[Vol. VI. containing Numbers I. to XII: July 1886 to June 1887.]

"Step after step the ladder is ascended."—GEORGE HERBERT, *Jacula Prudentum*.

THE TROPICAL AGRICULTURIST:

A

MONTHLY RECORD OF INFORMATION

FOR

PLANTERS

OF

Tea, Coffee, Cacao, Cinchona, Sugar, Rubber, Tobacco, Palms, Spices, Rice,

AND OTHER PRODUCTS,

SUITED FOR CULTIVATION IN THE TROPICS.

[ISSUED ON OR ABOUT THE 1ST OF EACH MONTH.]

COMPILED BY

A. M. & J. FERGUSON,

of the "Ceylon Observer," &c.

"It is both the duty and interest of every owner and cultivator of the soil to study the best means of rendering that soil subservient to his own and the general wants of the community; and he who introduces, beneficially, a new and useful *Seed*, *Plant*, or *Shrub* into his district, is a blessing and an honour to his country."—SIR J. SINCLAIR.

A. M. & J. FERGUSON: COLOMBO, CEYLON.

The "TROPICAL AGRICULTURIST" can be obtained from, or advertisements for it sent to, the following agents:—

London:—Messrs. TRÜBNER & Co., 57 & 59, Ludgate Hill; JOHN HADDON & Co., 3, Bouverie St., Fleet St.; GEO. STREET & Co., 30, Cornhill; F. ALGAR, 11 and 12, Clement's Lane, Lombard St.; BATES, HENDY & Co., 37, Walbrook; COWIE & Co., 17, Gresham St.; GORDON & GOTCH, St. Bride St., Ludgate Circus; CALRE, SON & PLATT, 85, Gracechurch St.; W. H. SMITH & Co., Strand; S. DEACON & Co., 150, Leadenhall St.; T. CHRISTY & Co., 155, Fenchurch St.; W. B. WHITTINGHAM & Co., 19, Gracechurch Street.—*Cambridge:* DIGBY & Co.—*Manchester:* PICKLES & BROWNE, 25, Cathedral Yard.—*Liverpool:* CHAS. BIRCHALL, 32, Castle Street.—*Glasgow:* W. & R. MACPHUN.—*Edinburgh:* W. & A. K. JOHNSTON.—*Dundee:* SINCLAIR & DAWSON, "The Corner."—*Aberdeen:* W. WESTLAND, 53, Nicholas Street.—*Paris:* AGENCE HAVAS.—*Madras:* ADDISON & Co. & HIGGINBOTHAM & Co.—*Nilgiri and Wynaad Districts:* A. PRIMROSE, Mercara, Coorg.—*Calcutta:* THACKER, SPINK & Co.—*Bombay:* THACKER & Co., LTD.—*Rangoon:* SOLOMON & Co.—*Pinang:* BLAZE, REIDEL & Co.—*Singapore:* J. LITTLE & Co.—*Batavia:* JOHN PRYCE & Co. and G. KOLFF & Co.—*Surabaya:* THOS. C. WILSON & Co.—*Samarang:* MANUAL & Co.—*Saigon:* FLEITH & LAPLACE.—*Hongkong:* KELLY & Co.—*Shanghai:* CHINA AND JAPAN TRADING COMPANY.—*Natal:* ROBINSON & VAUSE, Durban.—*Mauritius:* C. W. HALL, Port Louis.—*Melbourne, Sydney and Brisbane:* GORDON & GOTCH.—*Sydney:* WM. MADDOCK.—*Adelaide:* CAWTHORN & Co.—*Northern Queensland:* W. HOPKINS, Rockhampton.—*Perth, W. Australia:* STIRLING & SONS.—*New South Wales and Queensland:* JAMES INGLIS & Co.—*New Zealand:* COLONIAL NEWS AGENCY, Napier.—*Fiji:* ARTHUR STEPHENS.—*West Indies:* C. H. CALDERON, St. Thomas.—*Dominica:* "DOMINICA DIAL" OFFICE.—*British Guiana:* "ROYAL GAZETTE" OFFICE.—*Brazil, Rio de Janeiro:* LOMBAERTS & Co., 7, Rua dos Ourives; A. J. LAMOURBUX, "Rio News" Office.—*Central America:* JAMES BOYD, Panama.—*Guatemala:* W. J. FORSYTH.—*United States:* S. M. PETTINGILL & Co., 263, Broadway.

MDCCCLXXXVII.

PRINTED AT THE "CEYLON OBSERVER" PRESS: COLOMBO, CEYLON: 1887.

TO OUR READERS.

In closing the Sixth Volume of the "Tropical Agriculturist," we have but to repeat what we have said on similar previous occasions, in directing attention to the large amount of useful information afforded, and to the great variety of topics treated in our pages. From month to month, we have endeavoured to lay before our readers the latest results of practical experience and scientific teaching in all that concerns tropical agriculture; and our ambition has been to make this periodical not only indispensable to the planter, but of service to business men and capitalists, never forgetting that agriculture trenches upon every department of human knowledge, besides being the basis of personal and communal wealth.

While directing our attention chiefly to the products prominently mentioned on our title-page, we have never omitted to notice minor industries likely to fit in with tropical conditions; and our readers have an ample guarantee in the pages before them, that, in the future, no pains will be spared to bring together all available information both from the West and East, the same being examined in the light of the teachings of commonsense as well as of prolonged tropical experience in this, the leading Crown and Planting Colony of the British Empire.

The official Reports on the Royal Botanic and Economic Gardens in Ceylon are republished in full in the present volume, and throughout our pages will be found reviews of, and extracts from, the Reports of other Botanic Gardens situated in or near the tropics. We are ready to give copious extracts from, if not to reprint *in extenso*, the Reports of all other sub-tropical Public Botanic Gardens which may reach us. Most of these Reports we already receive and utilize as above-mentioned for the benefit of our planting readers.

A full and accurate Index affords the means of ready reference to every subject treated in this, the sixth volume, which we now place in our subscribers' hands, in full confidence that it will be received with an amount of approval, at least equal to that which has been so kindly extended to its predecessors.

We are convinced that no more suitable or useful gift can be made to the tropical planter or agriculturist, whether he be about to enter on his career, or with many years of experience behind him, than the half-dozen volumes of our periodical which we have now made available. They are full of information bearing on every department and relating to nearly every product within the scope of sub-tropical industry.

In conclusion, we have to tender our thanks to readers and contributors, and our wish that all friends may continue to write instructively and to read with approval; for then, indeed, must the "Tropical Agriculturist" continue to do well.

A. M. & J. FERGUSON.

Colombo: 7th June 1887.

INDEX.

A.

CEYLON AS A PLANTING FIELD OF ENTERPRIZE FOR YOUTH.

It is curious to note, how, during the course of a long connection with Ceylon, it has been found necessary at almost recurrent periods to vary the advice to be given to parents seeking a field in which their sons may commence life. "What shall we do with our boys?" is a question constantly heard in England from parents and guardians. Only a short time back, we were obliged to tell such that this colony presented no opening; that the market for young men was overstocked; and we had to instance to them the numerous cases of sad distress which were witnessed among us. We do not say that we should be altogether justified in changing the tone of that advice even now as regards those who may desire to select Ceylon solely with a view of obtaining employment. It will be some time yet, we fear, before the demand for young Europeans at a rate of pay commensurate with their wishes, and even needs, can render it desirable that any considerable influx of such men should be counselled. But there is another class for whom, perhaps, the condition of affairs in Ceylon and the prospects it opens out, will shortly offer a singularly eligible opportunity. We feel, therefore, that we may well direct the attention of parents in England to the opening this island is now developing for their sons, who may have the prospect before them of ultimately being able to invest capital.

Some years have passed since we were able to make a recommendation of such a character, and there is no doubt that instances of ill-success during the prevalence of the depression which has throughout those years characterized our planting industries have given this colony a bad name at home. Parents who some ten years back looked to a start in Ceylon as ensuring to their sons a prosperous future, have long ceased to regard the island in such a light, and have preferred to send them even to the distant farming lands of Manitoba and British Columbia rather than here. We have been so repeatedly appealed to for our opinion on the subject of this island as affording an opening for the start in life of British youth, and have for so long a time past deprecated its selection, that it is doubly a pleasure for us now to feel justified in improving the position in this respect that it has lately occupied.

We may feel confident, however, that the distrust we have above alluded to will not suddenly be removed. It has been engendered by conditions which have unfortunately been too long existent to justify any hope that it can be so: nor have we failed, when personal reference has been made, to insist on the desirability of further waiting before sending out young men with the object of future investment in Ceylon planting pursuits. A great responsibility necessarily rests upon those who tender advice upon which the life of a youth just entering upon manhood may be ultimately wrecked. We have felt this responsibility often weigh heavily upon ourselves, and have constantly refrained even when of late we had felt almost justified in endorsing the desire of many friends to send out young men to begin life as planters among us. That hesitation, we now feel assured, need no longer be felt. We are satisfied that the improvement in our planting prospects has every chance of being permanent and progressive, and under that impression we desire no longer to tell our friends in England to wait, but, on the contrary, to assure them that the present time affords opportunities for their sons, of which they will do well to avail themselves.

It is in a transition time, indeed, that such opportunities have a specially favourable character. One or two thousand pounds sterling judiciously invested within the next few years, will, we believe go as far as double the amount will do later on in the history of our tea-industry. We cannot and ought not to forget the lessons of the past, how land rose to a price at which, although it was eagerly bought, it could offer no prospect of remunerative cultivation. It was the eager, the almost insane, rush after land when selling at such rates that contributed greatly to intensify the distress which was afterwards experienced when bad seasons, and that fell enemy of our coffee trees, the leaf disease, afflicted us. We desire therefore never again to witness such a mania for speculation in land as we saw during the years 1872, on at intervals, to 1878. But we feel that if this is to be avoided, young men possessing capital must begin their career here before increasing scarcity of land brings about any chance of a recurrence of what took place during those years. A youth coming out now might well serve an apprenticeship to planting in all its branches including of course, tea preparation, for a term of say three years. The rule of thumb no longer applies to estate cultivation in Ceylon. It has become a science, one that requires to be studied before success can be hoped for. An aspirant for that success should, while learning the methods which alone can ensure it, make himself acquainted not alone with the routine of tea cultvation and preparation, but with those peculiarities of soil and situation, knowledge as to which can alone fit him to select judiciously for his operations where experience has prepared him to undertake them. With the reservation, therefore, that in all cases this preliminary training should be submitted to before investing, we feel that we can, with sincerity, recommend fathers and guardians once again to regard Ceylon favourably as affording the prospect of a successful career to English youths.

"THE CEYLON DIRECTORY AND HANDBOOK."

THE CHANGE IN THE COLONY IN EIGHT YEARS.

(Communicated.)

The Ceylon Directory for 1885-86 duly reached me, and I must really add my testimony to the many complimentary remarks on its usefulness, already published by you. In my library I have the guides and directories of almost all our colonies, but none of them can compare, in the smallest degree, with the Ceylon one, which is not only a Directory but contains a general outline of the history of the whole country and an immense amount of information of various other kinds. Comparing the present volume with that of 1876-78, which I brought home with me, when I left Ceylon, I find the new one larger and more complete, and in every way better, although, at the time the other one was published, I thought it could not be more complete than it was. In some respects the matter which is contained in the new directory, is not pleasant reading: for, on turning up the list of estates in the old district, in which I lived so long, I find several estates abandoned; one of the best ones, now in the hands of a native, has been abandoned to the extent of more than one-third of its acreage; and another, which, in my day, had over 200 acres of coffee, now only

returns a few acres of cardamoms; the group of estates which had the character of being the best in the district has dropped from 750 acres cultivated to 520, whilst one estate, which was considered a second-rate one in my time, has added 50 acres to its cultivated area, and as I was told the other day by one who ought to know, is far the most valuable estate in the district, thanks to good management. The ups and downs of these estates I suppose are on a par with those of other districts, and it is interesting to read the information and to try to account for the difference between then and now, whether bad management, short funds or worn-out soil has most to answer for. Although many old names are wiped out of the list of the estates, they are not singular in this respect, for on reference to the list of Colombo firms I find no less than twelve well-known and well-to-do ones have been withdrawn.

But these drawbacks do not appear to have interfered with domestic arrangements, for I find that the population of the island has gone up 300,000 and this in spite of a decrease of Tamil immigrants from 164,000 in 1876 to 45,000 in 1885. All the centres of population appear to be adding to the number of their inhabitants in a most marked manner, except poor Galle, which has dropped from 47,000 to 33,000.* Under the heading "Occupations of the People," I find only 2,719 returned as coffee-pickers, and yet, ten years ago, that number would have been attached to the mills of one firm alone in Colombo—but coffee was King then. In the class called "landed proprietors," there are entered 452 males and 1,525 females. This seems strange to me, but not more strange than the fact that, in the commercial class, there appears under "tavalam *men*," one *female*, and that there are 47 female barbers in the island. Woman suffrage will soon follow this, I fear!! Reading a dictionary or a Directory is supposed to be dry work—but, to any one, at all interested in Ceylon, the reading of the "Ceylon Handbook and Directory for 1885-86" will be not only agreeable, but entertaining and instructive.

COSMOPOLITE.

"THE CEYLON TEA PLANTER'S CATECHISM,"

Ought to be the title of the information collected under the auspices of the Maskeliya Planters' Association when the same is republished in a complete form with the questions and answers duly following each other. Today we find room for the very full summary sent us by special arrangement with the Sub-Committee through the Honorary Secretary, Mr. Welldon. We think that the thanks of their brother-planters not only in Maskeliya, but throughout the island have been earned by the Sub-Committee for the considerable amount of useful practical information brought together in a concise form in their summarizing Report. Could a better illustration be afforded of the untiring, almost insatiable craving of the Ceylon planter for "more light" in reference to every branch and detail of his profession? Here we have a body of men in one district,—and that not the largest or most important in the island,—and although they have had several gentlemen of experience to lecture before them, though they have had all the essays locally published and all the practical books, we and others have been able to introduce from India—from Money's prize essay to Dowling's "Notes"; from the Vade Mecum to Brace's papers in our Handbooks for 1874-5—yet, they are not content. They resolve to get at the diverse opinions of the men of most repute in different parts of the island, as cultivators and makers of tea. They form a Sub-Committee: draw up a series of questions: have the same printed and circulated; and the result does not disappoint them. The typical Ceylon planter is as ready to give as to receive information, and although the Maskeliya catechism was laughed at in some quarters, the result has fully justified the trouble taken, as our columns testify today. The names of the gentlemen who have furnished answers based on their own experience—apart from Mr. Barber's special report—afford ample guarantee for information of very considerable practical value, representing too a variety of districts at different elevations and with differing conditions. Now it is this spirit of enterprise and restless enquiry among our planters that have justly earned for Ceylon her high reputation in connection with the agricultural industries carried on within the island. There is nothing like it, at least in Northern India; and if so much has been done here almost at the very outset of the enterprise to examine, check, simplify and improve all the details of the cultivation and management of the tea-bush, and the preparation of the leaf, how much more may we not look for as time rolls on? In Tea Machinery alone, how much of invention and improvement is likely to be due to Ceylon planters. Full credit is given in the Report before us, as to the—in some respects—unequalled position attained by Jackson as a machinist, whether in his Rollers, Driers, or Sieves, and if this leading patentee succeeds with the Witherer he is now said to be busy on, at home, he will indeed have furnished a series of machines of unique importance in the Tea-planting world. But it is undoubtedly encouraging to learn how Ceylon planters and colonists are following hard on the men of many years of Indian experience: Barber's Roller is an illustration, though it is said to owe much, very much, to Thompson's "Challenge"; more local is Frater's Uva Roller *par excellence;* and now we have Kerr's improved roller, costing no more than R350; while just as we write we hear that under Davidson's and Law's patent, a very serviceable Roller nearly all in hard wood, jarrah perhaps—will be offered for as low as price as R250, guaranteed to do all that is required on a small garden and to give the utmost satisfaction in the quality of its work. What Fairweather and Megginson have done in the improvement of Withering arrangements is duly noticed; and there are several other suggestions both as regards appliances, and the several modes of plucking and manufacture which are certain to arrest attention and to be subjected to the test of experience, or to searching criticism.

One result mentioned is rather startling in the high amount named for the cost of erection and fitting up of a suitable Tea Factory, for a plantation of 200 acres, namely R12,000 to R15,000. This, however, is likely to be modified as time runs on. But what are we to say to the force of 300 coolies required to work 200 acres of tea? At this rate for the 150,000 acres likely to be under tea before 1886 closes, we shall have to provide a force of 225,000 coolies. Altogether therefore in Ceylon, over 300,000 labourers will be required on the plantations for tea, cacao, coffee, cinchona, &c. and even with all the assistance that Sinhalese may give, our draft on Southern India must be greatly increased. We have no doubt however, that it will meet with a full response in due season.

Altogether, it is very satisfactory to learn that the Maskeliya Sub-Committee arrive at the conclusion that careful planters under average cir-

* The limits of the town have been circumscribed. —ED.

cumstances as regards climate, soil, jat of tea, &c., in Ceylon, ought to turn out their tea at not more than 24 cents per lb. This is enough to warn our Indian and even China competitors of what they have to expect. "No more planting"—ought to be the cry in both Northern and Southern India—"until we are better able to judge what the 150,000 to 250,000 acres of tea in Ceylon are really going to do." But, whoever yet took warning after this fashion? Nevertheless, we may, with the Maskeliya Report before us, well believe that in the coming tea struggle, Ceylon will hold her own, and that if we are to see the "survival of the fittest," the position of our little island ought to be well in front.

TEA PREPARATION IN CEYLON.

RESULT OF ENQUIRY BY SUB-COMMITTEE OF MASKELIYA PLANTERS' ASSOCIATION.

ANSWERS TO QUESTIONS BY SOME 16 PRACTICAL PLANTERS.

PAPER BY MR. BARBER.

QUESTIONS ON TEA CULTIVATION.

We have seen the questions on tea manufacture sent out by the Maskeliya Planters' Association, and we would ask any of our readers who receive them to reply to them, as we feel that the answers of the 100 tea manufacturers to whom the questions have been sent, carefully collated, will be an extremely important addition to our information on tea, and will probably be a means of still further improving manufacture and raising the repute of Ceylon produce in the London Market. As the report will be published, each of those who reply will benefit by the information obtained from the replies of the others. So we hope no one will refuse to assist as far as he is able. Every effort has been made by the Committee to save those applied to trouble, even to supplying stamped directed wrappers for the return of the paper. It is by such means as this that District Associations really do good, and the Maskeliya Association has always been well to the front. These questions are a continuation of the work commenced by the Dimbula Association, and we hope the Dikoya Association will not be behind in this kind of work.

The questions are as follows:—

PLUCKING.

1.—Defining fine plucking—leaving the bud leaf and ¾ of the next leaf and plucking including the tip 2¾ leaves—and coarse plucking—leaving 1 proper leaf, ½ the second and ¾ of the next, *i.e.*, plucking including the tip 2¾ and a half leaf—which do you consider most trying to the tea tree?

2.—If by the latter method 500 lb. tea per acre was obtained, about how much per acre do you think could be obtained by the former—other circumstances being equal—and what would be probable difference per lb. in value of the tea made?

3.—Off old and young bushes should bangy below pruning level be plucked, should the flower be pulled off?

4.—How do you pluck first four rounds after pruning?—and do you pluck high class and inferior jat the same way?

5.—Do you use cutty sacks or baskets for pluckers?

WITHERING.

6.—Do you sift green leaf?—What kind of sifter do you use?

7.—Do you take off water from wet leaf before putting it out to wither?—and if so, how?

8.—Do you advise hard withering or if anything slightly under-withering?

9.—Is natural withering better than sun or artificial withering?—and of the latter which do you prefer?

10.—Is a draught of air and much light good for withering?

11.—What kind of withering tats are best?—For 1 lb leaf how much room is required?

ROLLING.

12.—What roller do you recommend for a small garden?—How many lb. withered leaf will it do per hour and how much at a fill?—what horsepower is required to drive it and what is cost?

13.—(Same question for large gardens.)

14.—Do you recommend hard or light rolling?—and your reasons?

15.—If hand-rolling what is task per cooly?—and do you prefer plain or grooved table?

16.—Do you sift rolled leaf?—when and through what sieve?

17.—Do you roll twice?—if so how long?—and hard or lightly?

FERMENTATION.

18.—What is best temperature for fermenting?—how do you ferment and how long? Do you encourage or by turning stop heating during fermentation?

19.—Does roll ferment or oxidize?—how do you account for change of color?

20.—Can you advise any plan to assist fermentation or mention anything that should be avoided?

21.—How can flavor or strength be increased?

FIRING.

22.—*Chulas*—Wood supply being near what is task of charcoal per diem from dry wood?—from green wood?

23.—To 1 lb. tea how much charcoal is used?

24.—What kind of chula do you use, and have you a grating?—do you replenish charcoal from an oven?

25.—To each tray how much roll is put and how long taken to fire off?

26.—Do you fire tea quite crisp or take off a little sooner?

27.—What effect has leaving tea in tray all night over embers?

28.—Before packing do you finaly fire?—and how? and do you bulk after or before this?—If by machine, at what temperature?

29.—*Firing Machines*—Which one do you prefer?—can you suggest any improvement?

30.—At what temperature do you fire?—How much roll to a tray and how much tea per hour?—how long do you take firing each tray?—what does fuel cost per lb. tea?

SIFTING.

31.—What sieves do you use?—How do you sift or what machine is best?—What grades of teas do you make?

COST OF WORKING.

32.—Where are tea requisites of best quality obtained cheapest?

33.—What machinery, what number of coolies are required for an estate of 200 acres giving 100 lb. tea per acre?

34.—What should be cost per lb. made tea on this estate thus distributed:—

Superintendence
Plucking
Manufacture—withering, firing, sifting
Packing (final for "boxes lead")
Transport to Colombo
Cultivation, weeding, pruning, manufacturing, field, &c.?

35.—What would be approximate cost of erecting factory and machinery for the above estate?

CULTIVATION.

36.—Would you use water-wheel, turbine or engine?—what is cost of fuel per lb. made tea for the last?

37.—For withering-shed should you put iron or wood roof?

38.—What effects have you seen from manuring, digging, burying prunings, and would you do it before or after pruning?

39.—What month do you prune?—or how do you prune?—and do you treat high-class and inferior jat the same?—do you prune whole estate at once or half at one time and the rest 6 months later?

GENERAL.

40.—Do you know any invention not generally used? that if used would save labor, such as utilizing coffee machinery for tea sifting, breaking, &c.,—and can you

suggest any method that will enable us to make better teas and get higher prices?

41.—Would you eradicate really bad jât plants and trees?

42.—What do you consider the best shape and material for a cheap external withering-shed or sheds? Will yield from inferior jât at high elevation be less than yield from high class jât.

From which can best tea be made.

ANSWERS.

Report of Sub-Committee of Maskeliya Planters' Association on Tea Manufacture.

The Sub-Committe have drawn up this Report from the replies of Messrs. Jas. Taylor, T. J. Grigg, W. Turing Mackenzie, J. Roydon Hughes, H. Deane, J. N. Campbell, T. Dickson, F. L. Clements, W. Cameron, W. Raffin, Giles F. Walker, W. B. Hope, A. Cantlay, T. W. B. Crowther, S. G. Tench, R. Webster and R. Maclure, and some which were unfortunately not signed. The Committee thank these gentlemen for replying to the questions and also Messrs. Blacklaw, Cantlay, J. Ferguson and Rutherford for assistanee rendered. The Sub-Committee regret that delay in the publication of their Report has in some respects lessened its value.

Questions 1-2. The definition of fine plucking given was not universally accepted. The Committee consider the majority of the replies sent in, advise that the method of fine plucking, as defined, should be adopted four or five months after pruning in order to get the highest return per acre combined with a good average price. The replies lead them to think fine plucking as defined by Mr. Taylor (an extract from whose reply is annexed) is decidedly more trying to the bush than medium plucking, as the shoots are removed before the bush benefits by them; the difference per acre in return is put at about 150 lb. per acre in favor of medium plucking the first year, later on perhaps more; the difference of price from 2d to 3d per lb. in favor of fine plucking, the cost of the latter system of plucking being much more expensive, perhaps double. All replies agree that before fine plucking can be safely adopted the bushes must have a good plucking surface and that on no account should it be commenced until the fourth or fifth month after pruning.

(Extract referred to.)

Question not intelligible.—If the bushes be allowed to get a good start after the pruning by leaving three or more leaves on all primary shoots, there is no apparent harm from finer plucking, that is, plucking the same leaves and leaving a leaf, the same as in coarser plucking, but doing it at an earlier stage of growth. Nevertheless it is reasonable to suppose that the finer plucking must be more exhausting to both tree and soil, yield being the same. There is practically no difference in quantity and the difference in value is fully ninepence per lb. in favor of the finer plucking which costs about twice as much for plucking or nearly so.

3. Bangy leaf below pruning level at the sides of young bushes should not be plucked, but where the bushes are old and cover the ground, this is not so important. It is not generally considered necessary to search for bangy in the centre of the tree below plucking level; a few replies however state that if bangy in the centre is plucked close during drought the yield when rain comes on will be greatly increased: to pull off seed and flower though beneficial is practically impossible.

4. After pruning it is advised that for three rounds 5 to 6 inches of primary shoots above pruning level should be left, or 3 full leaves, perhaps more after a heavy pruning; after third round all primary shoots may be plucked. On secondary shoots it is at first well to leave 2½ leaves including the bud leaf. Inferior jâts should be kept lower, some however say prune lower and pluck the same; the general opinion is that if thus carefully plucked after pruning, the bush will better stand hard plucking later on.

5. Baskets are unanimously recommended. For steep faces or when plucking new flush after pruning, cutty-sacks may be used with advantage if the leaf is continually turned out.

6. In a few cases leaf is sifted through ¾ inch mesh. The sieve can easily be attached to the waterwheel, and we are surprised it is not oftener done as it certainly improves the wither and fermentation and takes off some water from the leaf and bruises it very little.

7. By spreading wet leaf thick in the sun and turning it frequently or by continual turning without sun, water can be partially taken off.

8. Hard withering is almost unanimously advised. Mr. Taylor's remarks are:—"As hard as possible to allow the rolling to be properly done, so that no yellowish or unsquashed patches of leaf may be found in outturn from the tea-pot, and so that the depth of color in the liquor be not reduced. With under-withering, rolling will also be imperfect as the mass of leaf is too soft and slushy and slips about without the tissue being perfectly squashed; and depths of color of liquor will also in that way be reduced. Besides a lot of water must be evaporated from the leaf in withering or else juice will drop from the machine during rolling."

9. Natural withering is undoubtedly the best, but rather than keep leaf over till the second day it is advisable to utilize sun or artificial heat in moderation (*i.e.* Chula or Sirocco heat). At high elevations this is often absolutely necessary. Sun withering is preferable to artificial. The result of much heat in artificial withering is bad fermentation. It is advised by some that after sun or artificial withering, leaf should be allowed to cool before rolling. Artificial withering is apt to dry the leaf.

10. Plenty of air and light are necessary for withering purposes but whether the air should be damp or dry is disputed. The direct rays of the sun should always be excluded. The cold at high elevations retards withering. Mr. Taylor considers it a question whether light, except for the heat connected with it, is not a disadvantage.

11. Messrs. Fairweather's or Megginson's system of Tats is recommended: one pound of green leaf thin spread covers 6 sq. ft. Leaf withers best on boards.

12. For small gardens Jackson's hand-roller worked by power is highly recommended It takes 45 to 50 lb. withered leaf at a fill, rolls it in 40 minutes, requires 1 to 1½ horse power; costs R550 without power fittings. This refers to the old hand roller. In the new one there is no movement of the bottom tray and it is similar in action to Kerr's old roller which is also recommended in some papers. Jackson's Universal rolls 120 lb. withered leaf in 1 hour, in two fills; costs £85 stg f. o. b. in England; requires 2 horse power. For a large garden where there is plenty of power, Jackson's Excelsior is unanimously recommended. It takes 300 lb withered leaf at a fill, rolls it in 40 minutes, requires 4 horse power; price £138 stg. in Colombo. Barber's Blackstone rollers have the advantage of doing much work in a short time and require little power; there are two of them, the "Standard" takes 100 lb withered leaf at a fill, requires 20 minutes to complete the roll, which equals 300 lb withered leaf per hour; cost R900 in Colombo. Opinions on this subject expressed now will prob-

ably be obsolete in a few months as improvements and new inventions are announced, among which may be mentioned Kerr's new roller and Frater's. In none of the papers is the Challenge referred to, but we have heard it well spoken of. The price of all rolling machines is still exorbitant, but we hope competition will before long lead to considerable reduction.

14. Hard rolling and plenty of it, is generally recommended for giving strength and body to the tea, but not for appearance, which, however, is not so much considered at home at present. Hard-rolled tea will show little tip: for a hard roll a hard wither is necessary, and for a hard wither a hard roll is necessary. As the object of rolling is to break the sap cells of the leaf, the length and hardness of the roll depends to a certain extent upon the weather and the quality of the leaf. It is advisable not to put great pressure on at the commencement of the roll as it prevents an even twist, but weight should be added later on. For fancy teas light or hand rolling is preferable.

15. Task for handrolling is 35 to 40 lb. green leaf; a plain table is generally recommended.

16. Roll is generally sifted during fermentation through a No. 4; some prefer to sift immediately rolling is completed: some about one hour after; some at the end of the fermentation.

17. A second rolling of about 10 minutes or more, and a hard one is generally recommended; the time when this rolling is done varies as the above-mentioned sifting is always done first. Second rolling is said to improve the twist.

18. Fermentation is generally done by spreading the roll about 3 inches deep on a table, turning it every ½ hour, temperature 75 to 90. 1½ to 4½ hours seems to be the minimum and maximum time for leaving the ferment. In some cases baskets are used, and the roll is kept in a cool place. Turning the roll prevents it heating and gives an even ferment. The process is supposed by some to be oxidization: only a few replied to this question. In answer to No. 18, Mr. Taylor says:—"I do not think that temperature at least within range of climate here, has very much to do with it, though I think it has a little. My time is usually two-and-a-half hours, and three hours for first roll of the day, I spread loosely to ferment in flat trays about two or three inches deep for two hours, turning it at the end of one hour; at the end of two hours I put it into a deep basket, still loosely, to ferment the rest of the time. It gets a little warm during the process, but my turning of it is to let air get more evenly at it and to break small lumps."

20. It is considered advisable to avoid great heat during fermentation as it dries the roll, also cold draughts which blacken it. Roll should not be pressed down: free access to the atmosphere should be allowed and all balls very carefully broken up. Fermentation of fine leaf is quicker than that of coarse. A hard even wither followed by hard and long rolling of good leaf give a good fermentation. A damp cloth spread over the roll in dry weather is said to hasten the fermentation.

21. A few say that light rolling improves flavor at the expense of strength. Strength is obtained by fine plucking, hard withering and rolling. It is mentioned that tea from a new clearing gives stronger liquor than that from bushes on old land. Strength and flavour depend much on soil, the jât and the altitude, and brisk firing and as little exposure to the air as possible is recommended. Mr. Taylor deprecates long fermentation as he considers it a sign of deficient rolling, and states that for tea fermented for only one hour, he has obtained a 2s average, but he considers his present ferment better.

22-3. Average task for charcoal is 80 lb. or by contract 75 lb. From coffee stumps 60 lb. per cooly has been obtained. To one pound of tea, one to three lb. charcoal is used, according as rolls can be fired consecutively or not.

24. Chulas 2 ft. 5 in. wide at top, 13 in. at bottom, 2 ft. 6 in. or 3 ft. high are usual. Replenishing from oven optional: without gratings preferred. Brick is better material than stone for building them.

25. To each tray 3 to 4 lb. of roll is put which is fired in from 35 to 45 minutes; the former preferable. Roll is generally fired quite crisp, some take it a little sooner, some take it off when ¾ dry, empty contents of three trays into one, fire over milder fires or leave over the embers at night. Unless carefully watched coolies are inclined to leave too much to the dying embers to perform. Properly carried out this system tends however to ensure the drying being perfect and is said to develop aroma. The trays should be covered to keep out rats or anything falling on the tea. If roll is taken off before it is quite crisp, thorough final firing is required it not put over the embers as aforesaid.

28. Final firing by Sirocco or Victoria is done at 150 to 200° putting 5 to 6 lb. per tray. Final firing over chulas is done over slow fires, taking ¼ to ½ hour to each tray, 5 to 6 lb. per tray; firing before bulking is perhaps preferable to bulking before firing, as the latter is apt to falsify the bulking; but in the majority of instances the former system is adopted. A piece of cloth spread over the tray and under the tea is a safeguard against burning when chulas are used.

29. The Sirocco is certainly the firing machine generally preferred. Jackson's Venetian and Victoria are well spoken of. No. 3 Sirocco fires at 240 to 280° F., 11 to 14 lb. roll, 20 to 25 min. per tray, 55 to 65 lb. tea per hour. By using coffee stumps carried when knocking off work, cost of fuel has been reduced to less than 1-6th cent per lb. tea made. Jackson's Victoria at 280° F. has fired 240 lb. tea per hour, and cost of fuel for rolling, firing and sorting was about ¼ cent per lb. tea. No. 1 Sirocco at temperature 300° F. 4½ lb. per tray, has fired 35 lb. tea per hour, 18 min. per tray, cost of fuel 1-5th cent per lb. tea. Since this information was received great improvements have been made to the Sirocco.

31. Sifting by hand Nos. 14 or 12, 10 and 8 are used for 3 grades; 12 and 7 for 2 grades are recommended; dust being taken out through No. 30. Gore's Sifter with patent mesh for taking out flat leaf. No. 8 and 12 sieves have sifted over 200 lb. bulk per hour. Bailey & Thomson's Sifters and Jackson's Eureka are well spoken of.

33. Machinery required for 200-acre garden yielding 400 lb. tea per acre.—The following machinery advised:—

Jackson's Excelsior with hand Jackson in case of accidents; or

Barber's Big Roller with a Venetian Drier and improved T Sirocco; or

Two Improved T Siroccos, price each £95 f.o.b. Liverpool; or

A Victoria and No. 1 Sirocco, a Tea Sifter, a a Jonas' or Jackson's Cutter.

It is recommended to use the old pulper-sifter for a roll-sifter and attach green leaf sifter for the water-wheel.

300 coolies will be required for an estate as above described.

34. Cost of manufacture per lb. made tea including superintendence 5c; plucking 12c; manu-

facture 3c; packing 3c; transport 1c=24 cents per lb. in Colombo.

35. Approximate cost of machinery and factory for estate as above described is from R12,000 to R15,000.

36. Water-power is best where possible. Turbine is advised; a water-wheel being a less steady power and requiring more water; the former is, however, most likely to get out of order. Cost of fuel for engine per lb. tea is ¼ cent.

38. Digging is highly recommended. The effect of castor-cake manure in one case good; in another it did not improve the quality or price of tea. Cattle manure has undoubtedly shown good results; also burying green prunings and applying other bulky manure. In very dry weather it is advised not to manure; about a month or two before or during pruning are the times preferred. Manure increases strength.

39. Two papers advise pruning all the year round to keep the labour occupied and never to have a large lot of inferior tea all at once. A few recommend pruning half from June to Sept. and half from Nov. to Jan. The majority advise from June to Sept. and get over it as quick as possible. Indigenous and hybrid can be pruned the same; bad jât hybrid is pruned after the style of China or at any rate lower and more severely than good jât. Pruning at two seasons keeps labour employed. To prune or dig in very dry weather is not advisable.

40. To be careful in every detail is the only way to make good tea. Good soil and jât help greatly, and good leaf and hard withering and rolling are advised by all. In time the whole process may be done mechanically, and at any rate great improvements in machinery may be effected.

41. When a supply has been put in and has well started near a bad jât plant in young tea, take out the bad jât, but not before; as it is difficult to grow supplies. In old tea do the best possible with the bad jât.

42. An oblong wooden building of jungle timber, boarded floor, thatched or wooden roof with plenty of light and air make the best withering shed.

43-4. One paper says in a very wet climate a medium jât will flush better than a high jât, but the majority prefer the latter. The highest class hybrid and indigenous will not yield so well, and bad jât teas will yield 100 to 200 lb. per acre less and value per lb. will be 2d to 3d less. The appearance of the bush alters with soil. In bad soil no jât will appear good.

The Sub-Committee are of opinion the falling-off in the quality of tea complained of is not owing to any weakness or disease of the tea bush and must be sought for from other causes, perhaps the recent fall in price has caused this complaint to be exaggerated.

C. E. WELLDON, Honry. Secretary.

(Mr. Barber's paper.)

BLACKSTONE, 4th Jan. 1886.

1, 2, 4.—There is but one mode of plucking that can be safely recommended for the good of the bush, as for the quality of the tea to be manufactured: an entire leaf with the bud and stem attached to it, with the best part of the leaf below it, but without the stem attached—all taken at one nip. This can be done with safety at all times of the year; except soon after pruning, when the newly-grown shoots are being nipped. Calling these shoots primaries or primary shoots here for the sake of distinction, I will recommend that for the first four rounds or so, while still plucking the primaries, that they be nipped still more sparingly, a leaf with the bud and stem attached to it being all that should be taken; an entire leaf being thus left to develop at the end of the shoot, the next flush will be retarded somewhat, and the bush in the meantimes will mature, a condition to be observed if we aim at securing quality. At this early season of the year, instead of displaying an eagerness to fall with unsparing hands on the green stalks and leaves just shooting, and glutting our withering racks and machinery with vast quantities of insipid vegetable matter, which no art or skill can convert into good tea, as turned out later in the season,—if we exercise a little forbearance, and permit the bush to grow and gradually mature, taking meanwhile just enough to keep it in shape and form, we shall be speedily compensated for the apparent loss, with an ample yield of more matured leaf, without any very appreciable reduction of quantity in yield at the end, and we shall be the better enabled to maintain unimpaired the prestige we have won for quality in Ceylon.

3. Bangy leaves below pruning level should not be plucked, I think. A vigorous shoot is not commonly found ending in a bangy terminal, where the field is duly attended to, at the regular intervals. Twigs with unsufficient supply of sap are generally not worth attention. Flowers may with advantage be pulled off when flowering, and seeding are due to a change of season or inferiority of jât. Where however the cause is to be found in poverty of soil, something more than taking away the flowers will be found necessary to be done at once, viz., manuring. When due to age of bush a treatment more heroic will have to be prescribed, viz., the knife. In some instances trees badly planted with the tap-root bent or injured also speedily run into seed.

5. Cutty sacks for plucking should not be tolerated for a moment; their use would lead to the bruising, crushing and heating of the leaf in the field.

6. I do not sift green leaf; as I sift the green "roll" I am inclined to think that the pekoes would be less liable to be broken if rolled along with the souchong.

7. I do not remove water from wet leaves before spreading to wither. I do not say it should not be done.

8. I do not advocate either under-withering or hard-withering, though it may be safer to incline towards the latter than to the former. 30 to 35 per cent for wither is a sufficient average.

9. Natural withering is better than sun or artificial withering especially for flavour. Sunning is preferable to artificial withering.

10. Light and air are among the acknowledged agents in natural withering; a draught is no disadvantage if it does not blow away the leaf.

11. The withering tats I use are similar to Mr. Fairweather's, only a little more primitive in the details and perhaps a trifle less expensive. I believe his arrangement with the wire to guide the web a better plan than mine, but in principle they are much the same. For both serving and discharging they afford greater facilities than any other withering arrangements I know of, while they have the merit of being the least expensive at the same time.

12, 13. The "Blackstone" roller, of course; as for its merits—well! are they not chronicled in the columns of the local papers? I should wish to be spared discussing rollers in this paper under the circumstances.

14. When the souchong leaf has acquired the necessary twist for a marketable tea, and the juice is readily expressed on the roll being grasped by the hand, it is time to stop rolling. Hard and light rolling being relative terms may be differently understood according to the apprehension of different individuals, but if we go by the above tests anything under it would not ferment properly, while rolling beyond it would, to my mind, be barren of profitable results. The disadvantages would be the following:—Discoloration of tip, breaking of tip, risk of getting the coarse and unwithered leaf broken up and mixed with the broken pekoe; waste of time and energy; fuel where an engine is used, and water in the case of a water-wheel being used; extra wear and tear of machinery. Where, however, early plucking is resorted

to, that is to say, within the week, the mixing up of the grades would not matter much, as the souchong itself will command an extreme price; so that we should not be in a hurry to jump to conclusions and generalize from the success of one or two estates. Among the believers in hard-rolling there are some I am aware, whose opinions are entitled to great weight. It is nevertheless, a creed that cannot be followed by one and all, indiscriminately.

15. Forty lb: is a good task for hand-rolling; a plain table is preferable to a grooved table. Rolling being a process of gradual compression and bruising combined, there should be no endeavour to hasten the progress of work by corrugating or flirting the table; as it may result in the tea getting broken up, before getting flaccid enough to be rolled, especially when found underwithered, during the wet season. The table should be not only flat but sufficiently high to prevent too much weight being put on the leaf during the process at the start.

16. I sift about 40 to 45 per cent of pekoe out of "roll" after fermentation by means of a simple sifter with No. 3. Sieve, designed by me and manufactured by Messrs. McIlwraith Walker & Sons, at a cost of R80. It takes two minutes, driven by power, to work off a 100 lb. roll. It is not patented and may be had from Messrs. W. H. Davies & Co., Colombo.

17. I re-roll for about three or four minutes, the souchong only just before firing.

18. Fermentation should be carried out in a cool room not exposed to the wind; especially the dry N. E. wind. It is a good plan to turn the "roll" over occasionally. I do not encourage heating during fermentation; on the contrary I check it. The roll is spread about two inches thick on tables for about three hours. If leaf be found to overfermented, and cannot be fired off speedily for want of chulas or *firing* machinery, adequate to the demand at the moment, the leaf should be thinned out at once.

19. Whether oxidation or fermentation be the correct word to be used for the purpose of expressing the chemical change the roll has to undergo before firing, can hardly be said to be of any practical use to us without being prepared to carry the investigation further with the assistance of scientific men. As fermentation includes oxidation I see no reason why we should change this now familiar word into one less comprehensive and probably less applicable. The first chemical change that the bruised leaf undergoes when exposed to the action of the air at a certain temperature is oxidation. We cannot say we stop at this, before the leaf undergoes fermentation. Fermentation, according to M. Pasteur, is said to be essentially the life history of certain microbes, the germs of which are to be found in the air everywhere and always. According to the suitability of any organic matter for the development of any particular variety of these microbes, a particular kind of fermentation will result. There are, it is said, innumerable species of microbes each of which starts its characteristic fermentation. It exists for a while, during which it produces a certain chemical change, by which the organic matter is rendered fit for the growth and development of another species, which in turn gives place to a succeeding variety, and so on, till all fermentation ceases. What we have now to ascertain with the aid of science, is what that particular stage or kind of fermentation is which conduces most to the development of the qualities we desiderate in tea. It is possible, I believe, for a competent chemist both to define this particular stage and to help the planter with simple means by which to ascertain the right fermentation since every kind of fermentation (every stage according to advocates of this theory) can be ascertained by means of chemical tests and the microscope.

20. Heaping up leaf.—Putting roll thickly in baskets, appears to help fermentation. But the safest mode, I think, is to spread on tables.

21. Flavour to begin with, is due distinctly to altitude; care in the details of manufacture, a good wither and full fermentation will secure flavour, as far as it can go on any given estate. But strength is a matter outside the factory. I have said before, the art of good tea making begins in the field. I do not believe that we can obtain more strength from tea leaves, by passing them through "rollers" and firing machines than there is to be found chemically in the leaf itself; briefly we cannot get more out of a roller than we put into it. But we can get far less, by neglecting the cardinal rules of tea-making. It is by careful selection of our jât of tea, attention to the soil, a rational mode of pruning, maturing our bushes, and regular plucking, instead of waiting till the leaves get bangy, that we should hope to secure strength. The student who pursues his investigations exclusively in the factory is apt to gradually nurse himself into the pleasant delusion that good tea like good wine needs no bush.

I pass over questions intended for those who use "chulas."

28. Before packing I first bulk and then re-fire at a thermal heat, not exceeding 180 for Broken Pekoe, 200 for Pekoe and 240° for Souchong.

29. I have no fault to find with the Sirocco. I think it can hold its own a good while yet.

30. In firing I keep to the instructions.

31. The sieves I use are 14 and 10 for Broken Pekoe, that is 10 for Broken Pekoe out of "dhool-ghoorie" (the 40 per cent sifted out from "roll") and 14 for Broken Pekoe left in the bulk. No. 9 for Pekoe, and Nos. 7 and 6 for breaking and sifting Souchong.

38. Manuring has a marvellous effect on tea.

39. I prune at both monsoons to find work for the coolies all the year round.

40. I have answered this already partly.

41. I cannot recommend the eradication of bad jât plants and bushes now; as if followed, it may lead to the denuding of much of the present planted area of Ceylon. The result may prove disastrous to the prosperity of the colony.

42. For external withering sheds I would recommend the use of round timber "jungle sticks" and shingled roof with jute nailed on the sides to keep off the wind. I have two such here. Hundred feet by twelve or fourteen is a good size, with jute stretched on either side on rollers and laths. Ten lengths of jute on each side giving 4,500 square feet of withering area or a total of 9,000 square feet for the room. Such a building should cost no more than R150. Boarding the floor of same R112; rollers and laths for the jute R30. The total, exclusive of jute, within R300.

J. H. BARBER.

"W. M. L." ON COFFEE IN THE PAST AND TEA IN THE PRESENT IN CEYLON.

LONDON, April 30th, 1886.

Many of those who have lost their money in the struggle to keep the coffee plant going in Ceylon must have read with deep interest, perhaps even with a melancholy satisfaction, the account given in your columns by Mr. Blacklaw of the dying out of the once flourishing coffee estates in Rio districts. The similarity of the fate of these coffee districts to that of the estates of Ceylon, though apparently without the intervention of that arch dsetroyer, Hemileia Vastatrix, raises the question, (one now purely of speculative interest to the Ceylon planters) how long even under the most favourable circumstances could coffee cultivation in extended areas as practised in Brazil, Ceylon and Java be expected to flourish?

Strange it is that this question, twenty years ago of most vital practical importance to all engaged in the cultivation of coffee in Ceylon, should even at that date have received little or no attention. The coffee estates had so far borne regular crops, were still bearing them, and "next year" almost invariably was promising a bumper.

What more could hopeful man require? Why seek to peer into the certainly uncertain future?

Between the years of 1860 and 1870 one word of warning, and one only, came to the ears of the writer. It came from one who had never seen Ceylon, from a gentleman in London of very wide experience and learning, noted both in financial and philosophical circles. His son was proposing to join a flourishing Ceylon business. But the father put an unhesitating veto on the proposal on the ground of the uncertainty of the future of coffee cultivation.

Now on what grounds had this gentleman, so early as 1866, formed so strong an opinion as to the probable doom of Ceylon coffee that on his faith therein he should be guided as to his son's career?

Can you, sir, from the fulness of your stores of information in regard to the history of the coffee plant and its cultivation, say on what grounds such an opinion may have been formed at the date named? and how it came that in spite of such causes of mistrust the feeling in Ceylon was then and continued for some years later one of serene confidence in the future.*

It was not till about 1871 that the first cries of warning were heard within the household of Ceylon itself. About that date Dr. Thwaites of Peradeniya made public his fears that Hemileia Vastatrix would in time be the death of the coffee enterprise, and among planters about the same date Mr. William Mackenzie stepped forward as the prophet of the doom to come. Almost with tears in his eyes he confided to the writer the depth of his fears, especially as to all coffee north of Kandy. We were inclined to laugh at the time, but the sad truth has even exceeded in its misery these first gloomy forebodings of evils.

As has been said above, the question of the permanence of *coffee* is for Ceylon now only of speculative interest. All practical interest, for the future centres in *tea*. How lies the matter with that plant? Are there instances in history of large contiguous areas being planted with the shrub, to such an extent as will surely soon be the case in Ceylon? and if so, how long did the cultivation flourish? One naturally turns to China for a reply, but it must be remembered that, in regard to consoling information derived from that empire if such be forthcoming, the plant grown there differs much in habit and in hardihood from the Assam plant grown in Ceylon. Whether any reliable data as to the permanence of the Assam plant are to be obtained except from the Indian estates the writer knows not. He only ventures to bring this matter forward as subject for inquiry that may prove useful in guiding future operations in the direction of extending tea cultivation in Ceylon.

A matter of more immediate and present importance to the tea planters is the course of prices in Mincing Lane. It is pretty clear that the high prices ruling for the good Ceylon teas last year are, like high prices for so many other kinds of goods, a thing of the past. The net result of the praiseworthy efforts of Ceylon planters will be, as was foreseen, that the British consumer will at the same price as before, if not at a lower one, drink a much better tea than he has been accustomed to drink.

The fall in the better classes of tea has been very great during the last three months, and it is difficult to see how, as the weight of good tea from Ceylon rapidly increases (as needs it must), the continuance of the fall is to be arrested.

Within a few days the great Exhibition of the year will be opened in great pomp by Her Majesty —a recent visit showed something like a state of chaos in the Ceylon Court. But there were many willing hands at work, Messrs. Saunders and Davidson with several native attendants, Dr. Trimen, Mr. Smither, Messrs. Shand and Whitham, all under the command of Mr. Commissioner Birch, and no doubt by the 4th proximo, some sort of order will have been evolved.

The Kandy Tea House is approaching completion, and will no doubt be very pretty. Unfortunately it stands crouched between much higher buildings, and its goodly proportions will be dwarfed by those of its great ugly neighbours. After the opening it will be more easy to speak of the merits of the various exhibits from Ceylon.

The Government of India has spared no effort and no expense to make a grand Show, and with the vast resources at its command, it can hardly be but that poor little Ceylon, India's neighbour at Kensington as in the East, will be in some sort eclipsed. It may be hoped, however, that in the economical products Ceylon may, in spite of all, hold her own.

CEYLON UPCOUNTRY PLANTING REPORT.

CROTON OIL TREES AS A CATTLE FENCE—THE FUTURE OF COFFEE—KERR'S ROLLERS.

May 24th, 1886.

Yet another use for the CROTON. A man tells me that he has discovered that it is a perfect fence, once it is grown up and bearing, for all kinds of wandering cattle. They take kindly to eating the seed, and when they once do that, they never come back again! For years he has been worried with trespassing buffaloes; has tried both mild and drastic measures with the view to mitigate the evil, and had given up all hope of any really effectual relief until he saw a buffalo stiff on its back, and some of his seed-bearing croton plants pretty well eaten into. He calculates that that dead buffalo with its hoofs turned up to the sky had been browsing thereon. The owner of the brute mourns over it a great deal more than the planter does. To have crotons growing about anywhere within the reach of cattle or horses is rather dangerous. I know of a planter who lost his horse, by its eating a mouthful of croton seed, which it snatched off a tree in passing. It made the misfortune all the worse to bear that he had sold the horse, and the animal was to have left the estate that day for its new owner.

As to Coffee, I see, that the black-bug is again appearing on it, and this too on the best trees which had been left with the hope of getting a little therefrom. Ah! it's a heart-break. I like your cheery cry, Mr. Editor, that those who keep up their coffee will in due time be rewarded! Yet I know of some coffee which has been pampered and petted, treated in season and out of season in the most handsome manner, and *that* almost up till now, and when you look at the results,—well, you want a lot of faith to believe in that bright future. I suppose we will be trying to grow it by-and-bye as an ornamental shrub, a sort of thing to point out to a visitor from home, a plant with a history.

* 1886 was the black year of Overend-Gurney's downfall and Ceylon suffered terribly in the re-action, money being so scarce that it was said scarcely £1,000 could be raised in the Fort of Colombo on the best estate security at that time available. There was also a great outcry then about the heavy rate of expenditure on estates. The only other possible reason we could suggest is that the philosophic-financier had formed a well-grounded objection to a colony dependent on one staple, and to the turning of the Ceylon forests into fields with one product.—ED.

I hear rather good accounts of Kerr's Rollers. The hitch in the manufacture has been got over and the difficulties which until lately existed in getting a machine have been altogether removed. The price too is moderate (R350) and in the hands of the new manufacturers there should be no delay in placing them on the market. A rival engineer who saw one lately had only one fault to find with them—they were too cheap. That, as I take it, is not likely to prove a fault in the eyes of intending purchasers, and if that really be the only objection, I should say that Mr. Kerr has a chance before him of making up in some measure for the worry he had in connection with his first roller. I understand that a charge of 100 lb. of withered leaf can be rolled off by coolies in 40 to 50 minutes or by water-wheel in half-an-hour.

PEPPERCORN.

NEW MARKETS FOR CEYLON TEA.

What Mr. Rutherford mentions in his letter (page 18) about "Rings" in New York buying up Indian teas and reshipping them to sell in London at a profit, was experienced also in the more distant Melbourne market to the natural disgust of the Calcutta Syndicate. We quite agree that the best means of checkmating such operations on the part of "Rings" or merchants opposed to a change in the present course of trade, would be to get at the country retailers or the consumers and to show them how they can obtain equally cheap teas of far better quality than the "posts and rail" stuff now seen in "the bush" in Australia, or the adulterated green teas of Japan chiefly used in America. Mr. C. M. Henry who knows a good deal about the tea business in Victoria, shewed very clearly in the letter we published in our issue of the 25th inst. how this can best be done in the Southern Colonies. If a Tea Syndicate can be formed under the auspices of the Ceylon Planters' Association, and a reliable as well as smart man of business acquainted with the Australian tea trade employed to travel through the Colonies—the country towns especially—no doubt a considerable impression would be made, and a new demand created for wholesome good tea. Perhaps this work could best be done in conjunction with the Calcutta Syndicate and their Melbourne Agents, and as to this the Planters' Association will do well to inquire. We call attention to what our Tasmanian correspondent has to say today about small boxes.

In reference to the United States and Canada, we feel sure that no better means of checking and overcoming the opposition can be found than through the employment of Mr. J. L. Shand as lecturer and reporter. America is the country of "Rings" *par excellence*. The latest development is that which renders cattle-raising in the far West unprofitable, because all the Chicago "beef buyers" have established a "Ring" not to compete with each other for the cattle sent for sale there. New York is especially the head and centre of the trade in Japan and China teas. All are distributed from that trading capital, save what San Francisco gets by sea to distribute through California and along the North Pacific Coast. Now to defeat the New York "Ring," we must get at the tea-retailers in the surrounding States and their distributing towns, and not only at the retailers, but at the heads of families and we know of no better means of reaching the American intelligence than by lectures such as Mr. Shand could so well arrange for and deliver. Mr. Rutherford is right in referring the organisation of this matter as a duty incumbent on the Planters' Association and we hope that an early opportunity will be taken of considering it. We found the greatest possible interest taken in Toronto in our Ceylon tea industry and Alderman Lobb of that city—a leading resident—was prepared to become agent for Ceylon teas and to do his best to promote their acceptance and consumption throughout the Dominion. At that time (April 1884) the tea market in London was too good—and the Ceylon supply too limited—to make "new markets" an object of much practical interest. The case now is rather different and just as we lectured in Toronto with the result of interesting a circle of well-known citizens there, so should we like to see Mr. J. L. Shand discoursing on the merits of Ceylon teas (with, if possible, practical illustrations for matter-of-fact householders and housewives) in the towns of New England and at any rate the Northern division of the Central and Western States. It is perhaps too much to expect that the people of the Southern States from New Orleans to St. Louis and from Richmond to Kansas should give up their favorite coffee. But among the numerous town and agricultural population, West and North of Washington, New York and Boston, we feel confident that there is the grandest opening for the introduction of the wholesome, superior teas of India and Ceylon that can be found anywhere on the world's surface. The entire population of Australasia is not equal to that of one of the rising American States, and moreover, the surplus population of Europe keeps pouring into the region we refer to, going to swell the host of coffee drinkers although many of them have been accustomed in the (still) United Kingdom to drink nothing but tea. We travelled across from Yokohama to San Francisco, with a gentleman who was pointed out to be the largest buyer (and best judge of) Japan teas for the American market, and he freely confessed to the artificial facing and adulteration of their green teas, saying tea-drinkers would have them so prepared to their taste. But there is a vast proportion of the people who have no such taste and who therefore do not drink tea at all in America, because they cannot get that quality to which they have been accustomed in Ireland, England and Scotland. With such Mr. Shand should find little difficulty in persuading them to become not only drinkers but upholders of the good qualities of our teas, so soon as they learned where they were to be obtained; and so by degrees we should have also the bad taste for the adulterated green teas of Japan superseded even among native-born Americans.

THE TESTING OF KEROSENE OIL.

A correspondent writes:—"Having heard of kerosene lamps exploding in tea houses and also that there is a tremendous amount of bad oil being sold, I write to enquire if Government tests all the oils that arrive, and if so whether by the open or close test. I send you a little information on the subject as unhappily very little is known about it. In Ceylon, it seems, kerosene or refined petroleum is the principal product of the distillation of petroleum, crude American yielding 50 to 70 per cent of its weight. A similar product is obtained from bituminous shale in the south of Scotland. Good lamp oil should have a tolerably high boiling point, being neither too viscous nor too volatile. In addition to the density, the temperature at which kerosene commences to give off

inflammable vapour is important and was made the standard of test in both the Petroleum Acts of 1871 and 1879 and was called the oil flashing point. The 1871 act adopted the open test which was found inaccurate, while the 1879 Act describes the close test so minutely that it is practical and workable.

"Cold kerosene oil of good quality will not take fire when a light is applied nor will the superincumbent vapour inflame. The flashing point by the 1871 Act was limited to not less than 100° F. whereas the 1879 Act shows and has fixed it at not less than 73° F. D. 22.7 C. Now the burning point may be 10° or 20° higher and the two must not be confounded, as oils when spilled will ignite instantly on the approach of a flame when heated a degree or two above their flashing point. Now experiment shows that an oil flashing at 86° by open test and burning at 107° can be made to flash at 100° by removing 6 to 7 per cent by distillation, on the other hand a small admixture of Naphtha will reduce them greatly. *Water-white oil* is the best brand I know of, it has a flashing point of 140° F. and over, accompanied by a low specific gravity. The partial exhaustion of the U. S. supply has necessitated a larger use of Canadian oil, which is heavier, hence the greater density of that recently imported. The heavier and more viscous oils require a more loosely woven wick for their satisfactory consumption. The N. Y. Produce Exchange has adopted the test and limit as described in Act of 1879 for export oil test to England."

IN SEARCH OF A HOME IN TASMANIA.

(*By "Old Colonist," F. R. C. I.*)

THE FRUITFUL DISTRICT OF FRANKLIN—THE GRAND HUON ROAD—GREAT EUCALYPTS AND PINES—A COACH AND FIVE SPANKERS—THE LAND AND THE PEOPLE—FRANKLIN TOWNSHIP—IN THE FIELDS: THE ODOUR OF OLD FAVORITES—ORCHARDS AT £100 PER ACRE—A JAM FACTORY—THE FIRST SHIPMENT OF CEYLON TEA TO HOBART.

"Whatever fruits in different climes are found,
That proudly rise, or humbly court the ground;
Whatever blooms in torrid tracts appear,
Whose bright succession decks the varied year;
Whatever sweets salute the Northern sky
With vernal lives that blossom but to die:—
These here disporting own the kindred soil,
Nor ask luxuriance from the planter's toil."

No one is supposed to have seen Tasmania who has not visited the fruitful district of Franklin. One might as well talk of having seen Ceylon without having done Dimbula. Franklin—named after the celebrated Sir John—lies S. W. from Hobart, 60 miles by water or 30 by land, and is famous for its fruits and valuable forests. The climate is decidedly damp, the yearly rainfall being 39 inches against 19 at the Botanical Gardens, Hobart. The soil as a rule is very good, but the lay of the land being rugged and rocky, it is reckoned unfit for general agriculture. Admirably adapted for fruit-growing however, and as yet, free from codlin moth.

The magnificent road leading to Franklin—for the Huon—is one of the chief lions of the south-side of the island. "Have you seen the Huon Road?" is the usual query put to the new-comer by fair Hobartina, when she makes her formal call. A certain element of danger seems necessary to give zest to the enjoyment of travelling. The Huon Road has not so many awkward zig-zags as the old Ramboda Pass, but more break-neck gullies, and pleasant surprizes in the shape of lovely peeps by the wayside. A rattling good coach leaves Hobart every morning drawn by five spanking horses. Mr. Froude, in his "Oceana" expresses his disappointment with Melbourne horses, thinks them decidedly "a scratch lot" and surmises that the best may be away in Hobart with their owners during the hot season. But the fact is, it takes the eye a little time to become accustomed to the Australian horse: he is less compact and graceful than the English or Arab horse, but has many good qualities, and there can be no question that the gum-sucker is an admirable whip. Talk of horses and you at once rouse the dormant enthusiasm of young Tasmania, and rise in his estimation. To thoroughly enjoy a ride like this, one would certainly require a driver in whom they could place implicit confidence. The first few miles of the road are well-known to all who have done Mount Wellington, and is daily being traversed by picnic parties, whose destination may be the fern tree bowers. A charming view of Hobart and the Derwent is obtained as we ascend the hill. On the right, some hundred feet below, is the romantic cascade hollow, in which is pointed out that excellent institution "The Training School" for boys, so admirably managed by Mr. Longmore an indefatigable young Aberdonian, and born manager of boys. A little further up the hollow is the Cascade Brewery, an institution which if less admirable, is probably quite as much appreciated. We soon arrive at the finger-post pointing towards Wellington's pinnacle, and pass in succession fern-tree bower, and fern-tree inn, and onwards we go at the rate of 9 or 10 miles an hour, now holding in our breath as the horses turn the awkwardly acute angles, and cannot help thinking how a little bridging would have saved much road-making, and the nerves of many an old gent. These deep dark gullies are no doubt very pretty, and very interesting, but I doubt if the best way to enjoy them is riding in a coach and five and, I confess, I breathe much more freely when we get upon a tolerably straight bit of road, from whence we can have peeps of the distant channels. A fine view of Adventure Bay (where Cook landed) is to be had from here.

The little clearings themselves are not encouraging examples of the petit culture. Fruit, potatoes and grain are grown in a half-hearted sort of way, amongst the dead gum trees, which like gaunt skeletons extend their bleached arms from a height of 250 feet and upwards; their colossal trunks measuring from 50 to 80 feet round. What pigmies men look while perched on a scaffold ringing one of these gigantic denizens! The *Eucalytus amygdalina* may indeed be allowed to rank amongst the largest trees in the world: the celebrated Lady Franklin's tree is 107 feet in circumference at four feet from the ground, and other trees are pointed out with boles capable of holding a party of 15 or 20, and Sir John is remembered to have once attended service held in the bole of one of those trees! The most valuable tree, however, in this part of the world is the Huon pine, *Dacrydium Franklini*, which is restricted to this island, and most abundant in this locality. An extensive trade is now carried on in this fine wood, used for boat-building, house furniture, and anything for which oak is used in England; it is very durable, and in the hands of the cabinet-maker takes on a beautiful polish. I am afraid to trust myself to express exactly what I think of the unmitigated vandalism which destroys those fine trees for the purpose of dibbling a few potatoes or scratching in a few grains of oat-seed; and yet the poor immigrant—driven back from the agricultural land—is not to blame, but no language is strong enough or gibbeting bad enough for the men who have idiotically

bartered away the millions of acres of purely agricultural land in this island. For the vulgar cry in England of restoring the land to the people, I have no sympathy. Landed, or any other property honestly acquired, must be respected, but to speak of '*confiscation*' as applied to the recovery of the agricultural lands of Tasmania is a contemptible misuse of language. The shady transactions by which these lands were alienated will not bear light, and the sooner light is brought forcibly to bear upon them the better. A thousand pities that a valuable island like this was not retained as a Crown Colony, or united to Victoria until able to walk circumspectly alone.

Near the 24th mile-post from Hobart we reach the Huon,—a dark and dismal-looking water, crossed here by a fine bridge, at one end of which is a good hospitable little hotel, and here roads branch off to Port Cygnet on the one hand, and up the riverside to Victoria on the other. A pleasant drive of seven miles more brings us to Franklin, the principal township of the locality, situated on the banks of the black sluggish river. Franklin is by no means a cheerful spot, showing but few signs of life, and, like too many other townships of Tasmania, seems to have begun to decay ere it reached a tithe of the dimensions anticipated by the sanguine surveyor who traced its stately streets on paper. There are two comfortable hotels—where much hospitality is received at very little cost—which is more than one can say at most places, two unattractive little churches, two miscellaneous (very) stores where haberdashery and honey, silk sashes and soft soap, gold bracelets and galvanized iron barrows may be bought at the same counter; but the general aspect of the place is not inviting, and I am soon fain to seek the suburb of the village in hopes of finding something more attractive, nor was I disappointed. The climb up a rough lane was both exhilarating and inspiring. Surprised and delighted, I was too, to see so many of the Old World favourites growing wild around me. The air was laden with the scent of white clover; soon it changed, for the white gown-like flowers on which I trod, were nothing else than *camomile*, (the veritable *camowyne* o' my dear auld mither); and yonder feathery bush is *Southernwood*, to be sure; *lost Mercy*, too, like dockens, and mint, horehound, thyme and marjoram, all wasting their fragrance on this desert air; while the bells o' bonnie blue, deck the dykes and the whins and sweet briar still struggle for the mastery:—

> "And golden rods, and tansy running high,
> That o'er the pale top smiles on passer-by;
> Flowers in my time, that everyone would praise
> Though thrown, like weeds, from gardens now-a-days."

All this is very delightful and unexpected. It is only when I come to the more prosaic orchard that my feelings of dismay and disappointment return. Coffee in its darkest days was never so rudely treated as these poor fruit trees, which seem so willing to do their best, and yet few things more amuse me than the conceit of the crude cultivators. The cooly used to say: "Tamil teriyadu oonum teriyadu," meaning, I daresay, that the man who knows not Tamil, knows nothing. The Tasman is equally decided in his opinion that the new-comer must necessarily be an ignoramus. Armed with an introduction to an orchardist who had advertised his garden for sale, I proceeded at once to critically inspect his property, but it was easy to see that if I did not overvalue his practical cultivation, he did not overestimate my experience; if I made awkward allusions to surface weeds, grass, yellow leaves, dead tips and fallen apples, he was ready to overawe me with dissertations on the mysteries of budding and grafting; and while I attempted to make commonplace remarks on the hopeless state of the strawberry beds, or jungle of rasps and brambles, he spoke eloquently of the delicious flavour, and the tons per acre, "them paddocks" produced. But to business, "What is your lowest figure for cash down?" "£100 per acre" "£100! Why I could buy virgin forest for £2 per acre." "Yes and it would cost you £90 to clear out them stones and roots." But I do not consider it necessary to clear out stones and roots for the purpose of fruit growing. A look of withering scorn was the reply to this, enough to daunt the boldest V. A. and no further attempt at business was made, though—as I have often said of the Ceylon planter of 1873-4—it would be very interesting to ascertain upon what basis he framed his valuation.

I observe that in most cases the cultivation of small fruits is being abandoned here, the price (3s 1d per lb.) realised at the Jam Factory being insufficient to pay for the gathering; the great staple being now apples, the crops of which are quite as heavy as in the best parts of the Derwent Valley, and as yet they are free from the codlin moth, which the orchardists confidently attribute to their wet climate; but as I have seen the ruinous effects of this pest in districts of the island where the rainfall exceeds even that of Franklin, I hope there is something else to account for this immunity.

Being now in the neighbourhood of what is stated to be the principal Jam Factory of Tasmania I had a desire to inspect the establishment. "You need not trouble yourself," said my friend the apple planter, "strangers are not admitted," and on knocking at the gates the manager frankly told me "it was against their rules." However, after eyeing me from head to foot, and satisfying himself I did not look like one of those newspaper-writing-fellows, he admitted me. I feel now almost sorry he did, for I do not like to seem ungrateful or to betray confidence, but one has a duty towards their neighbours at large, and *Jam* is a very important article on the breakfast table of the Anglo-Indian. *I am not* satisfied with this Jam Factory. To speak plainly, it is no factory at all. Merely a *receiving house*, and a very dirty one. The immense quantities of small fruit smell like a pulp heap, as they are pitched into large casks, and the only curing they got here, is a bit of burning brimstone, the fumes of which are blown into the bung hole! This may for a time effectually prevent decomposition or the growth of fungi, and if anyone thinks that it sufficiently preserves the colour, flavour, and wholesomeness of the fruit, he is at liberty to do so. In this state it is shipped to Melbourne in order to save the heavy protection duties imposed by our big sister, and best customer, Victoria. In Melbourne, the mess is boiled with sundry additions, duly labelled and sent out to the world as "*Finest Tasmanian Jam:*" *Try it*,—and compare with Moir or Keillor. I have no object in advertising either, but the comparison may be interesting as showing the difference between *Free Trade Jam* and *Reciprocity Jam*.

THE FIRST SHIPMENT OF CEYLON TEA reached Hobart a fortnight ago and has all been sold at 1s 3d (in bond). There is no mark on the chests, not even the weight, and the quality is rather a dusty P. S. though it liquors better than the atrocious stuff in common use here, which reminds one of *ship* or Waverley Hotel tea. If the people here excel in anything it is in tea drinking! I have never seen anything approaching to it. It's tea to breakfast, dinner and supper. Tea when

you call at any hour of the day or night and when friends take a walk for a couple of miles or so, they almost invariably carry the everlasting tea-kettle. I should think 10 lb. per caput per annum would scarcely suffice here. The Chinese have the trade simply because they take the trouble to get the tea up in nice little boxes to suit the market. The Ceylon chests were all said to be 95 lb. though really 92 was the weight of the one I purchased. Few families care to take 90 lb. at once and to break up and divide, costs money. Mind you, labour is labour in a colony where the poorest creature will rather go to the invalid hospital than take less than 6s 6d for 8 hours' dawdling.

BRITISH NORTH BORNEO.

The *British North Borneo Herald* for 1st May has reached us, and proves an interesting number as our extracts show. The chief paper is on "the Climate of British North Borneo," a Report by J. H. Walker, Esq., M.D., Principal Medical Officer. This is an instructive and business-like account, though with the comparatively short experience and insufficient meteorological and other data, the conclusions drawn can only be provisional. We read :—

The climate of British North Borneo is noticeable for nothing more than for its equability and the absence of extremes. The Temperature, Rainfall, Winds, Natural Phenomena generally and the diseases are, for a tropical country, of the most mild and temperate types.

MONSOONS AND WINDS.—The Monsoons are the North-East and the South-West. The North-East Monsoon commences about the middle of October and continues till about the middle of April. The South-West Monsoon lasts from about the middle of April till the middle of October.

RAINFALL, &c.—The Annual Rainfall near the coast, according to the records kept has during the last seven years ranged from 156·9 to 101·26 inches and has averaged 124 34. The true Wet season occurs in the North-East Monsoon and includes the months of November, December and January, and generally part of either October or February or both. The true Dry season immediately follows this true wet season and includes March and April and generally the whole of May and part of February.

TEMPERATURE.—The temperature recorded at the coast has ranged between the extremes of 67·5 and 94·5. Until within the last few months however these records have been taken from thermometers kept in the shade of a verandah—with the exception of Kudat where there was a thermometer shade two years since, and little or no inferences can be drawn from the records there as the meteorological station is on a sandy plain, the temperature of which is several degrees above that of the country generally. Judging from the results of the observations at Sandakan since the proper shade was erected I think the minimum records fairly well represent the truth, while the maximum records are from two to three degrees over the true "temperature in the shade."

The absence of Tornadoes, Cyclones, and Earthquakes is to be noted. The only indication of the existence at the present day of volcanic action is the report of a hot spring in an island near the Coast. In some individual parts the South-west monsoon is by far the most unhealthy, and this is especially noticable at Kudat and Silam, where during the South-west monsoon fever is prevalent and rather severe, while during the North-east it is mild and at Kudat now almost absent. At these stations the evil influence in the South-west monsoon is undoubtedly the stronger winds which, blowing over the whole of Borneo, reach these places laden with the impurities collected from swamps, &c., in their passage; while Sandakan is protected from this influence by the purifying effects of the bay, over which the South west winds have to sweep for a distance of some fifteen miles before reaching the town, and consequently at that station there are no clearly defined healthy and unhealthy seasons as at the two others mentioned.

The CHIEF DISEASES to be considered under this head are Fever, Beriberi and Dysentery. In addition to these a few lines will be given to Anæmia and Sunstroke. *Beriberi* occupies a far more important position in the list of diseases of Borneo than would be gathered from the small proportion it forms in the table in the appendix (only 1·75 per cent of the diseases treated); partly on account of the high rate of mortality it gives and partly on account of the extent to which it has already interfered with planting. It has broken out in each of the plantations opened in the rivers in Sandakan Bay and has claimed its quota of victims not only in these—Sigaliud, Domoondong, Suanlamba and to a less extent Sapagaya—but also in the native village of Malapi, at the Birds-nest caves at Gomantou, among some of the parties of Dyaks collecting produce on the upper waters of the Segama and to some extent on the island of Banguey. This disease generally appears almost in the form of an epidemic and is generally closely restricted both to the locality and the race among whom it first appears. The cases enumerated in the appendix were chiefly drawn from the various rivers in the bay (patients sent to Sandakan for treatment,) but include also a few sporadic cases that appeared in the low-lying ground in Sandakan, and a few cases in the commencement of the recent outbreak in the old gaol here. The cause of this obscure disease is as yet uncertain; some ascribe it to the food, more especially to bad rice and fish, and there is no doubt that a generous diet has a strong curative influence on the disease; but on the whole, from its many analogies with Malarial fever and the strict localisation of the disease, I am more inclined to the view that is due to a specific maisma or exhalation from the soil. There are two distinct forms of the disease, and I think it not improbable that these may ultimately prove to be distinct diseases.

The Indian races on the whole stand the climate well. The Sikhs and Bengalees have attacks of fever, colic, constipation and occasionally slight dysentery, but there have been but few deaths among them; one or two from fever, one from heart disease, one from opium smoking, one from chronic neglected dysentery and one sudden death, cause unknown. The Klings are also fairly healthy here but like others have occasional attacks of fever and in two cases Beri-beri. The Sinhalese who were brought here for the survey department suffered severely from fever and its results. The Chinese are the only race that can be said to be decidedly unhealthy in this climate and even of them this can be said only of those fresh from China and sent to work in the jungle before they are acclimatized. Men such as those contribute more than half of all the deaths registered in Sandakan, succumbing chiefly to Fever, Beri-beri and Anæmia with ulcers. The Dyaks from Sarawak have excellent health in British North Borneo.

SANITARIA.—In the future when the country gets opened up there will be comparatively little difficulty in forming Sanitary stations on the hills near the West Coast. Probably the best site will be found on some of the spurs of Kinabalu, such as that described by St. John on the West-North-West spur, where, at an elevation of some 5,000 to 6,000 feet, on a good site to which a road could easily be made, is be found good water and an average temperature of 75° at midday, 63° at sunset, and 56° at sunrise. At Bodc Silam also on the East Coast it is possible that a site may be found at an elevation of some 2,000 feet, but this would probably prove much less satisfactory, not only on account of the smaller elevation, but also because from the isolated nature of the hill there would probably be difficulties about road, water-supply and shelter from the wind. 2.—At present, in default of such sanitaria, I find the short sea voyage from this to Singapore and back has a most powerful recuperative effect in convalescence from sickness. The voyage to Hongkong is not found so satisfactory in such cases, as the transition of climate is so rapid, and, though

the distant effects may be good, the immediate effect is to stir up any seeds of fever and other disease that may be latent in the system and cause an outburst of the disease.

We make further extracts as follows :—

COUNT GELOES D'ELSLOO, the first Netherlander to take up land in British North Borneo, described in the Java papers as "The land of promise," left Sandakan for Singapore on the night of the 3rd April by the S. S. "Banca." Count Geloes, who was the Governor's guest during his short stay, appeared much pleased and somewhat surprised at the liberal lines on which the Government of this territory is carried on as compared with the Dutch regime in the magnificient Netherlands Possesions in these seas. He was more amused than pleased with the freedom of intercourse existing between the Europeans and the Chinese, Sulus, Malays and other nationalities. The Count obtained on favourable terms the lease for 999 years of 26,000 acres of land in the vicinity of the Ranow river in Marudu Bay, making, with the 4,000 acres already taken up by his agent Mr. Persyn, a total acreage of 30,000 acres. He also made certain propositions, which have been forwarded for the consideration of the Court of Directors, for the concession of Mineral right on the Segama river.

TOBACCO IN NORTH BORNEO.—The Dutch Count Geloes d'Elsloo visited the Suan Lambar Estate of the Chinese Sabah Land Farming Company, and is said to have formed a high opinion of the *quality* of the tobacco. It appears that *one* leaf of tobacco from the Banguey Estate had found its way to Java, which did not stand the burning test, whereas the Suan Lambar tobacco was demonstrated to burn beautifully. Surely it must be to the advantage of Planters that their numbers in this country should be increased, with the result of better communication, cheaper supply of labour, attaps, and so forth, and it is difficult to understand how the solitary bad leaf found its way to Java. On the 13th April the Chinese Sabah Land Farming Company had ready packed 110 bales of 117 pounds of tobacco each, and are only waiting for mats to pack the remainder of their crop of about 430 pikuls. It seems that a large quantity of the mats procured by the Manager had been destroyed by rats. We learn that the German Borneo Company, Banguey, have 50 bales of tobacco ready for shipment by the S. S. "Paknam" in about a fortnight's time.

TIMBER IN NORTH BORNEO.—Mr. E. E. Abrahamson has converted his business as a Timber Merchant into a Company under the style of E. E. Abrahamson & Co. The principal works of the Company at present are on the right bank of the Dumoundong river in Sandakan Bay, an hour and a half by steam launch from Sandakan, where permission to fell over 100 acres of Government Forest land has been acquired. A visit to the locality would well repay any person who has not had previous experience of the way in which heavy timber is brought out of the jungle with a motive power of Chinese and Malay coolies only. Billian of excellent quality abounds, also large quantities of Sirayah (cedar) and some Camphor. About 30 rough tracks have been made up the small valleys separating the undulating slopes and on these are laid crossways from side to side wooden spars, at distances of three to four feet, on which a sledge made of billian, and kept well greased with tallow by men running alongside, is hauled by Chinese or Malay coolies. On this sledge heavy logs of billian 30 to 40 feet long are transported to the river, where they are made up in rafts with light timber to float them off to the ship. At the present time some 1,000 tons of wood are ready for shipment including one raft of 400 tons of Sirayah. The timber is as a rule squared by Chinese at so much a foot, the Malays not being handy with the large squaring axes. About 60 to 70 Brunei Malays are engaged on monthly wages and on piece work in one part of the ground and in another about 30 Chinese, who work entirely on contract, providing their own tools, rope and other requisite appliances. On the score of cost Mr. Abrahamson says there is little to choose between the Malay and Chinese coolies.

GOLD IN NORTH BORNEO.—Mr. H. Walker returned from the Segama on the 9th April with Mr. Ah Chee, leaving Captain Beeston to prosecute his researches further up the river, where he will be accompanied by Mr. Callaghan of Silam. It appears that Captain Beeston is of opinion that the alluvial below Sabandar Pungut's Campong is not rich enough to pay working, but above that the river working will pay Chinese and Malays well for some time to come, its richness improving as the river is ascended. The gold is confined to the bed of the stream, being continually washed down from the sources or the upper waters, so that in all probability the ground will take a long time to work out. Mr. Ah Chee appears much pleased with what he saw and intends to commence operations at once.

NEW PRODUCTS.—Referring to the paragraph in our last issue to the effect that the Government had allowed a grant of $1,000 for the purpose of encouraging the planting of gambier and pepper we are informed that the Chinese of Kudat have promised to contribute a like sum for the said purpose. Resident Davies must feel gratified at this proof of the confidence placed in him by the Chinese community.

WE hear that sport is good round Kudat just at present. On the 11th of April, Mr. G. L. Davies shot a large boar, his head being 22 inches long. On the 13th April Messrs. Davies, and Wheatley were out again, when the former's dogs brought a fine young Buck across the road within 20 yards of them. The deer fell with an express bullet placed just behind his shoulder by Mr. Davies, and with another shot in the stomach from Mr. Wheatley. On the same evening a native also shot a fine young Buck.

WE hear that the results of the Tawaran expedition have even exceeded the expectations formed by the Resident Mr. G. L. Davies, and that fifty-two villages have tendered their allegiance to the Government, and agreed to give up head-hunting. To show that they really mean it, they have already sent in part of the Poll Tax, which would be due from them in about one month's time.

GAYA Sago Factory has been shewing greater activity during the past quarter. 500 piculs of Sago Flour having been shipped to Singapore. A change of management has recently taken place which will probably act beneficially.

BUKIT MINDALONG.—Would not this fine mountain be a good point at which to form a Sanitarium, if one is ever contemplated, lying, as it does, an easy distance from the Coast, on the true right bank of the river Sayap, an affluent of the Tampassuk in the true right bank of the latter,—easily approached up the levell Tampassuk valley, and offering any elevation up to 8,000 and 10,000 feet? The word "Sayap," it may be added, is Illanun for the pointed, plaited-straw hat, worn by the Dusuns, and is synonymous with the Bajau "Sadok," the Brunel "Sirahun," and the Dusun "Siong." The Sayap valley owes its designation to a lofty, peaked mountain at its head.

IN CONSEQUENCE of the expedition against Penassan and Sirambutan, some fifty four villagers have signified their wish to come under the flag of the Company. The country may be said to be quieted down up to the banks of Kinabalu. This is a gratifying result to have been achieved with so little bloodshed, and it is to be hoped the head-hunting Hydra has been scotched, if not altogether killed.

The Hon. Ralph Abercromby travelling round the world, gives his impressions of North Borneo, and states among other things :—

There is not the slightest doubt that the soil and climate of British North Borneo are eminently suited to the culture of valuable big leaf tobacco. Two plantations are already started in Banguey and the first samples are now ready for market.

On the whole Sandakan seemed to be a very little hotter than Singapore, damper but not so hot as Colombo, much less baking than Port Louis in Mauritius, and greatly less trying than Sava in Fiji.

A well-known Ceylon Colonist Mr. L. B. von Donop, was acting for Colonial Secretary during the absence of Mr. Malcolm Brown and we read

the Governor has been pleased to appoint Mr. John Robertson of the Land Office to act as Superintendent of Public Works during the absence on leave of Mr. J. Sampson.

CINCHONA CULTIVATION AND SYNTHETICAL MANUFACTURE OF QUININE.

We are indebted to the correspondent who writes to us as follows—and we feel sure he is right in his conclusions on the subject :—

"The enclosed advertisement appears in the last *Lancet*. If quinine can be produced by synthesis it will be a bad look-out for cinchona growers :—

'Synthetical Manufacture of Quinine.—A Syndicate is now being formed for the above purpose. Capital £50,000. As the medical profession are almost the sole users, it is proposed to confine the interest to them—Particulars by post (stamp), M.D., 50A. Lincoln's-inn-fields.'

We are certainly living in wonderful times, and the progress of science will before long alter the interests of many industries. I always thought the chemists would have a shot at the artificial manufacture of quinine, and perhaps their efforts have had some effect in keeping down the price of the article. The former high price no doubt set many minds thinking how it would be done, but I doubt the feasibility of the proposal as all efforts hitherto to produce expensive alkaloids artificially have ended in failure in a commercial point of view. What has been the result of the artificial production of indigo !"

The marvellous cheapening of quinine by the successful cultivation of cinchona in the East operates against the usual inducement to manufacture by chemists, and, as our correspondent says, the "synthetical manufacture," long ago announced, of other products, Indigo for example, has not so far been very successful.

THE GOVERNMENT ENTERPRISE IN JAVA.

REPORT FOR THE 1ST QUARTER OF 1886.

(Translated for the "Ceylon Observer.")

During the month of January and the half of February there was comparatively very little rain ; the second half of the quarter was, on the contrary, very rainy. The planting out in the field was carried on uninterruptedly during this quarter. The young plantations thrive generally very well and rapidly develop, which is to be attributed to the selection of fine robust plants. At Nagrak the young plantations were subjected to an attack of grasshoppers(locusts ?) which caused some damage. The results of the harvest of 1885 was despatched to Batavia at the end of January. It amounted to 432,718 half-kilograms of bark packed in 1,008 chests and 2,026 bales. The harvest of 1886 is as yet very small, chiefly in consequence of the continued damp state of the weather, which in many establishments stopped the gathering. On the whole the quantity collected has been about 40,000 half-kilograms, almost exclusively obtained by the extremely necessary thinning-out of the closely growing ledgerianas and succirubras of which 9,794 half-kilograms were sent to Batavia by the end of March.

For the purpose of securing further data respecting the influence which the succirubra stem exercises on the graft of ledgeriana upon it, samples of bark from grafted branches from well-known and repeatedly examined parent trees have been transmitted to chemical examination. From these analyses it seems evident that in opposition to former opinions, the succirubra stem acts beneficially on the ledgeriana grafted on it as shown by the quantity less or more of cinchonidine which is found in the bark of the ledgeriana, and which is not to be discovered in the parent ledger trees. The conclusion appears unquestionable, that the yield of cinchonidine increases with the age of the tree, whatever may be the issue of future experience. It remains still to be ascertained whether or not the succirubra stem affects the higher parts of the ledgeriana grafted on it ; and if it does so, to what extent ? Even should the results cause no small degree of disappointment, still the analyses show plainly that the graft plantations of Tirtasari will yield a very valuable produce of ledgeriana bark, and that there does not exist the smallest reason for relaxing in the application of the system of grafting on a large scale, or even for placing any limits to it. The original ledgerianas, and the graft and cutting plantations at Tirtasari produced during the last quarter such a trifling quantity of seed, that up to the present time, it had not been possible to hold any public sale of cinchona seed. (Signed) VAN ROMUNDE,

Director of the Government Cinchona Enterprise.

Bandoeng, 6th April 1886.

Statement of the position of the Government Cinchona Plantations in Java for the first quarter of 1886 :—

Site and mean height above the sea, of the plantations. Height given in metres.	Reference.	Plants in the Nurseries.				Plants in the open field.				Grand total of plants.
		Ledgeriana.	Succirubra.	Officinalis.	Ledgeriana.	Calisaya & Hasskarliana.	Succirubra and Calloptera.	Officinalis.	Lancifolia.	
Lembang ..... 1,251 Mountain range Tangkuban Prahu.	...	...	40,000	...	5,000	8,000	110,000	...	...	163,000
Nagrak ..... 1,625 Mountain range Tangkuban Prahu.	...	180,000	...	...	220,000	35,000	24,000	35,000	...	494,000
Tjibitung ..... 1,527 Mountain range Wayang.	...	80,000	160,000	...	55,000	...	160,000	20,000	...	475,000
Tjibeureum ..... 1,560 Mountain range Malawar.	...	180,000	...	...	150,000	...	18,000	...	...	348,000
Rivereng-gunung ..... 1,625 Mountain range Tila.	...	30,000	25,000	...	75,000	11,000	90,000	2,000	...	233,000
Tjinyiroean ..... 1,566 Mountain range Malawar.	..	500,000	100,000	...	160,000	33,000	52,000	4,000	7,000	856,000
Kawah Tjiwidei ..... 1,950 Mountain range Kendeng Patoeha.	...	30,000	40,000	...	1,000	...	35,000	200,000	...	306,000
Tirtasari ..... Mountain range Malawar.	—	...	32,000	...	...	100,000	...	...	...	132,000
Total of the different kinds...	...	1,922,000*	365,000	...	766,000†	87,000	489,000	261,000	7,000	3,007,000
Grand total of all kinds...	..	1,387,000					1,610,000			

* Including 32,000 grafts. † Including 140,000 cuttings and grafts besides 4,250 original ledgerianas.

Report of the Yield of Alcaloids obtained from some Ledgeriana Parent Trees.

Number.	Kind of Cinchona.	Place of growth.	Quinine.	Cinchonidine.	Quinodine.	Chinconine & Amorphous Alcaloids.	Total.	Number.	Parent Tree. Number.	Year of Experiment.
1	C. Ledgeriana	Tjinjirnan	9·97	...	...	1·90	11·87	1	23	1874
2	do	do	11·01	...	...	0·72	11·73	2	23	1881 repeated.
3	do	Tjibeureum	10·59	...	...	0·74	11·33	3	73	1876
4	do	do	9·79	...	...	1·11	10·95	4	73	1881 repeated.
5	do	do	10·79	...	...	0·74	11·53	5	89	1877
6	do	do	11·20	1·17	...	1·02	13·39	6	89	1881 repeated.
7	do	do	10·76	...	...	1·36	12·12	7	78	1876
8	do	do	11·11	...	...	1·09	12·23	8	78	1881 repeated.
9	do	do	9·99	...	...	0·75	10·74	9	76	once tested.
10	do	Riung-gun-ung	12·31	...	...	1·19	13·50	10	94	once tested.
11	do	Tjibeureum	20·20	...	...	0·67	10·87	10	20	once tested.

Report of the Results obtained from Cinchona Bark during the first quarter of 1886, showing the Limits of the Alcaloids.

Number.	Kind.	Place of growth.	Quinine.	Cinchonidine.	Quinodine.	Chinconine & Amorphous Alcaloids.	Total.	Number.	Remarks.	
1	C. Ledgeriana	Tirtasari.	8·21	1·62	...	0·70	10·53	1	Schilfers*	From grafts from the parent stem. No. 89, 5 years old.
2	do	do	8·15	1·87	...	0·75	10·77	2	do	No. 89
3	do	do	7·10	1·40	...	0·64	9·14	3	Reep Bark†	No. 89
4	do	do	7·20	3·56	...	0·86	11·62	4	Schilfers	No. 73
5	do	do	7·50	3·52	...	0·93	11·95	5	do	No. 73
6	do	do	5·88	3·30	...	0·51	9·69	6	Reep Bark	No. 73
7	do	do	6·01	2·20	...	0·97	9·18	7	do	No. 73
8	do	do	7·04	1·54	..	0·63	9·21	8	do	No. 73
9	do	do	10·93	0·10	...	1·76	12·79	9	do	No. 78
10	do	do	11·14	0·15	...	1·72	13·01	10	do	No. 120
11	do	do	11·00	1·20	...	1·85	14 05	11	do	No. 76
12	do	do	7·81	1·71	...	0·88	10·40	12	do	No. 94
13	do	do	9·85	0·20	..	0 81	10·86	13	do	No. 23
14	do	do	10·48	trace	...	0·73	11·13	14	do	No. 23
15	do	Sukawana	8·61	1·11	...	1·17	10·89	15	do	No. 23

* Schilfers, the common meaning is scales (schilferen, to scale off); but I have no means of ascertaining its application to cinchona bark.

† Reep, is a strip, or a band of cloth torn off, and Reep-bast, I presume, is a strip of bark off the tree in contradistinction to what is shaved off, but I do not like to make a guess at the application of the word.—*Translator.*

LOWCOUNTRY PLANTING REPORT.

(*From an Old Hand.*)

MONSOON—COCONUT PLANTING—THE COPRA TRADE.

Hapitigam Korale, 25th May 1886.

The Monsoon opened here on the 17th, and it has dribbled daily evei since, with very little wind, except one fierce squall on the 23rd, that lasted only a few minutes, but quite long enough to tear forest trees up by the roots, and scatter large limbs of jak and other fruit trees in all directions.

This is the proper season to plant Coconuts, but most of the clearings in this part are somewhat behind, and in some cases the proper time may slip away and leave some of us up a tree. In my own case I was a trifle late, but I am getting on with lining and holing about 20 acres of new clearing as fast as the rainy weather will permit.

Within the past ten or twelve years, a vast improvement has taken place in the management of Coconut property in this district. A clean estate was then the exception, it is now the rule.

There are still a few, who stand true to old ideas; for instance, there are a few acres of the best soil in my neighbourhood, that about fifteen years ago was given out to goiyas and planted. When they had taken all they could from it, the land was left without another cent being expended, the lantana rushed up, and in a couple of years not one coconut plant remained. At the end of seven years it was again cleared, again cropped by goiyas, and again it ran precisely the same course. It has this season been taken in hand a third time, and it remains to be seen whether it will be better cared for on this occasion, than on the former attempts at cultivation.

On the other hand there appears to me to be more energy and liberality in some cases than knowledge of the plant and its requirements. My idea of Coconut Cultivation can be conveyed in two words, *manure* and *plough*, and those two operations should be modified according to the character and quality of the soil.

Within the past few years a revolution has taken place in the Copra Trade, the local oil mills cannot compete with the export prices, and have had to close up, but the export trade requires a better article than the smoked and less than half dried commodity, that satisfied the local trade. The copra dealers that used to compete keenly for the estate crops have not readily accommodated themselves to the new development, and, in consequence, they are not so prompt to purchase crops, and nuts accumulate so as to induce proprietors seriously to consider the expedience of drying their own copra, and such among them as have any constructive talent are using it in the invention of drying houses to render themselves independent of weather and enable them to turn out a good clean well-dried product that will take the top of market. I had occasion many years ago to test the difference between thoroughly dry copra and that taken to market by native dealers, and found that thorough drying brought 1 cwt. to 95 lb to say nothing of the discolouring of the resulting oil by smoking the copra, to save it from too rapid deterioration, before it could be sold in its less than half dry state. In those days, copra rose and fell in price, according to the supply and the wants of the mill and chekku owners, but there was no distinction of qualities. The rise of the export trade has done much to remedy this state of things, and the planter has now the chance of being rewarded for careful preparation, and more or less perfect drying apparatus will soon be made on most estates.

JAVA AND CEYLON.

Some idea of the difference between Java and Ceylon in planting enterprise may be gathered from the following particulars taken from a Batavia newspaper. At a meeting of the Planters' Association of Sukabumie held at that station on the 22nd April Mr. G. F. Mundt, a planter, set forth his experiences during a recent tour in Ceylon as regards plantation matters there. He spoke in high praise of the excellence of the roads in that country which taken on the whole, is unsuitable for the cultivation of the soil. On railways in Ceylon there is heavy traffic even in small produce articles in consequence of the low freights. The rapid progress and widespread destructiveness of the coffee disease were mainly ascribed by him to the unfavourable and stony nature of the soil and the gross carelessness shown in laying out estates. What struck him particularly was the rapidity with which in Ceylon substitutes were found for the declining coffee growing industry. The light pressure of taxation there has thus made it possible for planters to do what is beyond the reach of their fellows in Java. Abroad, people have been astonished at the enormous quantities of cinchona bark unexpectedly thrown upon the market from Ceylon all at once. The explanation must be sought for in the hasty planting of cinchona often between standing coffee trees, or their stumps and in equally hasty cropping, so that bark is actually shaved off from small trees barely a few feet high from below in consequence of eagerness to make money and take advantage of a rising market. At the outset, the favourite varieties were those styled *Officinalis* and *Succirubra*, but latterly great activity has been shewn in carefully laying out *Ledgeriana* estates with plants raised from seeds procured in Java, which found their way to Ceylon in spite of the hindrances laid in the way of their export from fear of competition abroad. In Ceylon, tea cultivation has been taken in hand with not less thorough-goingness and energy. Within the five years since that form of cultivation was undertaken, six hundred thousand rupees worth of tea seeds were bought in India. This branch of planting industry also has been carried on with an overhaste natural under the circumstances. Deep loosening of the soil, terracing, &c., were neglected. Tea also has been often planted among coffee and occasionally among cinchona as well. Plucking operations too quickly begun and too often repeated cannot have a favourable effect on the life of the plants. In spite of these drawbacks, the area under tea increased last year from 13,500 to fully 100,000 acres. Mr. Mundt held that reports from Ceylon bearing upon estimates of crops are sometimes misleading from a desire to influence capitalists. In his opinion the 80 millions of pounds of produce expected to be gathered in within the next few years may be safely reduced to 25 millions, that estimate being high enough for all practical purposes. There was also every prospect of tea in the long run feeling the harmful effects of the washing away of the thin layer of culturable soil loosened by weeding. Generally speaking Mr. Mundt felt no alarm at the prospect of Ceylon competition with Java, so far as regards planting enterprise, but as regards fiscal burdens and means of transport and the silver difficulty the balance of advantages was on the side of Ceylon from hardly any taxation at all falling on estates. He concluded his observations by noticing cocoa cultivation in Ceylon which yielded 100,000 hundred weights in 1885. This form of enterprise also bore the mark of the same eagerness for speedy profits in order soon to return to Britain with a fortune, which characterised Ceylon planters generally, and has been all along a source of harm. Sometimes in this way shade trees were cut down to secure a larger outturn of cocoa with the result that insect pests grew rife and the trees had to be replanted.—*Straits Times.*

[Some of Mr. Mundt's figures, if correctly reported, are very wonderful, like the 100,000 cwt. of cocoa: we have not got to 10,000 yet; and who estimated 80 million lb. of tea? In taking 25 millions as the estimate for a few years hence, Mr. Mundt is merely following the "Ceylon Directory." We put the export for 1887-8 at 20, and for 1888-9 at 30 millions lb. Mr. Mundt is too hasty in condemning the Ceylon modes of planting, though his criticism on a few points is deserved—ED.]

"MARKET GARDENERS" upcountry in Ceylon ought to be encouraged by the advertisement which appears regarding the requirements of the Military Commissariat for Colombo and Mount Lavinia. Were the railway running into Uva, there would not be the slightest difficulty in receiving a perennial supply of vegetables of all descriptions and of cheap, good fruit in abundance. But Nuwara Eliya and Dimbula can do a good deal.

JAPAN TEA.—The *Japan Herald* translates the following from the *Bukka Shimpo*:—"If the price of the first tea of this year be compared with that of last year there is a difference of some $30. The cause of this difference is the earliness of warm weather and tea leaves coming out very early in various districts, especially at Suruga province. The amount of the new tea transported to Yokohama, before the 24th instant, when the American mail left with the first teas, reached 15,000 catties, and until the *Kiyogawa-maru* entered the port with new tea, the price was about $70. But just before the American mail left foreign merchants offered low prices, and holders afterwards agreed to sell. Indeed the first price, is not a real price at all, and it is usual at the time of the second mail for the price to fall to about $40. Now in this year the first tea showed the second price, on account of the great amount transported to Yokohama at the time when the first mail left. Therefore in this year there may not be any great difference of price at the time of the second mail.

COFFEE IN UVA IN THE OLD DAYS.—A correspondent writes as follows:—* * * Referring back to old memories which Mr. Irvine's letter has "brought to mind," the finest native coffee in all Uva was grown in the villages behind Ella and about Leangawelle. (By the way, how few Europeans of today have seen the site of the old Ella Fort and the grave of a European officer who died at his post, name lost and unknown.) This coffee weighed much heavier than any other coffee in Uva or in Ceylon: the traders who bought the coffee by measure and sold it by weight made at least 10 lb. on every cwt. as compared with ordinary native coffee. I recollect well the wild coffee trees in the strips of jungle, now the outlying fields of Broughton estate; these trees were upwards of 20 feet high and were fully 5 inches in diameter at the bottom and tapered like a fishing rod, the villagers used them for rafters. These trees were not indigenous; the seed had been carried by wild animals from the villages and where the forest shade was not too dense the whole ground was carpeted with coffee seedlings. When coffee stumps or plants were required for planting, the coolies sent for plants were simply told to go and bring a thousand plants which they easily got, not in the villages but in the forest. * * *—*Cor.*

Correspondence.

To the Editor of the "Ceylon Observer."

NEW TEA MARKETS.

Madulkelle, 20th May 1886.

Sir,—Mr. Scovell has certainly opened up a subject which deserves the attention and support of all tea planters. But while I agree with him that it is highly important for us to endeavour to find fresh outlets for our teas, yet it is my firm belief we could do more in a given time but perhaps at a greater cost by endeavouring to cut down retail dealers' profits and so lower retail prices. If all grades of tea were lowered in (retail) price at least from 4d to 6d per lb. I scarcely think there can be a doubt but that the general consumption would largely increase—so largely indeed that I think all our tea would be absorbed for a few years at least, and this would give us time to attend to new markets also. I do not think Ceylon planters can hope to carry out this sort of work alone; the co-operation of India must be sought and if possible obtained; for the opposing interests at home are wealthy and influential. But there is another factor in the future which tea planters ought most carefully to watch, namely the price of silver and exchange. If, by any tinkering legislation at home to give silver a fictitious and high value, exchange is caused to rise against us; a very severe blow will be dealt at our industry, and not ours only but against all India; and there does seem to be a "reasonable prospect" of some legislation of that kind being proposed.

Will not Mr. Scovell himself initiate a movement in the matter, through the Association or otherwise?—Yours truly, A. M. W.

NEW MARKETS FOR TEA—AUSTRALIA.

Goatfell, 21st May 1886.

Dear Sir,—With the view of supporting Mr. Scovell's suggestions with regard to the immediate necessity for some efforts being made to increase the demand for what is now our staple product, I beg to offer a few remarks. The subject has been mooted in your columns before, and a little has been done towards making known the existence and quality of Ceylon tea far and wide, but our efforts seem rather to have slackened of late, while as yet but very poor results have been attained.

The passage from Messrs. Gow, Wilson & Stanton's review quoted by Mr. Scovell will commend itself to all who are in any degree interested in the matter; and the question only remains as to what are the most likely means to ensure the placing of our teas before the consumer. Mr. Scovell says the existing channels are capable of expansion, and this is doubtless true; but at the same time there are obstacles, in the shape of trade interests and inordinate profits, to be removed before those channels will yield the required expansion. I believe that in Australia there is a market for Ceylon tea capable of very considerable development if properly worked up; but it must not be left to the mere efforts of individuals struggling to earn a livelihood in pushing an article, almost, if not quite unknown, and this in the face of a well-established trade in the Chinese rival. Doubtless the Melbourne Exhibition did much to make Ceylon and Ceylon tea known to many in the Colonies; but out of the many there are probably very few indeed, who have either seen or heard of Ceylon tea since. Sometime in 1881; I think it was, Mr. Poett wrote to your columns and pointed out a means of bringing Ceylon tea before the Australian public which I quite agreed with at the time, and still think is the most feasible method of securing the desired result; viz., to establish travelling agents to sell our tea all through the country, the more directly to consumers the better. To carry out this plan, capital would be required in order to sustain the risks attendant upon an undertaking of this nature at the outset.

Tea is looked upon by travellers as one of the most paying commissions in their line of business, and it is not to be wondered at, when the retailers consider 9d per lb as no more than a fair profit. This is one reason why our teas do not fetch their value in Melbourne, for with China tea procurable at prices from 6d to 1s, and the low duty of 3d per lb, the selling price to consumers is easily fixed so as to allow the handsome margin I have quoted. Dealers will not buy Ceylon tea at its value, when in order to secure this high profit, they would have to raise the price at least 6d per lb to the consumer, who would not give it. But place Ceylon tea of average quality before the consumer, and he will give 2s per lb. for it and want the same article next time. It cannot be done through the dealers, as the trade is deeply interested in China tea and simply pooh-pooh anything else. I took samples of good Ceylon Pekoe Souchong to two dealers in a town in Victoria, both doing a very considerable business and making tea a speciality. One said the tea was undrinkable, and the other valued it at 1s 8d. I sold the bulk of it at 1s 5d at auction. The man who condemned it was very largely interested in China tea, and I am inclined to think his palate was rather in sympathy with his interests.

An accredited representative with the ability to lecture through the country would no doubt achieve a great deal, and by making Ceylon known as a field for the investment of capital, he might be the means of bringing about such commercial relations as would inevitably secure the diverting of a portion, at least, of our produce to the Melbourne mart. The population of the Colonies is not large, comparatively, although it is rapidly extending; but it is an eminently tea-drinking population, and it is certainly worth while making some effort to establish a demand for our teas in view of the vast amount of competition which will be erelong, and is even now, beginning to be felt in its effects upon our industry.

Since writing the above I have seen "A. M. W.'s" letter; and as our ideas seem to be coincident as regards the retailers' profits, I feel all the more justified in putting in my word. There is another point which I will just touch upon. I don't think there is much to be gained by a wholesale vilification of China tea especially in the colonies. Ceylon tea will easily make its way upon its own merits, but it is calculated to engender needless hostility to decry indiscriminately a commodity, the trade in which, affects such large and important interests.—I remain, sir, yours truly,

CHAS. M. HENRY.

LIBERIAN COFFEE.

Mahaoya Valley, 22nd May 1886.

Dear Sir,—I send dimensions taken of three Liberian coffee trees growing in the above valley between 6 and 7 years old, and would like to learn if there are

any finer specimens to be seen elsewhere :

	Feet	inches.
1st tree measured :—		
Height	16	8
Circumference ..	27	6
2nd tree :—		
Height	15	6
Circumference ..	28	6
3rd tree topped at ..	10	
Circumference ..	33	

—Yours truly, VISITOR.

NEW TEA MARKETS.

Colombo, 26th May 1886.

SIR,—Mr. Scovell has the interests of Ceylon Tea thoroughly at heart when he advocates extended markets for this product.

Mr. Scovell's scheme of a combination to ship at a loss, so as to establish a market in America, in the hope of ultimate gain, is not so easy of realization in its dual aspect, as it is in its first stage, viz., that of shipping at a loss.

From the experience gained by the Syndicate formed for pushing the sale of Indian teas in America it would seem they were perfectly successful in shipping at a loss, but lamentably failed in their endeavours to establish a market. Our American cousins in the tea trade formed a "Ring," bought up all the Syndicate shipments as they arrived, and quietly re-shipped them to London, thus preventing their being sold in America, and frustrating the designs of the Syndicate. It is not the prejudice of the people in favor of China and Japan teas that we have to overcome so much as the determined struggle the merchants interested in China and Japan teas make to keep us out of their field.

Now, this will not be overcome simply by placing large quantities of tea in the open market for sale, as it will be bought up by those opposed to its introduction, but it is more likely to be so by sending small consignments well distributed, thus getting in the thin end of the wedge. It will be well to recall the method by which our teas were introduced so successfully into Great Britain, which was by the distribution by Ceylon planters among their friends, of small packages of Ceylon teas. Their friends soon learned to appreciate the good qualities of the tea and demanded Ceylon tea from their grocers, who in self-defence were bound to keep the article. From family to family the knowledge of the excellence of the tea spread, and the trade generally (after a good deal of prejudice) was compelled to satisfy the demands of consumers. It is thus seen that the public first discovered the good quality of Ceylon tea, and that the grower is not indebted for its introduction either to the London sale room or to the London broker. The sale of Ceylon tea must be introduced in a somewhat similar manner into America, but it is obvious that exactly the same lines cannot be followed as the grower is not so intimately connected with that country.

Although I hold that it is more within the province of the trader or merchant than of the grower to introduce and establish himself in a new field, still, under the special circumstances of our product, the question arises whether it is not rather a subject for combined action than individual effort and one which the Ceylon Planters' Association might well take up in the interests of what will undoubtedly become in a year or two the staple product of Ceylon.

I am, therefore, strongly of opinion that at one of the early Committee-meetings of the Association this question should be prominently brought forward for discussion, so that by unity of action some defined plan may be formulated which would ensure the introduction of our teas into America, where, although the development of consumption might be slower than it was in England, still when once established, it should go on increasing and eventually assume very large proportions.—Yours faithfully,

H. K. RUTHERFORD.

NEW MARKETS FOR CEYLON TEAS.

Kandaloya, Nawalapitiya, 28th May 1886.

SIR,—With regard to the opening up of fresh markets for Ceylon tea, Messrs. Scovell and Rutherford are at one on the point of *combination*, although the latter gentleman is not sanguine of America absorbing much of our produce. There is an old saying that we should "look at home afore looking out o' window"; and, looking at home, I maintain that we have not tapped the home market. With the exception of families who have friends in Ceylon, and are supplied by them direct, the proportion of people at home who knew the taste of Ceylon tea is infinitesimal.

Whenever I send tea home, my friends invariably write "We would always drink Ceylon tea if we could get it." When the Ceylon Tea and Coffee Agency first started, I sent them a list of addresses of friends at home. These religiously dealt with the Agency so long as they could: but latterly the tea supplied has been so inferior in quality that my friends have been obliged to provide themselves elsewhere.

No doubt there is scope for the Planters' Association to move in the matter: but in the meantime I would venture to suggest that private enterprize might do a great deal on the lines laid down in some letters which I wrote, and which appeared in your columns, so far back as 1881.*

Let proprietors of estates *combine* and form a Company to start a "Ceylon Tea Refreshment Room and Retail Agency" in some central part of London. I believe that many coffee-houses pay satisfactory dividends. Why should not a Tea House do so also? While, in addition to paying on its own merits, it would serve as a depôt for the retail sale of produce *shipped to it direct from the gardens of the shareholders*, and would introduce Pure Ceylon Tea to multitudes to whom it was only a name before.—Yours faithfully,

W. TURING MACKENZIE.

* We (ED. *T. A.*) append a few extracts from the letters referred to :—

(Addressed to Indian Tea Gazette, 23rd Oct. 1880.)

Your address to English housewives in your issue of 1st September has suggested to me a plan by which our Indian and Ceylon teas might be brought more prominently before the tea-drinking public. I don't know if the plan is at all feasible, but here it is, in a very crude form to establish in some central part of London, an Indian and Ceylon Tea Refreshment Room (on the same principle as the teatollers' coffee-houses) at which a cup of Indian or Ceylon tea and a sandwich or bit of bread and butter could be always obtained. We all know what a refeshing thing a cup of tea is, to men whose brains or eyes are tired with much reading or writing; and I doubt not that many a jaded clerk would often turn in for a cup of tea, not to mention ladies out shopping who frequently don't care to go to regular eating-houses. The same place could be a depôt for the sale of tea, and if only people at home who are interested in tea, would combine to carry out such an idea, I have little fear that in time it would pay well, both directly as a Tea Refreshment Room, and indirectly, by introducing to the public pure Indian tea. If found to pay well in London, similar establishments could be started in other large towns. The *sine qua non* of success is that tea must be sold on the spot, so that if a man liked a cup of tea, he could

buy some of the same at once to take home: after he has drunk a pound or so of Indian or Ceylon tea, he will never go back to the China.

(*To Ceylon Observer, 16th May 1881.*)

I was afraid that my proposal to establish in London a Tea Room and Agency had quite fallen to the ground. I see however that Sir Wm. Gregory comments favorably on my letter; and as you yourself have taken the matter up, I begin to hope that something may yet come of it. I feel convinced that such an establishment would be the best advertisement that our tea planters could have; and as a considerable portion of our planting community is now interested in tea, it would only seem natural for the Planters' Association to move in the matter. Wants of funds, of course, would be the serious difficulty; but surely the numerous gentlemen now engaged in tea-planting could, if united, command sufficient influence to start a company for the purpose of establishing a Tea Room and Agency in London, with a view to stimulating a demand for our teas. It may be said by some that we have no tea should a large demand arise, and what is the use of creating a demand before we have the supply to meet it? But if we wait to create a demand until we have a large stock of tea, the market will be glutted, and prices ruinously low. Clearly therefore the sooner a start is made the better. Apart from the benefit of the tea rooms as an advertisement, the Agency would be most advantageous to planters, who by shipping direct could realize a decent profit themselves, while they could put their teas in the market cheaper than if they went through the broker's hands, in fact the planter would sell at a low retail price, and the consumer would get a good genuine article at a cheap figure.

(*To "Ceylon Observer," 4th June 1881.*)

Your extract from the *Home and Colonial Mail* in your issue of the 28th ultimo shows that what the Ceylon tea planters ought to do in London, viz., establish agency for the sale of their teas has already been done in Dublin by an energetic Indian Tea Company with respect to its own produce, and that the venture has been attended with success. If nothing better can be done, by all means form a tea syndicate to be affiliated with the Indian syndicate; but I maintain that by the establishment of such an agency as I advocate a great deal better can be done than affiliation with a syndicate whose power is necessarily handicapped by having to find markets for and dispose of such large quantities. Another point in our favour is that Ceylon tea is more readily appreciated than Indian which, though as good, takes longer than ours to accustom itself to the palates of people who have been in the habit of drinking China tea. Of course the whole secret of success would lie in advertising, and this should be done not only at home, but in the local papers here, with, at the foot of each advertisement, a "*note*" to European residents in Ceylon: "Please cut" this out and enclose it in your next home letter! Say 100 only responded to this and each house used 2 lb. of tea a week, there are 10,000 lb. per annum disposed of at once.

MARKS OF CEYLON TEAS IN MINCING LANE.

Matale, 29th May, 1886.

DEAR SIR,—In the list of tea sales published in your paper from time to time I have frequently noticed very large breaks sold under the mark of Highlands. Can you or any of your correspondents inform me of the whereabouts of this estate? It is remarkable that an estate putting in breaks into Mincing Lane of over 100 chests at a time should be so little known. Highlands estate does not seem even to be mentioned in the Ceylon Directory. Tea on this side flushing well.—Yours faithfully,

INQUIRER.

[We take "Highlands," "Oya" and some others to be Colombo marks, put on by buyers of tea in small parcels at local sales in making up big breaks. —ED.]

CEYLON TEA IN WESTERN AUSTRALIA.

29th May 1886.

DEAR SIR,—Should you think these few lines worth a corner in your valuable paper please insert them. Feeling deeply interested in the welfare of K. C. B. (alas! a title soon to be erased), and particularly after persuing a letter of Mr. Henry's in the *Observer* of the 25th, induces me to pen a few lines, endorsing his sentiments with regard to Australia being a good market for Ceylon teas. I have as a *bait* sent a few pounds of good tea to Western Australia, and I am glad to say, it has been *much* appreciated; and by the last mail I heard from a friend, and quote his words merely to show there is a demand for it:—"If anyone would let me know what they would sell tea a pound for and would send it over, I could guarantee them ready sales, as people here are paying 2s 9d for real *trash*. I have spoken to several of the merchants, and they are ready to buy at high prices. Mr. ——— should send his tea here, to pay well." I have also forwarded samples to a friend in Melbourne and am waiting the results. I think the above will show Ceylon teas will sell in Australia. K. C. B.

PRESERVING FISH IN A FRESH STATE by means of a mixture of salt and boracic acid, forms the subject of a paper which has been sent to us by the Madras Government. Deputy Surgeon-General G. Bidie, M.B., C.I.E., ever on the watch for improving the resources of the country, was struck with the abundance and cheapness of large sardines at Tellicherry and desirous that a cheap means of preserving the harvest of the sea and distributing it inland in a fresh state should be discovered. He found what he wanted in a series of articles in the *Scotsman* on a chemical powder, the constituents of which we have indicated, by means of which herrings sent from Norway in a fresh state were underselling English herrings in the English market. There should be two pounds of salt to one of the acid, and the fish should be packed between layers of the mixture. The full details appear on page 22.

OF THE BECHE-DE-MER fishing in Torres Straits Mr. Douglas reports that it is passing into the hands of South Sea Islanders who "will require pretty close watching." He believes that "there is not much margin of profit in it, unless very cheap labour can be obtained. This, however, is secured in the native inhabitants of the islands in the Straits, who are glad enough to work for small wages in order to earn what is called their 'tucker,'" He estimates that there are 500 men and boys employed, of whom probably a third, though possibly a half, come from the mainland of Australia, and he has reason to "believe that there has been a good deal of quiet kidnapping." In one case especially he ascertained that a lot of mere children had been purchased from their relatives on the Jardine and Batavia rivers. They were subsequently brought from Darnley to Thursday Island, in order to be entered on shipping articles, but it was so evidently a case which required his intervention, that Mr. Douglas "caused them to be taken back to their own people at the expense of their so-called employers." This action had a beneficial effect in checking the employment of mere children, and also established more friendly relations with the native inhabitants of the mainland. Port Kennedy, the seat of Government on Thursday Island, is a progressive place. The revenue collected in 1885 amounted to £12,553; and the exports of pearl shells were valued at £86,990, while the beche-de-mer sent away was worth £7,383.—*Australasian.*

IMPORTS OF AMERICAN COFFEES FOR FISCAL YEAR 1885.

The first quarterly report of the Bureau of Statistics of the Treasury department has just been issued, and it gives in detail the imports into the United States from all the countries south of us for the fiscal year ended June 30, 1885. From the statistics given we compile some statements that will be of interest to all dealers in coffee.

The following table shows the imports of coffee, by pounds, into this country for the fiscal year 1885, from the principal coffee producing countries of America, compared with the imports of the two preceding years:—

Countries	1885.	1884.	1883.
Brazil	406,714,346	347,873,001	315,465,986
Mexico	10,041,421	9,975,466	17,020,669
Central American States	36,811,072	31,827,573	22,449,112
Hayti	19,034,988	16,825,183	22,527,950
Dutch West Indies.	322,620	1,221,858	3.442,467
British West Indies	3,896,698	5,205,957	2,888,404
United States of Columbia	4,608,889	8,817,733	6,956,008
Venezeuela	53,506,130	53,363,495	43,369,170
Porto Rico	4,864,188	217,827	80,286
Total	539,800,352	474,288,093	491,974,968

It will be noted that the imports for 1885 are some 65,000,000 larger than for 1884, and nearly 50,000,000 pounds more than for 1883. The imports from Brazil are very large—nearly 60,000,000 pounds in excess of last year. Outside of Brazil the increase is something over 5,000,000 pounds. The Central American states and Venezuela still continue to furnish large supplies, while Mexico does not loom to the front with the bigness of a few years ago.

It has frequently been said that low prices would decrease the cultivation of coffee, but no evidence has yet been produced that there is any decrease in coffee culture. On the contrary, there appears to be an increase. —*St. Louis Grocer.*

SEEDTIME AND HARVEST.

[Not poetry, but a good deal of common sense for cultivators of the soil.—ED.]

The sowing time and reaping are surely linked together,
The issue often pending on the rain and clime, and whether
The tiller has attended to his duties with the soil
By making a good seed-bed, not thinking of the toil.

***

Economy of labour is good enough 'tis true
To warrant an endeavour to limit it all through;
If while the work we spare thus we do not touch our purse,
And show our progress downward from bad right on to worse.

***

Temptations most alluring assail the planter's heart
To well reduce the labour and try by scheming part,
To make secure his profits without the toil or care,
Which trouble those who patiently and well the soil prepare.

***

But since the world began it has been thus decreed
That from the sweat of brow no tiller can be freed,
For without fit preparation the soil can never do
The will of those who work it, or cheer them fully through.

***

Then with good will bestow ye that daily meed of toil,
Which surely will reward you with an abundant spoil,
In sowing time be thorough that in reaping time you may
Rejoice in full and plenty and make a good display.

***

Resist the wily tempter who whispers "never mind,
The soil is there and seed too, so in good time I'll find
A crop all ripe to garner whether I work or play."
Beware! or lessened profits will chill you with dismay.
—*Planter and Farmer.*

COFFEE-TEA.

(TO THE EDITOR OF THE "ADELAIDE OBSERVER.")

Sir,—The following extract from the "Chemistry of Common Life," by Professor Johnston, is, I think, of sufficient interest to warrant me in asking you to publish it.—I am, Sir, &c., CONRAD N. WORNUM.

"Attention has been drawn to the use of the leaf of the coffee-tree as a substitute for that of the tea-tree. In 1845 Professor Blume, of Leyden, who had travelled much in Java, made known in Holland that this leaf was so used in the Eastern Archipelago, and recommended it for trial in Europe. Subsequently it was known in this country by Professor Brande; and at the Great Exhibition, in 1851, Dr. Gardiner showed specimens of prepared coffee-leaves, announcing at the same time that they contained theine, and suggesting that they should be substituted for our ordinary tea. These, along with other circumstances, have drawn the attention of Eastern merchants to the subject; and it appears from various communications which have been made public that the use of coffee-leaves in this way is an old practice in the Eastern Archipelago. In the Dutch island of Sumatra especially, prepared coffee-leaves form the only beverage of the whole population, and from their nutritive qualities have become an important necessary of life. The leaves are roasted over a clear, smokeless bamboo fire till they become of a brownish-buff colour. They are then separated from the twigs, the bark of which, after a second roasting, is rubbed off and used along with the leaves. In this state they have an extremely fragrant odour, resembling that of a mixture of tea and coffee. When immersed in boiling water they give a clear brown infusion, which, with sugar and cream, forms an agreeable beverage. Mr. Ward, many years settled at Pedang, in Sumatra, thus narrates his experience in regard to the use of the coffee-leaf in that island:—'The natives have a prejudice against the use of water as a beverage, asserting that it does not quench thirst or afford the strength and support the coffee-leaf does. With a little boiled rice and infusion of the coffee-leaf, a man will support the labours of the field in rice-planting for days and weeks successively, up to the knees in mud, under a burning sun or drenching rain, which he could not do by the use of simple water, or by the aid of spirituous or fermented liquors. I have had the opportunity of observing for twenty years the comparative use of the coffee-leaf in one class of natives, and of spirituous liquors in another, the native Sumatrans using the former, and the natives of British India settled here the latter; and I find that while the former expose themselves with impunity to every degree of heat, cold, and wet, the latter can endure neither wet nor cold for even a short period without danger to their health. Engaged myself in agriculture, and being in consequence much exposed to the weather, I was induced several years ago. from and an occasional use of the coffee-leaf, to adopt it as a daily beverage, and my constant practice has been to take two cups of a strong infusion with milk in the evening as a restorative after the business of the day. I find from it immediate relief from hunger and fatigue. The bodily strength is increased, and the mind left for the evening clear and in full possession of its faculties. On its first use, and when the leaf has not been sufficiently roasted, it is said to produce vigilance; but I am inclined to think that where this is the case, it is rather by adding strength and activity to the mental faculties than by inducing nervous excitement. I do not recollect this effect on myself except once, and that was when the leaf was insufficiently roasted. As a beverage the natives universally prefer the leaf to the berry, giving as a reason that it contains none of the bitter principle, and is more nutritious. In the lowlands coffee is not planted for the berry, not being sufficiently productive, but for the leaf the people plant it round their houses for their own use. It is an undoubted fact that everywhere they prefer the leaf to the berry.' (*Pharmaceutical Journal*, vol. xiii., p. 208).

"He adds further that while the culture of the coffee-plant for its fruit is limited to particular soils and more elevated climates, it may be grown for the leaf wherever, within the tropics, the soil is sufficiently fertile.

This is a very important fact, and, should the leaf come into general use, will no doubt lead to the introduction of new forms of husbandry in many tropical regions, from which the coffee-tree, as a profitable article of culture, has been hitherto excluded. At present the price of the prepared leaves in Sumatra is about 1½d. a pound, and they may be packed, if good quality, for the European market for 2d. a pound. In regard to the constituents of the dried coffee-leaf, the agreeable aroma emitted shows that, like Chinese tea, it contains a volatile oil, which will probably act upon the system like the similar oils of tea and coffee. It has been proved also to contain theine to the extent of about 1½ per cent (Stenhouse), and an astringent acid closely resembling that which is found in Paraguay tea. Both of these are present in it in larger proportion than in the coffee-bean, and hence, probably, the reason why the leaf is preferred to the bean by the natives of Sumatra. These, with about 13 per cent of glutin and some gum, are all the important ingredients yet found in the leaf. But the presence of these substances proves it to be so similar to the tea leaf in composition as to lead to the belief that it may be successfully substituted in common use for the Chinese tea. And this conclusion is supported by the wakefulness which is said to be produced by the infusion of coffee-leaves, by the bodily refreshment it is found to yield, by the directly nutritive power which the leaves possess, and by the general favour they have found in the estimation of the people of Sumatra. To boiling water the dried coffee-leaves yield about 39 per cent of their weight—as much as is taken up by water from the most soluble varieties of the coffee-bean, and more than is yielded by average Chinese tea. In this property, therefore, the leaf of the coffee-tree is also equal to the bean."

ANNUAL STATEMENT OF THE COFFEE TRADE OF THE UNITED STATES.

The more prominent features of the coffee trade of the United States during 1885, have been, first, a further increase in consumption as compared with previous years; second, an extremely low range of values throughout the year; and, third, the change that has become established in the methods of conducting business, more particularly with respect to the product of Brazil, which constitutes the bulk of our supply. Increased consumption has been due partly to the growth of population, but unquestionably the most important element has been the increasing popularity of coffee as a beverage among all classes, while its relative cheapness to consumers as a food staple has not been without its influence. The extent to which roasted coffee is now prepared and distributed has had much to do with its increased popularity. So long has this preliminary preparation had to be accomplished in the kitchen, the loss and labor that was entailed deterred many from its use. A lack of care or experience in this important process was apt to cause waste, in addition to the ununiform and imperfect results obtained, but this has been entirely obviated by the erection of large roasting establishments throughout the country, where, with the aid of improved machinery, and by the utilization of many ingenious inventions this labor is all performed perfectly and satisfactorily, and consumers are enabled to obtain from retailers an article that is thoroughly prepared for cooking. This fact, together with the relatively low prices that have been established during the past two years, has made coffee peculiarly the poor man's diet, and greatly popularized and extended its use with all classes. The extent to which low prices have influenced consumption may be readily appreciated from the fact that the average price of Rio during the year under review is the lowest since 1852. The changed methods of doing business relate to the manner of importation and sale. Jobbers and roasters now supply their wants chiefly by purchases made direct in Rio, that is, instead of coffee being imported here for sale, its sale has been accomplished in most instances before it is shipped, and the sea coast ports have become clearing-houses, and distributing centres, rather than marts where actual merchandize is bought and sold. The net results of low prices and new methods of business have been narrow profits to importers and dealers and a year of trade that, while in no sense disastrous has not proved one of singular prosperity to those engaged therein. These features have not been confined, however, to the coffee trade alone, but have characterised, to a greater or less extent, the operations of the year in almost every department of commercial activity and may be readily traced to the natural development of the tendencies of the times, after experiencing a long period of trade depression and the practice of close economy. The existing condition of affairs has resulted from keen competition, a radical improvement in the methods of transportation by water, as well as on land, increased facilities for rapid communication with all parts of the world, the abundance and cheapness of money, the closer relations existing between buyer and seller, and a consequent disposition to trade upon a narrower margin of profit. The fact that the yearly average price for fair to prime Rio is the lowest since 1852, is the best proof of its relative cheapness during the year, but the very narrow fluctuations of the market have been of still greater importance in restricting the opportunities for obtaining more than a living profit.

Consumption east of the Rocky Mountains has increased in comparison with 1884, 11,855 tons, or 5·3 per cent, which although not as great an increase as shown the year previous, nevertheless means about one-half pound more for every man, woman and child of our population, which is a very considerable expansion, considering the relative proportion of this population that are not coffee drinkers. This brings the per capita consumption of the country up to about 9·31 pounds, against 7·61 pounds in 1879. While the United States, as a whole, is one of the largest consumers of coffee in the world, its population is not so universally addicted to its use as Holland, where the per capita consumption is about 21 pounds or in Denmark and Belgium, where it amounts to about 13½ pounds, but with these exceptions we are the largest individual consumers of the beverage. In this connection it is worthy of remark that Great Britain shows a steady decrease within the past few years, the quantity imported last year, which amounted to only 41,000 tons, being less than one-half what it was four years previously.

The total importations of all kinds of coffee have been 16,938 tons in excess of the previous year, that the stocks carried over January, 1, 1886, were 1,785 tons less than at the corresponding date in 1885, and that there was exported 3,700 tons more than during 1884, thereby resulting in an increased consumption of 11,855 tons. Brazil has been the most important source of supply, the United States absorbing by far the largest proportion of the product of that empire, and the direct importations from there forming about 73 per cent of the total quantity of all kinds imported. The total importation of Brazil coffee last year from all sources was 3,180,343 bags, against 2,787,111 bags in 1884, an increase of 393,232 bags. There has been a slight falling-off in the importation from Venezuela and the United States of Columbia which amount to only 417,632 bags, against 462,040 the year previous. This has been due to the political disturbances in the latter states, which prevailed from March to September, and in some unexplained way led to the disappearance of over 40,000 bags that was expected from that source. The direct receipts from Java and Sumatra show a considerable decrease compared with last year owing to smaller crops in those islands, but the deficiency has been more than made up by increased importations from Macassar, which, although inferior in quality and price, has no doubt been readily consumed by an unsuspecting public as "old Government Java." There has been an increase in the receipts of Mexican, which are nearly double those of last year, and would seem to point to increased cultivation. These grades are of excellent quality and appearance, but in the hands of the distributer they lose their identity and find their way into consumption in the various mixtures that are sold to the public under other names. In addition to 43,753 packages received at New York, about 32,500 packages were imported at New Orleans and Galveston. The

importation of Mocha is about the same as last year, but the 18,000 bales received at all the ports is but a small percentage of the Mocha consumed, Santos Pea Berry and other similar appearing beans being used by mixers to supplement the supply of genuine Mocha. There has been a considerable increase in the importations from Holland, which are nominally brought over as the product of the East Indies, but the mixing proclivities of Dutch coffee traders are too well known to make the identity of these grades in any sense sure. — *New York Shipping List.*

PRESERVATION OF FRESH FISH.

In my official report on the town of Tellicherry recorded in G. O., Financial Department, No. 166 M., of 20th February 1886, it was mentioned that "at the time of my visit fresh sardines of large size were being sold at the rate of 100 for quarter of an anna." It was further remarked that "as this fish is so abundant at certain seasons and so cheap, it seems a great pity that it could not be cured in large quantities so as to keep good for some time for the benefit of the inland population." At other places on the coast I was also much struck with the rich harvest of the sea both as to numbers and variety, and the subject of the more general utilization of fresh fish has at intervals occupied my thoughts ever since. It was, therefore, with much satisfaction that I noticed in recent issues of *The Weekly Scotsman* a series of papers by so distinguished an authority as Professor Cossar Ewart on the preservation of fish, and, as one of these is calculated to be of some use now or hereafter in the way of increasing the food supplies of the rural population of Southern India, I take the liberty, and have now the honor, to submit it to the Right Honorable the Governor in Council with the suggestion that it might advantageously be republished in the District Gazette of Malabar and perhaps also in the Gazettes of some other maritime districts on the East Coast. Professor Ewart's attention was directed to the subject by the discovery that through the use of a "chemical powder" in preserving her fish, Norway was driving indigenous fresh herrings out of the English market, as many as 30,000 barrels having been sent across during the present winter and sold at prices so low as to defy all local competition, and in a state which led the consumers to believe that they were eating absolutely newly caught fish. Before giving the extract from the Professor's paper, I would express a hope that its perusal may induce some enterprizing firms on the West Coast of Madras to try the experiment of sending fish, prepared with the "chemical powder," by rail into the interior, where no doubt they would find a ready market. There is apparently no reason why stations all along the line, such as Coimbatore, Salem, Trichinopoly and Bangalore, and even places on the north-west line, should not be thus supplied with some of the admirable species which at certain seasons are so plentiful off the Malabar ports. I am not in a position to discuss the commercial aspects of the proposal, but *primâ facie* it seems likely to be remunerative. At present the Madras Railway carries fresh fish at reduced rates, and if the traffic were increased it is probable that a further reduction would be made. It may be also anticipated that with an increased demand more extensive and skilled means of capture, and more speedy delivery at the curing stations, would follow. In a European climate the "chemical powder" is said to keep fresh fish perfectly good for several weeks, and if in India it would perform the same office for one week or even three or four days, the gain to the country would be very great. The preservative is a mixture of common salt and boracic acid, and the latter can be bought in England for less than six pence a pound. The following are Professor Cossar Ewart's remarks on the subject, including instructions as to the application of the powder:—

THE PRESERVATION OF FRESH FISH.

The "chemical powder" used by the Norwegians for preserving herring is a mixture of boracic acid and common salt. From our greatest authority in antiseptics I have learnt that boracic acid has been in use in Norway for at least fourteen years "for the preservation of articles of food, &c." Those acquainted with Norway can well understand how necessary it is for the farmers and others who live far removed from the towns—by the margins of the long winding fords, or on the slopes of the great mountains—to provide themselves with various kinds of pickling agents. It seems boracic acid, after a long trial, has proved a most valuable preservative, chiefly because it keeps fish and other food stuffs in a perfectly fresh condition for several weeks, and, without being hurtful, it often tends to improve the flavor.

Recently, a mixture of boracic acid and salt has been used with so great success for preserving herring in a fresh condition that it is now possible for Norwegian herring to compete successfully with absolutely fresh herring in the English market. Thousands of people in England have consumed Norwegian herring a week or more after their capture, believing they were fresh from Yarmouth or some of the great Scottish fishing stations. I need not say that herring rapidly become unfit for food when taken out of the water. In summer they are often useless twenty-four hours after they are captured, and in winter the process of disintegration is not long delayed. What is true of herring is to a great extent true of other fish. Often in summer the fish landed at Newhaven (from fishing boats becalmed at sea) is all but putrid, and were it thoroughly inspected, as it doubtless should be, it would often be at once condemned as unfit for food. It is, as already pointed out, this extreme perishableness that necessitates the rapid dispatch of fresh fish, and affords an excuse for the high rates charged for carriage. Hence the boracic acid will be welcomed as a great boon if it preserves fish in a fresh condition for several weeks. On learning some time ago that the Norwegians were sending us herring preserved in a chemical powder, I succeeded in getting a sample and had it at once analyzed. After an elaborate examination, Dr. Atkinson, Assistant to the Professor of Materia Medica in the University, reported that the substance submitted to him was a very pure preparation of boracic acid. Mr. David Murray, of Anstruther, who takes a keen and practical interest in all question relating to the fish trade, was good enough to pickle several samples of herring according to the Norwegian plan. Some of these samples I have examined with the most satisfactory results. Herring pickled on the 19th January are as fresh and sweet to-day as they were when introduced into the mixture, and when cooked they can scarcely be distinguished from herring only a few hours out of the water. I understand that equally good results have been obtained by Mr. M'Combie, of Peterhead, with haddocks.

Let us now indicate how the boracic acid should be applied. For preserving herring, the best plan seems to be to make a mixture of powdered boracic acid and fine salt, taking two pounds of salt to every pound of boracic acid. This mixture having been made, the fresh herrings should be arranged in layers in a barrel, in exactly the same way as cured herring are packed, and each tier covered with a thin layer of the mixture. When the barrel is full it should be tightened down in the ordinary way, and then "pickled" with a weak solution of pure boracic acid. For treating a barrel of herrings in this manner, 2½ lb. of acid and 5 lb. of salt are required for spreading on the tiers of herrings during packing, and about 10 ounces of pure acid for dissolving in the fresh water used for pickling. After further experiments it may be found advisable to alter somewhat the proportions here given. The barrels when packed should be kept in a cool place where there is a nearly constant temperature. The expense of pickling a barrel of herrings (a barrel holds from 800 to 1,000 herrings) in this way need not be great, for boracic acid can be purchased under 6*d.* per pound. A barrel of herring, which cost originally 8*s.*, might be preserved in boracic acid and delivered in London for 14*s.*; this is supposing the pickling to cost 3*s.*,

and the carriage 3*s*. If sold for 20*s*. (*i.e.*, three or four for 1*d*.), a considerable margin would be left for profits to the curers and others.

In addition to preserving fish, boracic acid might be of use for preserving fishermen's bait. Often the fishermen (or more often the fisherwomen, at considerable expenditure of time and money, bait their lines in vain. All arrangements are made for a night's fishing, when a change of weather prevents the boats reaching the fishing ground. Before another night arrives the bait has usually lost its catching powers, and the tedious process of baiting the lines has to be repeated. Whether boracic acid will preserve bait the fishermen only can settle. If at Anstruther, or some other fishing station, two or three fishermen use bait which has been preserved for some days in an equal mixture of salt and boracic, and compare its catching power with fresh bait, they will be able to ascertain whether this preservative will in any way lessen their labors. The United States fishermen often have wonderful success when they use frozen herring as bait; the herring are usually frozen and exported from Labrador.

It may be hoped this system of treating fresh fish will be useful. It ought at least to enable our curers to compete with Norway, for in addition to other advantages they have better material to work with, our herring being undoubtedly superior to those taken around the Scandinavian coast; even the Norwegians prefer Scotch-cured herring to their own. Further, if curers preserve herring with boracic acid they will to a great extent be independent of the Railway Companies, it will no longer be necessary to dispatch fish by express trains, and pay for their carriage two or even three times their value. Whether the herring take a day or a week to reach London, Manchester, and other large towns will make no differece, and in many instances curers may with advantage forward parcels of fish by the ordinary coasting steamers. The saving made by sending fish by sea will be evident when it is stated it would probably cost less to send a barrel of herrings twice round the world by steamer than to send it once from St. Andrews to London by rail We must, however, not expect too much from boracic acid. Something more will be required before the fishery industry recovers from its present state of collapse, and begins to assume the importance it deserves. The consideration of a more thorough system of reaping and distributing the harvest of the sea will be better reserved for another communication.

TEA CULTURE IN NATAL.

Sir,—In my previous letters respecting the above, dated Oct. 10, 1884, and Aug. 28, 1885, which you kindly published, I endeavoured to convey to your readers that a profitable and pleasant industry, requiring but small capital to commence with, was open to those anxious to benefit themselves and relieve the congestion of population in this country, whereby others would be also benefited.

At the Colonial and Indian Exhibition your readers have an opportunity of seeing the exhibits of Natal tea, and assuring themselves that tea of really superior quality is grown and manufactured in South Africa, a fact that I have heard many question.

The *Natal Mercury* of March 23 has the following:—"Up to date Mr. J. L. Hulett has manufactured this season 28,500 lb. of tea. His estimate for the season was 35,000 lb., which he will be able to secure now without much difficulty." "Messrs. Lyle and Reynolds, Kirkby Vale estate, have secured over 5,000 lb. tea this season, but they anticipate getting 10,000 lb. altogether before the present season closes." These paragraphs refer only to two estates. The oldest, Mr. Hulett's, commenced with the planting of half-an-acre, Nov., 1877; 5½ acres planted out Nov., 1880; 26 acres Nov., 1881; 18 acres 1882.

Now that the industry is assured, extensive planting is going on throughout the coast lands of the colony. Mr. Hulett kindly volunteers any information required to beginners on the spot, or to correspondents. I am also open to afford all information at my disposal, and desire to state that the tea-growers in Natal have all had to grope their way without special training. I have heard it suggested that with the cultivation of Indian and Ceylon teas increasing, that over-production is sure to be the result in the course of a few years. I put the question to a practical man some few weeks back, and he replied thus: China teas year by year decrease in strength and value, owing to overcropping and the natural exhaustion of the soil. The demand for good tea is ever-increasing, and to keep up the standard of quality, increased quantities of Indian teas have to be mixed with those from China for retail trade. In other words, China at present supplies bulk, and India and Ceylon quality or strength. The sample of tea enclosed, of Mr. Hulett's, has just been valued at 2*s*. 7*d*. in bulk, and partakes of the full character of Indian and Ceylon teas in liquoring and appearance.—MORTON GREEN.

[Having submitted the inclosed sample to a firm of high standing, we have received the following report as to its quality and value: "It is very like a Ceylon tea, has a very pretty leaf, but not much of a liquor, and would be almost sure to find a market in England. If it was printed as a Ceylon tea no doubt it would fetch 1*s*. 3*d*. to 1*s*. 4*d*., but being a new tea people would not care about giving more than 1*s*. to 1*s* 2*d*., as they would not know how it would do for bulking purposes. The infusion is good, but inclined to be greenish."—ED.]—*Field*.

PEPPER.—Discussing the future prospects of pepper generally, the *Grocer* says:—"High as prices may be considered in London, they are looked upon as being very moderate or low in Singapore and Penang, and it has been reported that shipments from thence have in consequence been stopped. Be that as it may, the arrivals from the East are certain to be later than usual, having only lately begun,-whereas in other years at this time they have been near at hand; and besides that, heavier stocks were also already in warehouse. The bulk of the supply of black pepper may consist of Penang descriptions, or it may not, and the answer to this question will decide whether or not the season's shipments to this port will be large, restricted, or small. Advices from Eastern India are silent on that point, and it is of course impossible to predict whether the market will go higher or lower. Home buyers naturally would prefer to see the value further decline, as it enables them to get rid of a larger quantity of stuff and that too at a better profit. At the same time the exporters are much freer purchasers when prices tend more in their favour; and although their being so increases the competition between one branch of the trade and another, it helps to quickly absorb the supplies on offer, and make the necessity for liberal importations to this country all the greater. It thus appears that the tendency of the market is as much dependent on the largeness or smallness of the demand for export in the spring or autumn, as it is on the scantiness or abundance of the whole season's supply, and until the one or the other of these probabilities develop themselves into living facts, it is mere coquetting with the question to say what will be the prevailing condition of the pepper market during the next six months. There are, nevertheless, one or two things of which we may be sure, and the first is, that speculators for a rise—should there be any persons so foolish or misguided—will not have much scope for operating as they wish, as with Singapore white pepper of fair merchantable quality at 10¾d. to 11d., and black at 6¾d. per lb., there is but little room for a fresh advance, unless the enquiry is very strong or the consignments hither extremely light. Another circumstance which ought not to be lost sight of is, that while the supply of pepper in general does not appreciably augment, the consumption and deliveries at the leading depots are gradually extending, and may at no distant day assume bigger proportions that any dealer or exporter ever supposed."—*Home and Colonial Mail*.

A JUDICAL SLAVE AUCTION was held at Limeira, Sao Paulo, a few days since, which was largely attended. The bidding on some slaves went up as high as 1,600$, notwithstanding the maximum valuation in the Saraiva-Cotegipe compact is 900 $. It would seem that the planters have little fear of an immediate collapse of "the foundation of our society."—*Rio News.*

A SUCCESSFUL FRUIT-GROWER in the Rockhampton district gives us a chapter from the dark side of his experience as follows: "I see some one signing himself 'C. M. H.' fancies that the scale is the orange grower's worst enemy. I guess if he had to fight the orange moth as we have had to do it this season he would alter his opinion. On the evening of April 15th I. and T. caught 356, and during the fortnight, from the 10th to the 24th of April, we got 2,333. For three weeks we had to work almost all night at them, and we still have to patrol every night, and after all our work I believe that to estimate the portion of the crop thus destroyed at eleven-twelfths is very moderate. Out of the large quantities of guavas on our trees we gathered only seven sound ones, for the grubs and flying foxes got the rest." Fruit-growing in some parts of Queensland at any rate is not all "beer and skittles." Daylight marauders are bad enough, but these "night birds" are evils magnified, and "hanging is too good for them," especially the flying foxes.—*Planter and Farmer.*

THE FRUIT TRADE WITH NOVA SCOTIA.—Our contemporary, the *Colonies and India*, says:—"Very few consumers know that the nice rosylooking apples which they see in the fruiterers' shops come from Nova Scotia, or that there is exported from that province to this country something like 100,000 barrels out of an annual average production, say, of 200,000 barrels. It is only in late years that the people of the valley have awakened to the remarkable adaptability of their lands to apple culture. Cheap railway and ocean communication and the opening of the English markets a few years ago inaugurated, however, a new era. In 1871 the acreage of the valley devoted to Apple culture was 5,152; in 1881 it had increased to 8,500. To-day it is over 10,000 acres. When the next census is taken there is reason to believe it will be 16,000 acres; while the acreage of the province, which to-day is about 25,000 acres, will then at least be 30,000 acres. Nova Scotia's great advantages as a fruit producing country are these:—1st, its nearness to Europe and consequent short land and ocean carriage and cheap freights; 2nd, the generally acknowledged fact that her Apples, as a rule, have better keeping qualities than the same Apples grown on any other part of the continent, so that if properly handled the risk of loss from decay and overripeness is reduced to a minimum.—*Gardeners' Chronicle.*

TOMATOES IN POTS.—The great demand that has arisen for tomatoes has led many to give up other crops and to concentrate their energies on the production of tomatoes, which never seem sufficiently plentiful. With such a strong-rooting plant as the tomato, there is little difficulty about growing it, the main question being how to get a maximum weight of crop from a given space. We find confining the roots to a limited area, and cutting off all side shoots, so as to make regular cordons of each plant, to produce the best results. For main crops under glass, we sow in January in heat, and grow the young plants on by giving them successive shifts until they are in 8 in. pots, which are allowed to get rather full of roots. This induces free flowering, and then they are set on boxes filled with good rich soil, and allowed to root through into it. By keeping the soil moist by frequent applications of water, a very heavy crop may thus be produced in any position under glass exposed fully to sunlight. As regards varieties, I find a good selection of the old smooth red kind to be very prolific, and not easily excelled for general use; but all have their special merits. The main point is to prevent excessive leaf production by timely attention to pinching out the side shoots directly they are visible, and only leaving large and healthy foliage on the main stem. It is sheer waste of force to let a crowd of shoots grow and then cut them off. Preserve the foliage on the main stem intact, and do not let any other be produced. Plenty of fruit will set on the leading shoot for any one plant to swell off to full size.—HANTS. —*Field.*

PLANT LIFE is invigorated by the mechanical condition of the soil as certainly as by its fertilising properties. Unless the pores of mother earth are kept open above and below for air to rush in and water to move downwards healthy vegetation need not be expected. Both air and water should be able to permeate the soil freely to ensure good vegetable growth. —*Planter and Farmer.*

A BILL has been introduced into the Sao Paulo provincial assembly by Visconde de Vinhal for the repeal of the law imposing a tax of 2,000$ on all slaves imported into that province. According to the *Diario Mercantil* the reason for this is to be found in the fact that some 40 or 50 slaves have been brought into Sao Paulo from Bahia and are for sale. When this hard-fisted Paulista gets down to Rio, he will probably ask the imperial assembly to repeal the Rio Branco law and the anti-slave trade law of 1831, so that Brazil can return once more to unrestricted traffic in human flesh and blood.—*Rio News.*

COPALCHI BARK.(*Croton niveus*, Jacq.,) forms the subject of a note by M. E. Schmidt (*Repertoire*, April, p. 157). According to the author its first appearance in European commerce was in 1817, when it was brought to Hamburg under the name of Trinidad or Cuba cascarilla. He finds in the bark a bitter principle, soluble both in water and alcohol, also a resin. The aqueous infusion of the bark has a yellowish and the alcoholic a brown colour. A careful description of the physical and microscopical characters of the bark is also given, such as will serve to identify the article examined for future reference.—*Pharmaceutical Journal.*

THE WEATHER AND FEVER.—Mr. C. E. Paget, medical officer of health for the Westmoreland Combined Sanitary District, has published a detailed review of the prevalence of "fever" in the borough of Kendal. He compares it with the average rainfall, barometer records, and temperature. The records of only a few years are available, so the results may need revision, but it seems that excessive falls of rain have been followed with an increase of enteric fever; sudden falls of the barometer, especially when accompanied by heavy rain, have a similar effect; and a rise or fall of the mean annual temperature generally corresponds with an increase or decrease in the mortality from the disease. The *Lancet* points out that heavy rainfall forces the air from sewers to escape from every available outlet; reduced atmospheric pressure sucks the air from sewers and from soil alike; so that it is possible that the apparent relation between disease and the weather may have a simple explanation.—*Chemist and Druggist.*

DESICCATED COCOANUT.—Messrs. Linton, Hubbard & Co., Red Lion Square, London, are bringing out, by means of a new patent and improved process, the article known as "desiccated cocoanut," so largely used by biscuit manufacturers, confectioners, pastry-cooks, and now slowly gaining hold with the English house-wife for puddings, cakes, tarts, &c. Hitherto this has been imported by this country from the United States, but the American goods are found frequently to be adulterated with starch, topioca, Indian corn-meal, and even with "terra alba" or pulverised soap-stone. Messrs. Linton, Hubbard & Co., who do a large business in goods of this description, have therefore determined to make desiccated cocoanut and "Noix de coco" themselves, and to produce none but the purest goods. We are confident that by this enterprize they will command the general approval of the English consumer of these productions, and they also deserve the thanks of the public for introducing what is a new industry in this country, as they are the only manufacturers of these goods outside the United States. We have examined their samples, and find them much whiter and brighter than the American product. They are, moreover, fresher, and retain the full flavour better after baking. With sugar, and spread on tarts and buns, desiccated cocoanut is a delicious substitute for peel or almonds; and as such its use is likely to spread very considerably when it has been properly brought before the attention of the trade. Messrs. Linton, Hubbard & Co.'s productions cannot be too highly commended, and we wish their enterprize all the success that such energy deserves. —*British Trade Journal.*

CURING OF TOBACCO.

At the close of Mr. Jackson's very interesting article on this subject he takes exception to my recommendation as to allowing the plants to lie a short time on the ground before removal to the drying-shed. He also appears to deny the necessity of any fermentative action at all. In my own practice I found it useful to let the plants lie for an hour or two, for this reason—that the leaves, especially the lower ones, which stand out from the stem, are succulent and brittle to handle when freshly cut, and so liable to become bruised or broken when placed on the cart or wheelbarrow. When slightly wilted this does not occur. In one of the notices which I have read this is carried to excess, as the crop is directed to be laid in heaps at once, under cover, and kept there for some time; this is there called "the first sweating." I made some experiments in this direction, but found the process did not suit our climate. From the various accounts I have read it is evident that there are "more ways than one" in "killing the cat." The artificial heating process for producing the fashionable yellow colour is new to me; but, in fact, the same thing is effected in my simple way under the ripening vine leaves in a warm September. In none of the descriptions I have read can I find anything like perfect information as to the physicial changes which take place in the plant between the cutting of the crop at the beginning, and the "perfect cure" at the end. I have watched these closely, and will try to describe them. There are, in fact, two yellows concerned, which seem to be confused together in the description. A plant in proper condition for harvesting will have the lower leaf perhaps quite yellow, and the next ones, counting upwards, more or less tinged, the topmost ones remaining without apparent change. When such a plant is hung up as I have directed the whole plant will turn yellow in a few days—sometimes in forty-eight hours. Now this is yellow No. 1, and is, in fact, the "sere and yellow leaf" of normal, seasonal decadence, in which life still faintly lingers. After this, and extending over a much longer interval, comes the next grand change—the change from life to death. Then appears yellow No 2: that is the tint of tobacco-paper, minus the ripening or ferment, which is the result of any tight packing. I use the term "yellow" here, but, in fact, you can never tell what colour, differing somewhat in which individual plant, will turn up. I am familiar with every gradation, from true yellow, through varying shades of chestnut-brown to nearly black. Another example of yellow Tobacco making was described a year or two since in an admirable article in the *Times* by Mr. Hamilton Lang. Here the changes I have described seem to have been effected in the full sun. I tried this system also, but found it impracticable in our uncertain climate. I believe, however, that the colour of the ultimate product is due to soil and conditions of cultivation. This would appear from Mr. Jackson's quoted pamphlet to be either virgin or unmanured soil, and in my remarks on this subject I deprecated the use of manure as likely to encourage a rank vegetation antagonistic to the development of the aromatic and other organic products peculiar to the plant.

The phenomenon of colour is a very curious and interesting subject, and well worth investigation. I have seen a beautiful bale of yellow from China, and the Japanese I am told will produce any colour to order, from plain black shag to imperial Lebanon. Why is Turkish yellow as gold, and Latakaia as black as your hat? In all the processes I have read of, and they are many, a fermentative process is indicated, notably so in Mr. H. Lang's article, where it is described as going on for several months. Doubtless the treatment varies in different countries, and according to the purpose to which the article is destined, whether for cigars or cut Tobacco for instance. In the former instance I believe the material takes a heat after its formation into cigars. I think if Mr. Jackson were to take a pipe before and after a ripening or fermentative process he would find the difference very remarkable indeed.

Finally, the subject is new to us here in England and we should be cautious in criticising each other's work. I have only had it in hand four or five years and I begin to suspect that neither I nor anybody else "knows everything."—R. T. CLARKE.—*Gardeners' Chronicle.*

DELI TOBACCO PLANTATIONS.

Deli tobacco owes its good quality mainly to the seasonable rainfall. The soil is not so good as in Java, but there, the weather has to be struggled against, whereas planters in Deli do not trouble themselves about it. Tho longest drought lasts generally 20 to 25 days at the outset of the planting season. It is by no means easy to get nowadays suitable land sure to yield satisfactory results as is too evident from the heavy losses suffered by growers from neglect, wastefulness or ignorance, owing to most of them lacking experience. A few lucky enough to pitch upon good land at the start gained enormous profits. Others took up land at a venture, only to abandon it on finding that they could never make the enterprize pay. All the land fit for tobacco growing has been taken up throughout Deli and Serdang. Even land formerly abandoned has been again brought under cultivation generally with success. The terms for leasing are 75 years at a quit rent amounting to one guilder per bouw, besides the purchase money which varies from 2 to 6 dollars per bouw. Seeking and demarcating land is no trifling matter owing to difficulties arising from jungle swarming with leeches, ants, &c. Should the land prove to be of doubtful quality the safest course is to be always prepared for failure at a slight loss rather than to sink capital sure to be gone beyond recovery in that case. Tobacco is grown by means of Chinese coolies from Penang or Singapore. To bring out singkehs or coolies direct from China costs $50 each. Experienced coolies may be had for $30 each. Large companies always work with singkehs. Pioneers and small land owners get on better with the other class of coolies from their being cheaper, more fully acquainted with the details of cultivation, and standing the climate better. Planters deserving of confidence say that singkehs are preferable chiefly from their being less troublesome to manage. On starting an estate 60 to 100 Chinese are engaged. In clearing, roadmaking, and housebuilding operations 100 Chinese are made use of on a plantation of large size together with 30 to 40 Javanese. The wage of the latter is from 6 to 8 dollars a month. They have to work 10 hours per day and set their hands to anything handy besides the planting of tobacco. Felling jungle is undertaken by Malays and Battaks, the Chinese bearing part of the expense. After it is over, burning the felled timber, &c., is set about when the dry season sets in, generally in December. In January the Chinese set to work planting, fifteen thousand plants being set out on the average every season. They receive 5 to 8 dollars per 1,000 plants delivered into the storehouses according to quality. These houses are built of jungle timber and roofed with thatch. To every 10 Chinese, there is usually one storehouse 150 feet long, 60 broad, and 30 high. In Deli sometimes the yield becomes higher than usual when the plants admit of a second cut. The planters being almost the owners of their holdings, can manage better than their fellows on Government land in Java, besides having Chinese labourers who are simply invaluable when compared with Javanese. Safety of life and property is sufficiently ensured. The Chinese are generally well treated. Most of the difficulties with them arise out of ignorance of their language. There is medical aid at hand on every estate. I never saw any Deli planter ill-treating his coolies. The planters are first-rate fellows, hardy, muscular, hospitable, open hearted, and helpful. On the East Coast, the most unbounded hospitality is met with. Visitors are welcomed everywhere and readily supplied with information. The planters being good-humoured and enterprizing get on very well with one

another. They do not foolishly compete with each other, but help one another as much as possible. Owing to the bad weather, I was prevented from seeing the wonderful work wrought by the Deli Company, whose successful operations are borne witness to by the large dividends distributed. Other estates held either individually, or on the joint stock principle are also doing well. One remarkable characteristic that strikes the eye in Deli is the total absence of lavish display of any kind. Dwelling houses and tobacco sheds are fitted up simply just enough to meet practical requirements. Land after being cropped once is allowed to lie fallow for several years. Sorting operations are carried through by Chinese only who do the work very quickly, it being greatly facilitated by the circumstance that the rains which usually fall at the season make the tobacco pliant and easy to handle. Everything seems to work together to render the country fit for tobacco growing. However brilliantly successful many planters have been in Deli, I would not advise any one to go there at a venture trusting to luck, from the slender chances of his doing well in that quarter. There are more applicants for employment than there are situations available. I met with many young men tramping through the country vainly seeking for something to do. Generally speaking, the assistants there are of a superior stamp to those in Java from their being men of a determined and fearless cast of mind. Many of them are highly educated and they comprise a great number of foreigners. Living in Deli is not cheap. Servants in particular are expensive there. Matters however in this respect show signs of improvement. The Deli Company keeps a store of its own where ordinary food supplies are obtainable by its employees at low rates. In conclusion, I heartily wish that the planters may do well and may be amply rewarded for their toilsome exertions to develop the resources of the country.—*Samarang Locomotief.*

ROCKHAMPTON BOTANIC GARDENS.

THE ROSE.

Most people are fond of a good rose, but only a few take the trouble to grow plants so as to get blossoms worth looking at. Numbers of plants are annually put in the ground something after this fashion. They are bought from some nurseryman, and a small hole is dug, very likely about a foot square. Into this the plant is put, the soil filled in and watered. Possibly the plants thus dealt with are watered every day. A good deal of the soil in town, which has not been previously drained, when holed in this way will hold the water until it is dried out by evaporation. I have seen holes two feet deep that have been full of water for months at a time. Is it any wonder then that so many plants die. A most amusing thing is that when all has been done inadvertently that could be reasonably expected to try and kill the plants, the climate of Queensland gets the blame and hard words are used by the would-be rose grower.

My experience is, there is a great number of varieties of roses that can be grown here to prefection, if the ground has been properly prepared, and this is requisite in any country. Almost any good soil will suit roses. Experienced growers prefer a rather strong loam, but very good roses are produced here on a light sandy loam. Whatever the soil may be, it is indispensable that it be trenched and drained, and if bones are available a layer should be put in the bottom of each trench, and plenty of rotten manure spread on the surface, well dug in, and forked over two or three times to thoroughly mix it with the soil. Roses should always be grown in a bed or border by themselves, unless in cases where ground has been prepared for fruit trees. For three or four years they will do very well in the spaces between the trees if the ground is specially manured for them. When the ground has been prepared the next thing is planting. If a border, the climbing and tall-growing varieties should be set at the back, and the dwarf varieties in front. The climbers can be either trained as pillars, or on a trellis. If in a bed, put all the tall sorts in the centre.

Now, about the varieties to plant in this district. The nurserymen are offering from two to three hundred varieties in their catalogues for this year, so that it is easy to get a large collection if anyone wishes it. For my own part, I prefer a dozen or two of well-defined varieties, well cultivated, to having a larger number not skillfully and properly taken care of. For the benefit of those who may contemplate planting I will give the names of a few varieties which have done well in our gardens:—Acidal, Adam, Aimee Vibert, Baronne Hallez, Beauty of Waltham, Celine Forestier, Charles Lefebre, Cloth of Gold, Comtesse de Bertha Cramoisie Superieure, Devoniensis, Eclair de Jupiter, Gloire de Dijon, Glorie de Lyons, Victor Verdier, Paul Neron, Triomphe de Lyons, Souvenier de Dr. Gommes, Lyonaise, Dr. Ardre, Robin Hood, Lord Raglan, Marie Guillot, Madam Moreau, Marechal, Neil, Solffateur, White Banksian, Yellow Banksian, Souvenier de la Malmaison, Souvenier de un Ani, Gloire de Ducher, Madam de Vatry, Acturios, Amelia Hoste, Duke of Connaught, Mrs. Baker, President Thiers. Most of the above varieties are free growers, and are of easy cultivation.

Those who wish to propagate any favourite variety have three methods open to them; first, budding, which is very little practised in this country, and is rather a difficult operation to be performed by amateurs. I don't think it is necessary to describe how it should be done. Second, by cuttings which is easy if the season is a good one, and the cuttiugs are put in during the month of July. The cuttings should be made of well matured wood of the last season's growth, cut off square just below one of the eyes. Six inches is quite long enough for rose cuttings, and a very small portion should be left above the surface. The bed is best made of nice sandy loam, and shaded slightly. Thirdly, comes the easiest plan I can recommend, which is layering. All that is necessary is to carefully bend down the branches, and make a small hole three or four inches deep beneath where the middle of the branch touches the ground. Bend the branch until it is well down on the bottom of the hole. Cut it half through with a sharp knife; fill in soil; cut the point of the branch off to within a few inches of the ground; water occasionally, and the following Autumn the plants can be taken up, and put in a nursery bed, or planted out permanently. If the season is good layering can be done at any time from March to the beginning of August. It is very little use trying to propagate roses or anything else in such a season as the present unless there is a good supply of lagoon water to be had. It is not easy in an article like this to explain how roses ought to be pruned as this needs to be done according to the strength of the growth of the different varieties. As a general rule it is safe to cut back all tall straight growing varieties to one third of the season's growth. Those that form compact heads do best by cutting off the ends of the branches so as to make the head as symmetrical as possible, and removing all dead and useless brush out of the centre. Climbing roses require different pruning to all other varieties. They require stakes or trellising to support them. Train in the young shoots as they grow, in the spring. Take the shoots off the trellis or stake, and shorten them by about one-fourth of their length; cut off all dry or weak branches, and tie them up again neatly. I have found that from the middle of July to the middle of August is the best time to prune most varieties.—J. S. EDGAR.—*Rockhampton Bulletin.*

TEA.

We took occasion, some months ago, in commenting on the relief afforded to Java tea in the Netherlands budget, to remark that Chinese statesmen also would do well to realize the fact that Indian tea is a sufficiently dangerous competitor on its merits, without being helped by a handicap on its rivals. There

is no doubt that one reason of the rapid increase of production of India is the absolute freedom from impost, and Holland is wise in giving the nascent industry in Java similar encouragement. China tea is handicapped in two ways. SIR ROBERT HART has lately pointed out that the imperfect preparation of the leaf places it at a disadvantage with the produce of its rivals, which it will feel more keenly as the shipments from India and Ceylon augment still further in quantity; and—supplementing this argument—there has lately appeared, in the columns of our Shanghai contemporary, a series of letters insisting that heavy taxation is a still more serious factor in the case. It is beyond question that China tea might be very much improved if the same care were given to its manufacture as is given in India, Ceylon, and Java; still, though the export figures have lately become stationary; the taste for it is not dying out; England and America will still buy it at the same relative value as that from other countries; "but buyers "naturally look for the best value, and that can un- "doubtedly be better found in the duty-free produce "of other countries." The import duty of sixpence a pound which it encounters in England is no doubt in itself a heavy burden, and we have more than once suggested that there is room for grave remonstrance against the incidence of a tax which amounts to nearly a hundred per cent. on the cheaper teas, and only five-and-twenty on the dearer. It might perhaps be argued that, from this point of view—the China teas being the cheapest in the market—it constitutes an indirect handicap on the latter against their dearer rivals. There is however, here, no direct disadvantage. The sixpenny duty falls on all teas alike—whether from India, Ceylon, Java, China, or Japan. Where the shoe really pinches is at home. In India and Ceylon there is no tax at all; in Japan the duties amount only to about one dollar a picul; while China tea starts with a handicap of from 30 to 40 per cent. in the race. In the Hunan and Hupeh provinces, it. appears that local duties are exacted ranging from Tls. 5.22 to Tls. 5.38 per picul—nearly, in fact, doubling the export duty; while the districts which feed Kiukiang have to pay from Tls. 4.41 to Tls. 5.74, and Green Teas of Chekeang from Tls. 4.05 to Tls. 5.17. The legitimate export duty of Haekwan Tls. 2.50 per picul constitutes, of course, the larger portion of these amounts, and that is probably the only portion which subserves imperial purposes; lekin—ranging from about a tael and a half in the majority of cases, to H. K. Tls. 2.50 on one district of Kiangsi—comes next, and various petty local taxes go to make up the total.

It may well be asked, how can China tea be expected to hold its own, under such conditions, against absolutely untaxed rivals? The policy of remitting direct taxation, in faith that compensation will be found in a consequent increase of general prosperity is, as we remarked on a former occasion, as opposite as possible to the principles of Chinese Government; and even if Peking statesmen could be brought to see that China tea, weighted by lekin and local taxation and subject to a heavy export duty besides, is unwisely handicapped, the bare idea of relieving it of all the various squeezes which go to fill the pockets and coffers of the local officials would be sufficient to produce a rebellion in Mandarindom. Either by direct remission, however, or by a more gradual process of evaporation, it seems clear that a great portion of these taxes are certain to pass from them. If the trade is not relieved from their pressure, it will be gradually killed by increasing competition. "England," to quote the concluding words of the writer whose statistics we have taken, "will be virtu- "ally "independant of China in a few years, owing "to the rapidly increasing production of India and "Ceylon. The United States, another large customer, "promises to be chiefly supplied from Japan. Can "China afford to lose the two best customers she "has? She can only retain them by a great effort. "First, by making tea duty-free; second, by improving "the article itself."

We remarked, in a recent article on the same subject, that the Chinese are indebted to SIR ROBERT HART for having impressed it upon their attention. They will be still more indebted to him if he will return to the attack with improved statistics and with the additional weapon which the above arguments furnish. We pointed out that the figures quoted by him for India and Ceylon, produce were—unless a clerical error could be suspected—very far below the mark; and his representations could obviously not be expected to have the weight they deserve, so long as they fail to indicate the real extent of the competition. A quarter of a century ago, China had nearly a monopoly of supply to the tea markets of the world. The demand for tea has since then very greatly increased but, though the value of her tea has fallen heavily, her export stands nearly where it did; while an additional supply of 115,000,000 lbs. has grown up from India, Ceylon, Java, and Japan. The 260,000,000 lbs. sent forth by China still give her an immense preponderance; but the fact has to be faced that they constitute now only two-thirds instead of, as they once did, nine-tenths of the world's supply, Hitherto, as we have said, increasing demand has kept pace with the increasing supply from other quarters, but that supply threatens to increase so rapidly within a very easily measurable period, that keen competition must ensue in which the heavily taxed and less carefully prepared China tea is sure to suffer. Already the increase of export which might have been looked for under fair conditions has been stopped; in one case, even, the current would seem to have turned—the export of green, which in 1874-5 reached 31,000,000 lbs., against 19,500,000 lbs. from Japan—having fallen this season to about 28,000,000 lbs., against 38,000,000 lbs. from Japan! Let the Inspector-General of Customs, we repeat, return to the attack with greater vigour, improved statistics and greater breadth of argument than before. There is here, as his commentator points out, no question of conceding anything for the benefit of foreigners. It is one of importance to the Chinese themselves. If the duties are not reduced, they must be prepared to stand by and see the tea trade go to other countries which have a more intelligent fiscal policy. "China will then grow merely for its own wants, and the districts "which have profited by supplying foreign markets "will become impoverished; while a speedy reduction would again give life and importance to the trade." The prospect may seem remote; 260,000.000 lbs. is a great figure to overtake; but the tendency is distinctly in that direction, unless Chinese statesman and Chinese growers agree to mend their ways —*L. & C. Express.*

THE VALUE OF THE EUCALYPTS AS TIMBER TREES.

By D. Howitz, Forest Conservator.

The Eucalypts, or Gum-trees as they have been called, have of late years attracted a great deal of attention on account of their healthy properties, but their value as timber trees has hitherto not penetrated to the great markets. There have been several reasons for this, the distance from far-off Australia, their native place, the difficulty of transport to the shipping place, the peculiarities of the wood, which as a rule is very heavy and hard, and last, but not least, that people have not known the quality of these timber trees, nor quite understood how to treat them. There is as yet a large field open for experience with these trees, but as it is likely that they will play a prominent part in the near future, it may not be without interest to know a little of their general character and utilization.

The first objection, *viz.*, the distance to the great markets, will in a few years be somewhat modified by the introduction of the more valuable Eucalypts on a large scale into the countries around the Mediterranean, and particularly in the colony of Algiers, where the cultivation of these valuable trees is being executed at a great rate. As the Eucalypt timber gets more known, the demand for the more valuable

kinds and dimensions will also cause a brisker trade in Australia, and thereby lessen the freight and the cost as better means of obtaining these dimensions are discovered.

Foremost amongst the Eucalypts, of which a couple of hundred species are known in Australia, the great home for the whole Myrtle family, stands the Jarrah tree (*E. Marginata*) of Western Australia, where it is found on the ironstone ranges along the cost. The exact extent of the vast forest containing Jarrah timber cannot be exactly ascertained, as this tree gradually gives room for other trees, but Baron von Müller, the celebrated botanist, maintains that the belt stretches from the Collie River as the southern boundary as far as the Hershel ranges in a width of varying size. The wood is brownish, and if taken from dense forest of a straight and even texture, hard, resinous, closely grained, and particularly from rocky ground of an oily appearance. It receives a fine finish and polish, and shipbuilders prefer it to teak and oak. This wood is exceedingly durable, but its chief virtue consists in the now recognized fact that it resists the attack of the "teredo navalis" as well as that of other insects destructive to timber in exposed positions. It is therefore extremely well suited for piles, wharves, railway sleepers, and telegraph poles, and as it also resists the attack of fungi or rot caused by putrid water, it should find a prominent place as wood pavement. In Australia it is a common theory that vessels built of this wood do not require copperplating, a fact only mentioned to show that it resists animal or organic parasitical life. India has already during several decades been monopolizing this tree for railway sleepers, and a great export trade has long taken place from Perth to various places in India. On the south-eastern part of Australia is found a congener, called the Bastard Jarrah (*E. botryoides*), which resembles the Jarrah, but its wood is not so durable or oily and does not resist the attacks of insects so well. The Bastard Jarrah is found in Gippsland, in the colony of Victoria, where it forms fine forests. It grows taller and furnishes straighter and larger dimensions than the Jarrah, and though not so durable as that tree is still a most valuable timber tree. In Western Australia there were about thirty saw-mills in 1882, and most of these were only employed on the Jarrah for sleeper-cutting.

The next in rank should be the Red Gum (*E. rostrata*), on account of its durability when used for underground work. This tree is a native of Southern Australia, where it is found on river flats, in swamps, and on the plains. The wood is reddish, resinous, hard, works well, and receives a high degree of polish. Ship-builders utilize it extensively for all purposes where strength and hardness are required. If used for planks the wood should be steamed before use. This tree is being cultivated largely in Algiers, and it will not be many years before its presence there will make itself felt on the flats at Lacalle, and near Bona, where this tree seems to prosper and grow exceedingly well, but no information is as yet to hand about its timber value. For railway sleepers it is extremely well suited, and even in very awkward positions it has been known to last for upwards of 23 years before showing signs of decay. Also for wood pavement this timber should be utilized; and as it resists the attacks of insects nearly as well as the Jarrah, it should take a prominent place in importation for that purpose. To this class belong also the so-called "Flooded Gums" of South Australia and New South Wales, but as transport to the seaports is difficult, and they do not play a very prominent part, they are only mentioned here.

There are many more valuable Eucalypts, but I will not weary the reader with their names and descriptions, and only remark that amongst them are found the hardest and most durable woods known, for experience has shown that some of them are practically everlasting as fencing posts and sleepers, wear and tear, of course excepted. The large giant tree, the stringybark (*E. obliqua*), furnishes immense dimensions of a light fissile wood, useful for shingles, rails, &c., and when it becomes more known, perhaps some more paying use might be found for it, while some of the mahogany Eucalypts furnish beautiful wood for cabinet-making and ornamental work. With the present facilities for transport it is a curious fact that these timber trees are so little known in the timber market, where they ought to take a very prominent place, and it is also curious that the greatest part of these woods are exported to India and to America, while Europe knows little or nothing about them. The most practical way to test the value of these timber trees would most likely be to form a company of timber merchants to deal with the matter, and then, after having communicated with the various agent-generals in London to send a practical man out to make himself acquainted with the various places and to form business acquaintance with the saw-mill owners, so as to secure a supply of good timber to throw on the market. I have no doubt that the public would back such an effort, and I feel sure that the Australian colonies would, singly and collectively, do their utmost to aid the success of the undertaking, whereby everybody would be a gainer.

The next important Eucalypt should be the Karri of Western Australia (*E. diversicolor*, Müeller) on account of the large dimensions of a straight even-grained timber which it furnishes. This timber is much sought for masts and ship-building, and is not so heavy as the before mentioned, but of a lighter and more elastic character. The tree is of a rapid growth and reaches a great height and considerable girth. In the valleys and on the flats in South-west Australia colossal Karries are found, frequently reaching a height of 300 to 400 feet and a girth of 40 to 50 feet about 6 feet from the ground, but it is rarely found except in mixture with other Eucalypts. Most important is also the so-called Ironbark tree (*E. Leucoxylon*) found mostly in Southern Australia, although it does not furnish such large dimensions as the above named. The wood of this tree is close grained, firm, and of remarkable elasticity and durability. Carpenters, ship-builders, and wheel-wrights use it, and for treenails, rudder stocks, belaying pins, blocks, &c., as well as for wheels, spokes, &c., it cannot be surpassed. There are already several saw-mills at work, and there is room for many more, as the supply is very great. For axe handles and handles in general it excels the hickory (*Carya alba*) both as regards durability and elasticity, and as this valuable tree prefers a rocky, stony ground it will most likely be cultivated to a very large extent on the otherwise useless ranges. This tree has received some attention in Algiers, whence it may confidently be expected that a good supply will be obtained before many years. The Ironbarks of New South Wales and Queensland furnish also most valuable timber of this kind, and will, no doubt, be cultivated largely as soon as the demand for them arises; but the ignorance of the European market with regard to them has caused them to be but little appreciated as yet, and consequently the forests have not been properly protected.—*Timber Trades Journal.*

TEA IN JAPAN.

Through the courtesy of Messrs. J. M. Robertson & Co. we have been enabled to inspect several models of Japanese tea machinery and implements which have been procured by Mr. Drummond Deane and which are to be eventually presented to the Colombo Museum. These miniature models are very neatly executed in the material from which the originals are made. the basket-work and sieves been really pretty specimens of workmanship, and are worthy the inspection of those who take an interest in knowing how the Japanese manipulate their produce. It may also be of interest to give some information as to the whole course of tea cultivation and manufacture in Japan. The plantations are opened in similar localities to those we have in Ceylon, the only difference apparently being that on steep land the slope is cut into terraces to prevent wash. A gently undulating country is pre-

ferred to steep land, and great attention is paid to complete drainage. It is when we come to the planting of the tea bushes that the custom in Japan differs so much from what we have been accustomed to. The seed is planted in circles of about two feet diameter and about five feet apart. As many as thirty seeds are at first sown round each circle. The circle of seed developes into one thick bush, and here a difficulty presents itself which we avoid by our single plant system. The plants in the circle develop into different classes of bushes, so that it often happens that several varieties of plant are growing also, and consequently the leaf gets mixed together. Plucking commences in the third year, and the bush is considered at its best from the fifth to the tenth year, after which it may require manure. The bushes are topped at a height of from three to four feet. There are not more than three rounds of plucking in the year; and each lasts about twenty days or a month, the first beginning at the end of April or the beginning of May, the second in June or July, and the third (which is not always available) later on in the year. This work is done principally by women and girls, and seems to be done very roughly, as whole shoots and long stems are frequently met with in the basket. Quoting from Mr. H. Gribble's "Preparation of Japan Tea" a publication by the Asiatic Society of Japan, "as a rule the tea belongs to very small proprietors, who fire their few catties a day, generally in the entrance of their own apartments, and then sell the fired leaf to larger dealers, who as principals or go-betweens, mix their various purchases together and then send 20 or more boxes of similar tea for sale at the treaty ports. But the process of preparing the green leaf is the same whether done in a small shanty or the godowns of a well-to-do merchant." This is done by steaming it for about half-a-minute in a wooden tray with brass wire bottom, placed in the mouth of an iron cauldron set in plaster, over a wood fire and covered over with a lid. The workman takes a look at the leaves and stirs them before removal, and the moist leaves, with their natural oil brought to the surface are thrown on a wooden table for a few minutes and then fired. "A box-shaped wooden frame, about four feet long by 2½ feet broad, coated with plaster forms the oven. Charcoal (well covered with charcoal ash) is alight at the bottom of the oven, and about a foot and a half above the charcoal rests the wooden frame with tough Japanese paper stretched across it." Six-and-a-half lbs. of steamed leaf is reduced by firing to about one-and-a-half. "At first he throws up the soft, moist leaves in quick succession and keeps the whole mass moving without any attempt at rolling or twisting; gradually the leaves assume a darker color, and gradually he works them up into balls, rolling the balls between his hands, separating the leaves again, rolling them on the hot surface of the paper, and finally does so with considerable strength and pressure, occasionally resting one elbow on the edge of the tray and rolling the tea between the palms of both hands with all his might. After some hours' work (depending upon the quality of the tea) the leaves have all become separately twisted, and have changed their color to dark olive purple. They are now crisp, long, thin, wiry spills, and in the case of the best leaf look more like slender tooth-picks than the leaves of a shrub. When finished the tea is strewed on a similar firing tray, but at a lower temperature (about 100°), and is then allowed to dry until it becomes quite brittle. The heat is then further reduced to about 95° and the tea left for four to six hours, even longer, if it is intended to keep it in stock for many months. Tea well fired in this manner and afterwards packed in earthenware jars will keep for a whole year without spoiling." From this description our readers will see that, though steaming is substituted for withering, and a great saving in time is thereby effected, still the process as detailed above is one that requires considerable time and trouble; and to such as it is, must be added "sorting" by hand trays; "sifting" through sieves suspended from the ceiling; and finally "hand picking" by which stalks and refuse are separated and removed. After this, the tea is collected and taken to the treaty ports to be finally manipulated and forwarded to America and Canada, which constitute its principle markets. "There are two systems of final-firing Japan tea—pan-firing and basket-firing. Pan-firing is done in rows of iron pans (21 inches in diameter by 13 inches deep) set in brick work and heated by charcoal." About 5 lb. weight is put into each pan, and stirred until sufficiently done; then it undergoes a second stirring in a cold pan and is sifted to remove the dust, being packed into the lead-lined chests while still warm. The hot firing may take from 40 to 65 minutes and the cold-pan stirring from 25 to 60 minutes. If coloring matter has to be added it is thrown in during the firing process, and is absorbed by the tea. The American demand for colored tea is becoming less every year, and in all probability will fade away altogether before long. Allusion is here made to a matter of which we have heard before "the remanufacture in London or New York of teas shipped from the East, a process for which merchants here are not responsible." Then we have to learn how basket-firing is effected. "Basket-firing consists in simply refiring the tea without any of the stirring process as gone through in the pans. A bamboo basket, shaped like a dice box, but open at the ends, is placed over a large iron brazier containing lighted charcoal (well covered with ashes), and the tea is strewed about an inch in thickness, on a close-woven bamboo tray which fits the neck of the dice box. The baskets are occasionally removed from the brazier and the tea turned over by hand in order that all may be equally fired. They are carefully replaced on the brazier without allowing any dust or leaves to fall through the tray on to the charcoal, and in the course of 40 to 60 minutes the tea is ready for packing."

The foregoing description relates to the manufacture of ordinary Japan tea, known as Japan green tea, and in which, as our readers will no doubt note, fermentation takes no part, but in the making of Japan Congous fermentation has to occur. Hitherto the financial result of Japan-made Congous has not been a success, but, as the demand for green teas is year by year less than the supply, and American and Canada are the only markets for it, it is felt that by making black teas instead of green an outlet would be found in Europe and Australia. The greater part of the Congou made in Japan is shipped to England, where it is mixed with Indan teas, the former most effectually toning the latter, and thus forming an excellent combination. To make the black or Congou the leaf is "spread out on bamboo or straw mats in a sunny place till it is quite soft. In wet weather, or when it is cold, the leaf may be rendered sufficiently pliable by wilting on iron plates or ordinary firing pans over charcoal fires. Steaming, as in the green tea process, must be avoided, as it takes too much vitality out of what is naturally a weak tea." The rolling is done by hand: "each cooly takes a double handful and rolls, as a baker kneads dough, for thirty minutes, after which it is packed tightly in large round baskets and covered over with a cloth for an hour or so to allow it to ferment, at the expiration of which time it attains a reddish brown tint. To assist the process of fermentation the basket containing the rolled leaf should be placed in the firing-room. The leaf is then tipped out on the rolling-table, well shaken out and rolled for fifteen minutes more and fired on iron gauze sieves or drum baskets, over charcoal fires. The first mentioned process takes 45 minutes and the drum baskets seventy-five." Sifting and sorting are much about the same in making both green and black teas: in the latter case, the larger leaf is broken by the hand, and the bulk is finally reduced to 5 sizes—large and small congou, large and small pekoe, and dust. The models we have had the pleasure of inspecting fully illustrate every implement that is used in the manufacture as above described even to the box and brush for the paste used in papering the boxes. Miniature boxes ready for shipment are also included with a remarkable sample of tea in one of them. It is not probable that our planters can learn much, if anything, from the Japanese that would be of advant-

age to them in Ceylon, though the "withering" by steam is a hint which might be taken so far as experiments are concerned. But in regard to native holdings of very small extent the relation of the Japanese method of curing is especially of interest, showing as it does what can be done on a small scale and with inexpensive tools, though, as we have already stated we believe the general custom here will be for the natives to sell the green leaf as picked from the bushes to small manufacturers much as they have been accustomed to do with their coffee in past days. Mr. Drummond Deane has done a service to the island by introducing his Japanese tea boxes, and his models of implements used in Japan may be regarded as an interesting addition to our store of a material for a general knowledge of the tea interest and cultivation throughout the world.—Local "Times."

A PLEA FOR THE PRACTICE OF HYBRIDISATION OF PLANTS.

BY JAMES PINK, ESQ., F. R. H. S., BRISBANE BOTANICAL GARDENS.

THE produce of vegetation as found in its primitive state conduces little in a direct manner to the maintenance of civilized man, and it is not until it has been improved by culture that it is really of any value to the world in general. This beneficial result has been brought about by the practice of the arts of cultivation and hybridisation. In this short paper I intend to deal with the latter of these, viz:—hybridisation, including cross-fertilisation.

It may be fairly assumed that in the origin of vegetation distinct species only were in existence, all other forms being merely varieties of such species; and this opinion is confirmed by the fact that, even at the present day, botanists are unable to define what strictly constitutes a species.

It is only within a comparatively recent date that the organs of fructification of flowers have been thoroughly understood, although the ancients appear to have had certain ideas as to the sexuality of flowers. Empodocles and Anaxagoras in the fifth century before the Christian era, claim for vegetables the same sexuality as animals; and Herodotus states that the Greek cultivators of the date, Phœnix dactylifera, brought the flowers from the male plants and attached them to the fruit-bearing trees, that the produce might attain maturity. Yet it was not till 1787 that any great improvements had been effected in varieties of fruit and vegetables. In that year, Thomas Andrew Knight, President of the Royal Horticultural Society of England, commenced his experiments in hybridisation, which he carried on uninterruptedly for forty years, since which time the general appearance of our cultivated plants has very much changed. It matters not whether we look to the useful or to the ornamental department of the vegetable kingdom—at the beautiful flowers that adorn our gardens and add a charm to our daily lives; or to the more useful, the fruits and vegetables that supply our wants. In each department is the thought and skill of man apparent, as year by year new forms of beauty are added to our already large list of flowers, and new and improved varieties to our stock of fruits and vegetables. For years past both the Queensland Acclimatisation Society and the officers of the Brisbane Botanic Gardens have searched the world for fruits and plants of economic value; and with great success as the garden and orchard throughout the colony testify. But here the matter has ended; with the exception of one solitary instance—so far as I am aware—no endeavour has been made to improve such plants by raising indigenous hybrids, for it is only by such means that plants can be really acclimatised. Some one has truly said that plants like men thrive best on their native soil. The one exception to which I referred is that of our President, Dr. Bancroft, who has succeeded in raising a new and indigenous variety of grape by hybridising or crossing the Isabel with the Sweetwater, the former being the mother and the Sweetwater the father of the new variety. This was done as an experiment, and no great result could be expected of it. To have raised a really improved and invaluable hybrid I would have suggested the crossing of the Muskat of Alexandria with the Isabel. This cross would probably result in a distinct break in our varieties of grapes, and by such means we might obtain a hybrid possessing the hardness and productiveness of the Isabel with the large and delicious fruit of the Muscat.

The art of practical hybridisation is very simple in itself, but it is absolutely necessary for the operator to have a knowledge of the various parts of the flower, and especially of the functions of the organs of fructification. A typical perfectly formed flower is composed of a calyx, corolla, stamens, and pistil. It is with the two latter essential organs that the hybridist has to deal. The pistil is the central organ of the flower and is divided into three parts, the ovary, style, and stigma. The ovary is that part of the pistil which is to contain the future seed. The stigma is the moist, spungy surface destined to receive the pollen-grains by which the ovules are fertilised, and the style is the column supporting the stigma, through which the pollen-tubes pass to the ovary. A stamen consists of a stalk called a filament and the anther containing the pollen-grains. It is by conveying the pollen-grains from the anthers of the flowers of one distinct species or variety to the stigma of the flower of another species or variety that the practical process of hybridisation is effected. Hybridisation is one of the most interesting departments in the whole field of horticulture, and one which from its simplicity can be carried to a successful issue by anyone especially after having once seen the operation performed. Morning and evening, in fine weather, are the best times for effecting the process.

It will be well to glance for a moment at what other countries have effected by hybridisation. Take America, as an example and where America has led surely Australia can follow, and in her turn raise hybrid fruit of her own, better adapted to her climate than imported kinds.

America in the early days of her history did exactly as we are doing, that is, introduced all her fruits from the Old World, with various results. The apple as introduced from Europe would not thrive, neither is it indigenous to America, and early writers say that nearly all the varieties had degenerated to the normal state of "crabs." As soon, however, as Knight had promulgated his theory of crossing and hybridising, through the agency of the Royal Horticultural Society, the Americans, ever ready at grasping improved ideas, at once commenced experiments in raising new varieties of apples by means of artificial hybridisation. The result is that at the present day America has the finest collection of apples of any country in the world, and these all raised on her own soil. So local are many of these varieties, that they will not thrive out of the State in which they were raised. As with apples so with grapes. The early American colonist, crossed the European varieties with the native grapes *Vitis labrusca*. This latter unfortunately gives to all the American varieties a slightly "foxy" flavour, but it also gives them a strong constitution and large productive powers, and California is to-day reaping the benefit of the exertions of her early settlers, in both grapes and apples. To improve our own grape I think we could not do better than follow the example of America, and cross the best European or American varieties with one our native kinds, as a basis for further hybrids. I have been informed by several gentlemen that there is growing around Cooktown one of the tuberous-rooted varieties of grape. I have never seen this plant, but I very much wish to do so, for if it is only half as good as the description given me—which I have no reason to doubt—here is the very thing to our hands: a plant with a fleshy tuberous root, and consequently capable of withstanding any amount of drought, nature having adapted it to the position it occupies, and from which an endless variety of Australian hybrids might be raised perfectly suited to our climate.

I am quite aware that there have been in the past tens of thousands of chance seedling fruits such as oranges and peaches raised in this colony, yet we never get a peach equal to the original varieties as grown in Europe, in consequence of all the European kinds degenerating when imported here. The cause of the lack of improvement in these seedlings is that they have been raised from seed produced from flowers left to fertilise themselves, or to chance fertilisation by insect agency, instead of by judicious hybridisation.

Hybridisation and cross breeding of plants have now become a science of which the results in either fruit or flowers are made an almost absolute certainty. The hybridist should have a clear conception of what he wishes to obtain, and then operate on the two varieties possessing the desired qualities that he wishes to concentrate in one. For instance, take two varieties of oranges or peaches as the case may be. One is very hardy and productive variety that can be always depended on for a crop but its fruit is of inferior quality. Another variety may be of weakly constitution and a shy bearer, but its fruit is superb. and we think if the robust hardy variety would only produce fruit equal to the weakly kind what a grand thing it would be. That can never be; but there is no reason why a hybrid should not be raised, a distinct cross between the two, combining the hardiness and productiveness of the one with the superior quality of the other. To accomplish this flowers of the robust variety should be fertilised with pollen from the flowers of the weaker kinds. thus making the strong-constitutioned plant the seed bearer. If this were properly carried out the result would be a certainty; the hybrid seedling possessing the strength of the mother plant with high qualities of the male parent. It is rare that the progeny of two distinct varieties represent the parents in a perfectly intermediate degree but the general habit is usually that of the mother or seed-bearing-parent. No absolute principle can be laid down on this point, but as a rule the strongest constitution should be made the seed-bearer. Dropping from the useful to the ornamental, there is another wide field open to the labours of the hybridist. There is not a flower of any standard growing in our gardens that has not been more or less civilised or improved by this art. All our hybrid perpetual roses originated in a cross between *Rosa damascena* and the prepetual *chinensis*, and from this group all our hybrid Noisettes, and Tea and scented roses have been raised. Again, it is now difficult to realize that one of the commonest and showiest flowers grown here (the geranium) is the result of a simple cross of a variety growing wild in S. Africa with the small, flowered and sweetly-scented, foliaged *G. citriodora*. But so it is, and still new varieties are being added—the result of artificial fertilisation. It has long been considered an undeniable fact, that distinct species will not cross. It has always been a stock argument that no one has ever yet succeeded in crossing the apple with the pear; the gooseberry with the currant; or the raspberry with the strawberry. Last season this fallacy was swept away by Mr. Culverwell (*Gardeners' Chronicle*, Vol. XIX., No. 490), who succeeded in crossing the gooseberry with the black currant and raised seedlings the result of the cross; and also in raising hybrids from crossing the strawberry with the raspberry. The successes have opened up to scientists a vista of unlimited possibilities, and the full effects of which on our orchards and gardens it is impossible at present to anticipate.—*Planter and Farmer*.

CINNAMONUM OBTUSIFOLIUM.—Mr. Peal writes that *Cinnamonum obtusifolium* is wrongly named, the leaves being fairly *acute*, unless bitten off by insects. which is commonly the case, and this may have given rise to the idea that they are *obtuse*.—*Indian Forester*.

LIME is helpful to the soil by hastening the decomposition of the organic matter, and liberating the fertilising elements contained therein. Lime should not be too frequently applied to land, and is always better when mixed with some other good fertiliser which it can assist. Many have proved the great value of lime to mix with weeds, leaves, or decaying vegetable matter of all descriptions, for it hurries on decomposition and prepares the compost for immediate usefulness. The old farming proverb is a true one:—

"Lime and lime without manure
Makes both soil and farmer poor."

Another axiom equally sound is—

"To well manure and dress with lime
Will surely give good crops in time."

—*Planter and Farmer*.

IT appears from Mr. D. C. Robbins's 'Review of the Drug Trade of New York for the year 1885,' that the total import of drugs and chemicals into that port during the twelve months was valued at 46,075,063 dollars, showing a decrease of nearly 6,000,000 dollars as compared with the previous year, the falling-off being manifest in respect to both dutiable and non-dutiable goods. The import of cinchona bark, however, showed an increase for the first time in five years—from 2,588,307 pounds in 1884 to 3,559,691 pounds in 1885; whilst that of quinine also rose from 1,263,732 ounces to 1,390,691 ounces. Opium is another drug which shows a marked alteration in the figures, since although the increased import of medicinal opium only about compensates for the increase in population. the imposition of a duty of ten dollars per pound on opium prepared for smoking has practically transferred the manufacture required for home purposes from India to the States, crude opium being now largely imported for the purpose. —*Pharmaceutical Journal*.

COCAINE.—Mr. Wm. Copeland, M.R.C.S., Darlington, relates in the *Lancet* his personal experience of cocaine as an anæsthetic in an operation for cataract. He is in his 70th year. Dr. Bell Taylor, of Nottingham, performed the operation. He says:—"The solution of cocaine was applied to my eye three times at intervals of five minutes before the operation, and each step of the operation was explained to me by Dr. Taylor as it was successively accomplished; the preliminary incision was completed without pain, as was also the excision of a small portion of the iris made in the upward direction—a satisfactory answer, it appears to me, to the query. Does cocaine affect deep-seated parts? I can truthfully affirm that the whole affair was painless, that the cataract was removed without pain, that I have had very little pain or discomfort since, and can now. little more than a fortnight after the operation, see objects distinctly, make out words of small print, and am improving every day. You have had satisfactory evidence of the value of cocaine before, but I venture to think none so conclusive as this which I have now to offer."—*Chemist and Druggist*.

THE GROUND NUT TRADE AT PONDICHERRY.—The ground nut trade continues unsteady; notwithstanding prices keep within the neighbourhood of R14 per French candy of 529 lb. Up to date shipments approximate to about 2,00,000 bags, or to one-fourth or one-fifth of the probable total crop available for export. The prices in Marseilles are stationary, and show no signs of advance, while freights have gone up from 32-7 to 36-6 within the last month or six weeks. A fall, however, is expected on the setting in of the south-west monsoon; meanwhile Pondicherry is filled to overflowing, and storage is getting scarcer every day. Penruti, the principal district market for the nuts, is crammed, and large quantities are reported from the surrounding villages. Cuddalore loaded a steamer with about 30,000 bags last month, and Messrs. Parry & Co. are now said to be buying 50,000 bags more for export, but the facilities for shipping seem to be greatly inferior to those of the French port. Until within the last fortnight or so the railway ran an average of three special "nut" trains daily into Pondicherry for five or six weeks; just now the receipts are very irregular, a better price being demanded, which buyers are not disposed to consent to. Judging from the shipments already gone forward, and the enormous stocks on hand and to come forward, the ground nut season of the present year is likely to be a late one.—*Madras Mail*.

DOCTORING PLANTS—AMMONIA.—In cold bleak spring weather, such as characterised the present year, many crops—*e.g.*, French beans, come up yellow, weak, and miserable. It is usual to root them up and re-sow. I prefer another course. I wait until the weather becomes warm and settled and then give them a dose of the "doctor," which is prepared as follows:—Take 1 lb. of the strongest spirits of ammonia, price 9d., and mix it in a quart bottle with a pint of rain water. To eight gallons of ordinary water add two fluid ounces of the solution of ammonia, and then well water the plants with this weak solution. The result is surprising. Two waterings will restore the plants to an exuberant vigour with dark emerald leathery foliage.—W. M.—*Journal of Horticulture.*

THE SUCCESSFUL INTRODUCTION INTO India of the tubers of the *Arracacha* esculent of South America. W. T. Thiselton-Dyer, Esq., Director, Royal Gardens, Kew, to the Under Secretary of State for India, dated Kew, 4th January 1886. In 1882, it was ascertained that the *Arracacha* was naturalized on the hills in Jamaica, and Mr. Morris, the Director of Public Gardens and Plantations in the Colony, stated that he believed it, "to be a most valuable food-plant," and that for his own part he not merely liked it but found it to become more palatable and desirable the longer it was used. He added—"If the natives of India take to it as an article of food, I can conceive nothing more likely to flourish in the hill districts, and to afford, with little labour, the means of sustaining life under adverse circumstances." A supply of tubers received at Kew from Jamaica was sent in 1883 to Saharunpore, Ootacamund and Ceylon, and in 1884 to Calcutta, for Darjeeling. Mr. Lawson, Director of Government Cinchona Plantations, Parks and Gardens Nilgiris, reported in 1884 that plants had been raised from the tubers sent from Kew. The result in the other two botanical establishments in India has not reached us. From Ceylon Dr. Trimen has recently reported that he has raised the *Arracacha* from seed obtained direct from Jamaica. He appears to have obtained the tubers without difficulty and in abundance. As a matter of taste, he has a less favorable opinion of them than Mr. Morris. But the point to which I wish to draw your attention is that the introduction of the esculent into India is accomplished, and that its further diffusion need present no difficulty.

COCA IN FATIGUE.—Dr. E. R. Palmer, of Louisville, gives in the *American Practitioner* an account of a very remarkable experiment made with Fraser's wine of coca. He visited a seven-day "go-as-you-please" pedestrian match on the sixth day, and found that a girl of 17, who had completed 247 miles, had abandoned the contest, but had been persuaded to resume it on a written contract to pay her $100 extra if she completed 350 miles in seven days. She was walking with evident pain and weariness, gait unsteady, eyes sunken and surrounded by broad dark rims. She had nearly 103 miles to complete in 36 hours to save her distance. At the doctor's suggestion Fraser's wine of coca was given, under his own supervision. She drank a large sherry-glass-full at once, and another in 20 minutes. At 30 minutes after the first dose her step was quick and elastic, head up, and she declared that she felt like a new woman. In 10 hours she consumed a pint of the wine, and walked 48 miles, then slept for 2½ hours, walked 3 miles, and slept again for about 6 hours. She then walked for 8½ hours, with an hour's rest for food, covering 31 miles. At this period she was the freshest of all the competitors, and her time the best, barring the spurts of a professional runner. At the 339th mile she had a fall which rendered her insensible, but she returned to the contest, and completed the 350 miles, with 1½ minutes to spare. The wine of coca was given freely whenever she called for it; it did not interfere with her digestion. During two days after the contest the wine was administered regularly. It was then withdrawn, when the pulse somewhat increased with slight irregularity, which soon disappeared. Dr. Palmer says the wine of the U.S. Pharmacopœia is inelegant and possessed of all the nauseal properties of the fluid extract from which it is prepared. He implies that these can and should be removed. He says, "To my mind the experiment was both striking and conclusive, in every way favourable to the vaunted efficacy of the coca wine in physical fatigue."—*Chemist and Druggist.*

THE SOUTH MYSORE PLANTERS' ASSOCIATION ANNUAL REPORT.—New Products.—It is most agreeable to us to record that Mr. Cameron, the obliging and talented Superintendent of the Government Horticultural Gardens, has signified his readiness to afford both friendly and official assistance in all matters connected with facilitating the introduction of new staple products, and we cannot but hope that this offer may lead to the happiest of results in Mysore, in the same way as has resulted in Ceylon, Jamaica, and other Crown colonies. Coffee Adulteration.—It is a matter of supreme importance to all planters, and one which should not be lost sight of in the future, but should be regarded as one of the most baneful influence hitherto unceasingly at work to frustrate the endeavour of the producer to bring within the reach of the consumer a genuine and nutritious article. We must trust to time and future exertions to induce the general public to insist on having a pure article supplied for their daily wants. Holding as we do this opinion, it is gratifying to note that a Company has been started for the sale of the whole bean, and we venture to regard this as an indication of a growing desire on the part of Loudon merchants interested in the welfare of coffee to leave no means untried which are in any way calculated to revive the efforts which were so strenuously made some time ago by some of the leading brokers to check the sale of spurious admixtures.—*Madras Mail.*

THE EFFECT OF THE GERMAN SUGAR BOUNTIES on the consumption of Sugar was thus noticed by Mr. Mundella in an interview with sugar refiners:—

Mr. Mundella: Why, with the German consumption not more than 12lb. per head, an English, what, ("67lb.") 73lb. this last year. It is the most marvellous thing in the world. Then, as Mr. McLean said, there is no depression in the sugar trade—in the demand for sugar. The demand for sugar increases by leaps and bounds. I have an interesting little book here, published by a Professor of Political Economy (Wm. Graham Sumner) at Yale College, and he says, speaking of this system of bounty and drawback, having seen it in his own country, he says: "Germany has an excise tax upon beetroot sugar, but allows a drawback on it when exported which is greater than the tax. This acts as a bounty paid by the German tax-payer on the exportation. Consequently, beetroot sugar has appeared even in our market. The cheap market for it, however, is England." He goes on to say: "So that the consequence is that the sugar, which is 9 cents a pound in Germany, and 7 cents a pound here, is 5 cents a pound in England; and that the annual consumption of sugar per head in the three countries is as follows: "England 67½lb." (now 73lb), "United States, 51lb., and Germany, 12lb.;" and he concludes: "I sometimes find it difficult to make people understand the difference between wanting an 'industry' and wanting goods, but this case ought to make that distinction clear." He concludes: "Obviously, the Germans have the industry and the Englishmen have the sugar." Well now, that is a fact. The evidence that has come before me is indisputable. In consequence of the great cheapness of sugar in our market there is a growth of subsidiary trades, not merely in London here, but in many of our provincial towns; for instance, in some of our iron districts there are large confectionary establishments, and sweet biscuits, and trades of that kind, which, I am quite satisfied that the evidence cannot be doubted, is employing a vast many more men than we could hope to employ by the refinery trade. So that is our compensation, to say nothing about the cheapness with which our people get the sugar. I believe it is computed that they have given us £34,000,000 sterling, in one way and another, by their folly.

This is the truth. The Germans have injured the West India planters and the sugar refiners, but they have given the English people cheap sugar.

CEYLON TEAS IN THE HOME AND LOCAL MARKETS.

HOW INFERIOR TEAS AND STRANGE MARKS ARE ACCOUNTED FOR; AND HOW TO IMPROVE OUR TEAS.

(Communicated.)

Our attention has been drawn to some complaints which recently appeared in one of the London tea brokers' circulars, that a large break of inferior Ceylon tea was offered for sale in London under the new estate name. It appears to us that the broker who made the marks knew very little of what is going on here in the way of local tea sales. The explanation given to us how so large a break as about 300 chests could be offered in one sale, is very simple; they were, we are told, the aggregate purchases of a local buyer, who, to prevent inquisitive and impertinent outsiders from following and criticising his operations, erased the estate names of his purchases, and put his own mark on the packages. It is said, this practice is being generally adopted by local tea buyers, and it accounts for the disappearance, from the London sales list, of the names of many estates, known to produce large quantities of tea.

The local sales, as our readers are aware, include a very large number of small quantities, often single packages of broken tea, broken mixed, red leaf, dust and fannings: the buyers of these little lots probably make much larger profits out of their purchases than they do out those of the better descriptions. These small lots, we are also told, are added together and bulked in London, and thus large breaks are made which the trade largely bid for. What therefore is the use of London brokers complaining of parcels of inferior tea being offered for sale?

It is well known that every estate has a portion more or less of what is called inferior tea. When the proprietors can obtain for it, prices which more than cover cost of manufacture, &c., is it to be expected that they will throw it away to meet the views of those who write about what they can scarcely be expected to understand? It is suggested we should sell all our inferior rubbish to the natives; now these, we have no doubt, have a great and growing capacity for imbibing a lot of inferior tea, but they can scarcely swallow the quantities that are being rapidly produced. What then is to be done with this tea, but to follow John Chinaman's example? There is a great outcry at present amongst unthinking critics, regarding the falling-off in the quality of some of the Ceylon teas; but it is asked, reasonably enough, who are the sufferers by this?—not the brokers, nor the buyers who get tea very cheap, nor the consumers who evidently drink what they like, but the estate proprietors. Is it to be supposed, we are asked, that their own interests are not sufficiently strong to induce them to make and ship the best tea their circumstances will permit? We shall be having London brokers very soon recommending proprietors to make nothing but broken pekoes, with a bright coppery infused leaf and pungent liquor, just as we remember coffee planters were formerly advised to grow nothing but peaberry and first size, and to sell all their triage to natives! It must be admitted that the Ceylon planter as a rule knows very well what he is about, and is quite able to look after his own interests.

A manager of an estate wrote to his principal:—"For goodness sake don't write to me any more of the Colombo opinions, regarding the withering and fermenting of our teas; by endeavouring to follow them, I have overwithered and overfermented my tea, and I have now been taught by Mr. Gow the folly of adopting the opinions of the people who absolutely know nothing about the subject." May not this be the case with London brokers? That the quality of the tea from some of the older estates where the names can be followed has deteriorated, admits of no doubt whatever. The explanation offered is, that, in the majority of cases, it is only temporary! Until every planter acquires Mr. Gow's method of making good tea out of inferior leaf, there will be a recurring period of inferior quality after pruning, and this will be intensified and prolonged if the weather after pruning sets in dry.

Apart from this cause of inferiority now, much of it is attributable to the large and rapidly increasing quantity of young tea made by superintendents who have neither appliances nor the requisite knowledge for making good tea. The art of tea-making is not acquired in a day. So London brokers must make up their minds that for a good many years to come they will have to sell a good lot of inferior tea from Ceylon.

In order to baffle the idle curiosity of those who, having no concern in the matter, make invidious comparison of the teas made on various estates, it is reported that proprietors are shipping all lots of inferior tea which they may have under initials, reserving the estate's name for all good qualities. As all teas are sold on their merits, no advantage is obtained by putting estate names on the cases, except in those instances where the average prices have generally been high; buyers are induced to look at lots of these, which they would otherwise pass by.

As germane to this subject we may mention that we have been shown some samples of tea recently made on Mr. Gow's system; as far as we can judge they are very fine, a great contrast, we are informed, to the last month's tea from the same estate. These samples are valued at an average of 85 cents per lb. against 57 cents, the last sale price.

Why, then, should proprietors grope any longer in the dark? May not much of the inferiority complained of be owing to inexperienced planters trying to make teas on the advice of empirics?

THE WHOLESALE TEA TRADE.

As all matters relating to the tea trade are important to our readers, we give some particulars of the annual meeting of the Wholesale Tea Dealers' Association, which took place on Friday last, at the London Commercial Sale Rooms, Mincing Lane.

After the notice convening the meeting had been read, the secretary read the following report:—

Your committee have again the pleasure of presenting their annual report and statement of accounts made up to the 31st March last. The meetings of the committee have been as numerous as usual, and the subjects which have engaged their attention varied in character, the following being some of the most important affecting the interest of the wholesale tea trade. An action at law was brought against a wholesale tea dealer to recover warrants in his possession, which, although paid for, were said to be held as a lien for an unpaid account. Three or four witnesses were examined in court, but they failed to furnish any evidence of the custom of the trade, and in order that no doubt might exist in future on this point, a circular letter was addressed to the trade, and the Association have sufficient replies to enable any member to give satisfactory and complete evidence as to the custom of the trade. Serious complaints were made respecting unreasonable delays in the delivery of weight-notes, and the subject was brought under the notice of the selling brokers, who at once met the case in a fair spirit and a marked improvement has since taken place. The weighing of Indian teas upon the average net weight principle was found

work with some injustice to the recipients of single packages, and a representation was made to the Customs' authorities which resulted in the amended regulation of November 9th last. It provides that if the variation in the test packages exceeds 2 lb., the whole parcel must be weighed gross and tare as formerly. Your committee would be glad to receive the opinion of the members generally upon the working of this amended regulation, as two or three cases of gross irregularity have recently been reported. An improved method of sampling tea has been adopted at Butler's Wharf, by which a return of fair value is guaranteed, and by the introduction of the principle of payment by stamps the dealers' returns are rendered unnecessary. This, it is confidently believed, will relieve the dealers from some trouble, and no inconsiderable risk of robbery; at the same time, purchasers will, in all cases receive returns, nearly, if not more, than equivalent in value to the sample drawn. It is hoped other warehouse proprietors will see their way to adopt a similar course in this respect. The charges for sampling and carding tea at the bonded warehouses have for a long time been considered exorbitant, and your committee, after making repeated applications to the proprietors for redress, have at last the pleasure to state that these rates were reduced on February 1st, the former by about 30 per cent. and the latter 50 per cent. This the members will no doubt consider a satisfactory step. There is, however, a matter in respect to the varying rates of insurance for teas lying at the docks and warehouses which is engaging the attention of your Committee, who expected the warehouse proprietors whould have met the case liberally. Two or three, however, have arranged either to pay or allow the amount paid for insurance, and negotiations are pending which will, it is hoped, result in the trade being placed in a position to be independent of warehouses where no allowance is made. The thanks of the Committee are again due to Messrs. Francis Peek, Winch & Co. for the use of their room for meetings' and in conclusion your Committee would acknowledge the continued confidence and valuable support of the members, upon whose assistance they rely to successfully carry on the important work of protecting and advancing their interests.—Signed on behalf of the Committee, Charles Hilhouse, Chairman.

The Chairman moved—"That the report and statement of accounts be adopted, printed, and circulated amongst the members." He said he thought the report, as a whole, must be deemed satisfactory, inasmuch as one or two causes of complaint had been met. One regarded the facilitating of the delivery of weight-notes, and the other—which was still more important—affected the trade in the reduction of charges both for sampling and carding tea at the bonded warehouses. There was a further reference in the report to a matter at present in embryo—a matter which must be pushed forward with considerable energy and determination on the part of the trade, inasmuch as it was of the most vital importance to the wholesale man and to the dealer in the country—that was the question of sampling. There were very few days in the week in which some of them did not receive some notice as to the quantity or quality of tea in chests forwarded to their customers. The plan that had been adopted at one wharf of making payments by stamps had inaugurated a principle which had occupied the attention of the trade for some years, and they hoped that the system at Butler's Wharf would be permanently adopted at all warehouses. It would improve the returns, and insure the recipient of the tea that quality which he had a right to expect. With regard to insurance, it was a very broad and difficult question, but it was withiu the knowledge of the trade that the rates of insurance had been considerably enhanced lately, and the committee thought they had a very fair claim on the dock companies, looking to the charges that the trade was subjected to. The committee, therefore, asked that the trade might be met to a certain extent in the extra payment. The proprietors of one warehouse had altogether agreed to pay the extra charge, and from the proprietors of another a satisfactory answer had been received; but with regard to some of the larger warehouses—those belonging to the East and West India Docks and general warehouses—the committee had not made the progress they had hoped for. They were still, however, having interviews with gentlemen interested, and he hoped that before long they would be able to get those gentlemen to see the force of the reasons actuating them. In reference to the accommodation for the bonding of tea the committee felt that, with the large increase in the importation of tea which had taken place in the last twenty-five or thirty years, since the abolition of the charter, there was not sufficient accommodation for the trade, and an application had been made to the Customs to sanction an increase of bonding facilities, which they did not seem at present inclined to grant. They had referred the Committee to the Treasury, and a deputation would very shortly wait upon one of the Lords of the Treasury on the subject, because the Committee felt that if they could get more bonded warehouse included in the Customs bond they would be able to bring more power to bear on the warehouses, which at present had a control over tea which amounted almost to a monopoly. If there were other warehouses to which preference might be given, an outside force might be brought to bear on the companies, so that the trade would have a chance of carrying its point. He hoped the members of the trade would consider the report satisfactory.

Mr. Worthington seconded the motion, which was agreed to.

Mr. Pearse proposed Mr. Jones seconded, and it was resolved:—"That the members of the Committee and the Honorary Treasurer be re-elected for the ensuing year; and further, that the thanks of this meeting be tendered to them for their efficient services."

On the proposition of Mr. Peek, seconded by Mr. S. Edwards, it was resolved:—"That inasmuch as the importation of tea has increased nearly 100 per cent since the present bonded wharves and warehouses were licensed by the Customs authorities, and as the limitation of bonding accommodation has tended to combination and exorbitant rates to wholesale dealers, this meeting requests the Committee to take such steps as may be necessary to secure additional bonding facilities."

Mr. S. Edwards moved—"That the experiment of having sample returns placed by warehouse proprietors in the packages in their keeping, selected from standard qualities, having proved to be practicable and an act of justice to buyers, this meeting requests the Committee to urge the general acceptance of this principle."

This was seconded by Mr. Lowcock, and agreed to.

The Secretary, referring to the recent fire at Hay's Wharf, said he visited the premises the day before that meeting. The system that had been adopted where tea was stored three packages on one making a pile of four packages, and the water came through from the upper floor, was this—they treated the top and bottom packages as damaged and the two intervening ones as sound hence in the lists exhibited in the warehouse, the numbers ran irregularly. The proprietors of the wharf informed him that if any dealer wished to have the teas inspected he could send down, and the tea should be laid out for inspection without any expence to the dealer. It was impossible for them to tell with certainty in all cases which packages were damaged and which were not, and it was very desirable in the interests of the wholesale dealers that the teas should be inspected before they were sent away from the wharf, since the liability of the warehousekeepers ceased upon the teas leaving the bonding warehouse. He had a list, made up to 11 o'clock that morning, of the teas destroyed by the fire, and a long list of those damaged by water, but the proprietors of the wharf had not yet been able to furnish a complete list of all teas burnt, or damaged by water or smoke.

Mr. Harrison asked what assurance dealers would have that teas not included in the list really were

not damaged. Damage by smoke would probably not be detected except by tasting.

The Chairman observed that teas would become affected by remaining long in the atmosphere of the wharf.

Mr. Peek said the water ran down the sides of the packages, and, therefore, those besides the two at the top and bottom must be more or less affected. He thought all the packages in the warehouse destroyed ought to have been handed over to the insurance offices as salvage, and that a claim ought to have been made on all of them.

The Chairman said that that was the only safe plan.

The discussion was continued by Mr. Pearse, Mr. Worthington, Mr. Harrison, and the Chairman.

The Secretary and Mr. Peek suggested that the proprietors of the wharf should be asked to give a list of all teas lying on April 21st in the building destroyed, and on the west of it. The Secretary promised to forward copies to all members of the Association.—*H. & C. Mail.*

TEA COMPANIES REPORT.

DARJEELING COMPANY, LIMITED.

Nominal capital £250,000, in 12,500 shares of £20 each; paid-up capital £135,420, in 6,771 shares of £20 each. Directors: John Farley Leith, Esq., Q. C., Chairman; Sir George Macleay, K. C. M. G.; William Sangster, Esq.; James Percy Leith, Esq.; Henry Smith, Esq. Calcutta Agents; Messrs, Begg, Dunlop and Co. General Manager; William Roberts, Esq.

The following is the report of the directors, to be made to the members at the twenty-first annual ordinary meeting, to be held on May 10th.

The directors beg to present their annual report and several accounts for the consideration and approval of the members of the Darjeeling Company, Limited.

The directors are pleased to be able to state that the gross profit derived from the operations of 1885 amounts to £14,253, which is an increase of £2,429 over the gross profit realized in 1884, and after setting apart a sufficient sum to meet the payments of commissions on profits and income-tax, the sum of £12,249 16s 6d will remain as net profits.

The directors accordingly have the pleasure to recommend to the members of the company the declaration of a dividend at the rate of eight per cent, clear of Income Tax, (which is one per cent above the dividend paid this time last year), and to carry the residue, say £1,416, to the credit of the reserve fund, which will then amount to £5,384 13s 2d of undivided profits.

The crop of 1885 amounted to 511,037 lb. of tea, showing a considerable increase of 37,831 lb. over the crop of 1884; and the average price per lb. was 1s 5·72d against 1s 5·41d in 1884; thus clearly indicating that the increased quantity of tea made in 1885 did not in any way reduce the high standard of quality that has been maintained for some years past. The proceeds of the sales amount to £37,195 19s 10d, being an increase of £3,219 19s 7d over 1884.

There was a further decline in the rates of exchange between India and London during the year 1885, and consequently the difference between these rates and the par rate of two shillings per rupee on the amount of drafts (£17,000) negotiated by our Calcutta agents was £4,330 10d, showing an increase of £1,037 1s 11d, over 1884, when drafts to the extent of £16,500 were drawn.

Thus the proceeds of the crop of tea, and the difference in the rates of exchange, amount to £41,526 8d; and adding to this the sum of £64 12s 5d, realized by the sale of teas in small boxes in 1884, the total receipts amount to £41,590 13s 1d, being £4,268 4d, above the sum realized in 1884 under similar headings.

Comparing the debit side of this profit and loss account for 1885 with that for 1884, it will be found that the expenditure at Darjeeling was £1,315 2s 7d in excess of that in 1884.

Miscellaneous expenditure was £57 5s 7d less than in 1884.

Insurance and charges on tea show a large increase of £581 13s 1d over 1884, caused by the extra charges on the increased quantity of tea manufactured and sold, and by largely enhanced rates levied for warehousing and working teas in London.

Thus the total expenditure in 1885 was £27,337 8s 8d being £1,839 10s 1d more than in 1884, and the gross profit in 1885 was £14,253; against gross profit in 1884; £11,824; increase in 1885, £2,429.

The usual comparative statements for the past three years are now recorded:—

TOTAL OUT-TURN OF TEA AND COST AT PLANTATION.

	Acres.	lb.	lb. per acre.	R.
In 1883 ...	1,562 ...	473,810	at 303 ...	182,965
In 1884 ...	1.586 ...	473,206	at 298 ...	174,932
In 1885 ...	1,661 —	511,037	at 307 ...	188,082

GROSS EXPENDITURE AND COST PER LB. OF TEA, AFTER DEDUCTING THE DIFFERENCE IN THE RATES OF EXCHANGE.

In 1883,	£25,461 ...	cost per lb.	1s 7d
In 1884,	£23,856 ...	„	1s 18d
In 1885,	£25,010 ...	„	0s 91d

ACCOUNT SALES WEIGHTS OF TEA, AVERAGE PRICES AND PROCEEDS.

In 1883,	463,631 lb.	at 1s 6·59d,	£5,927
In 1884,	468.239	„ at 1s 5·41d,	£33,975
In 1885,	503,754	„ at 1s 5 72d,	£37,195

The directors have recommended a dividend at the rate of 8 per cent, the members will be asked to confirm the same resolution, making it payable on and after May 10th, clear of income-tax.

From 1883 crop of tea, at 7½ per cent
„ 1884 „ 7 „
„ 1885 „ 8 „

The amount to the credit of this fund on 31st December 1884 was		£3,275	0 11
From profit and loss account, 1884		693	7 9
		£3,968	8 8
From profit and loss account, 1885		1,416	4 6
Total		£5,384	13 2

This reserve fund has been found most useful in the financial arrangements of the company, more particularly as there is no other working capital available.

The following are the estimates prepared by the manager at Darjeeling, showing the probable quantity of tea that will be made during season 1886, and the expenditure at Darjeeling for cultivating and maintaining the several plantations in a high state of efficiency, and for gathering, manufacturing and packing the crop of tea.

ESTIMATED CROP OF TEA AND EXPENDITURE IN 1886.

	lb.	R.
Ambotia Plantation	208,000	58,372
Ging do.	140,000	47,669
Tukdah do.	112,000	37,720
Phoobsering do.	72,000	25,004
Sudder Charges	—	12,827
Totals	532,000	181,292

These estimates compare favourably with the actual results of the previous season, viz.:—Crop of 1886, estimated 532,000 lb; outlay, 1886, estimated R181,292. Crop of 1885, actual 511,037 lb; outlay, 1885, actual R188,083. Increase, 1886, estimated 20,963 lb; outlay decrease, estimated R6,791.

Sir George Macleay retires by rotation on this occasion from the direction and, being eligible, he offers himself for re-election as a director of the company.

Mr. John W. Roberts, the auditor of the company, begs to offer himself for re-election for the ensuing year.—*H. and C. Mail.*

HARD FOR THE PRODUCER OF SUGAR, TEA, COFFEE, COCOA, &c.

From the *Home and Colonial Mail*, April 30th.

The totals given by Sir William Harcourt in his Budget speech lead to the inference that commercial operations during the first quarter of the present year have been more satisfactory than usual. The *Grocer* takes exception to this view, and, while admitting that the volume of business passing through the grocers' hand has been large, is considerate enough to admit that the continuous decline in prices has been very unfavourable to importers and producers. Undoubtedly this is so, as producers know to their cost. The following figures show that the consumption of many articles of food and manufacture that are entirely "duty free" has increased in an astonishing degree within the last fifteen years:—

			1870.	1873.	1876.
Tea	...	lb.	140,986.000	162,344,100	185,698,000
Coffee	...	cwt.	1,605.730	1,683,700	1,341,38
Cocoa	...	lb.	14,793.000	19,661,250	20,382.300
Sugar	...	tons	721,800	833,500	779.360
			1879.	1882.	1885.
Tea	...	lb.	184,510,300	211,080.300	212,375,300
Coffee	...	cwt.	1,617,380	1,358.960	1,035,600
Cocoa	...	lb.	26,344,760	18,990.400	23,419,400
Sugar	...	tons	885,660	1,128 727	1,236 000

With the exception of coffee, which has given place to tea and cocoa, there is a marked increase in quantities, but much of the increase in the quantities consumed has been due to their extraordinary cheapness as to the abundance and freedom with which they have been offered on the different markets. Nearly all kinds of produce have been declining in value since the begining of January last, and amongst others, sugar, coffee, cocoa, tea.

The losses in the tea trade during the past two or three months on sales by auction "without reserve," especially where the parcels on offer have been in "second hands;" and Indian teas, for example, have lately been disposed of in London at a decline of 8d to 1s 2d per lb., from the cost prices in Calcutta in November and December last. Similar instances of an alarming depreciation in the value of produce could be mentioned as having taken place of late.

A further illustration of the lowness of prices, and the disparity existing between them and those towards the end of April in 1870 is afforded by the following statement of the quotations for some of the leading articles of produce, viz:—

SUGAR.

	Demerara.	Low E. I.	Pieces	Loaves.	Beet. f.o.b. (88°/°)
1870...	34/ to 38/...	21/ to 29/...	30/ to 38/..	40/ to 41/	..33/
1886...	16/6,.	20/6...10/,.	14/6.. 12/ ,,	17/...16/6 ,,	17/6...13/

	MAIZE.	TEA.	COFFEE.	COCOA.
	good com.	mid. to fine		Grenada
			P. C.	
1870...	28/ to 31/...	1/ to 1/1 ...	72/ to 90/...	46/ to 72/
1886...	20/ ,,	21/...0/8 ,, 0/8½...	66/ ,, 108/...	70/ ,, 80/

MR. SHAND ON CEYLON PRODUCTS AT THE COLONIES AND INDIAN EXHIBITION.

Planters' Association of Ceylon,
Kandy, 27th May 1886.

To the Editors, Ceylon Observer.

SIRS,—I beg to enclose for publication copy of letter received from Mr. Shand on the subject of the Colonial and Indian Exhibition.—I am, sirs, yours faithfully, A. PHILIP, Secy.

Ceylon Commission, Colonial and Indian Exhibition, South Kensington, S. W., London, 7th May 1886.

The Secretary, Planters' Association of Ceylon, Kandy.

DEAR SIR,—Your letter of 15th March, which seems to have lain in Colombo for some time, reached at last safely.

Since I last wrote to you we have had a very busy time unpacking and arranging, and though I was not quite ready on the 4th, and it will be some days still before I get our exhibits entirely in order. With the assistance of Mr. Whitham I was able to place our collection fairly before the public. You will, of course, have detailed accounts of the opening ceremony, which was grand and impressive, and Ceylon was fortunate in the position of the seats which were alloted to it and a very liberal allowance of tickets for the Exhibition ceremony was placed at the disposal of myself and others by Mr. Birch for Ceylon friends.

Our three tea cases are arranged along the wall and contain samples of commercial teas from thirty-six (36) different estates; we had not enough to fill these up sent specially so we had to make a selection from the teas of other estates which had enough to show in these cases. Above those cases are Mr. Ferguson's photographs with drawings of tea, coffee, cocoa and cardamoms which I received from Dr. Trimen, and we have also thirty (30) bottles of fancy teas for show on one of our auxiliary stands, while Messrs. Henry S. King & Co. have 343 bottles in the tea trophy opposite one of the Ceylon tea rooms and adjoining the Indian trophies, which is a larger number than Assam or any other Indian districts show.

Our Cardamom case contains eighteen specimens of cardamoms from different estates, and we have filled up the vacant corners with mace and nutmegs from Roseneath, and two samples of vanilla.

The Cocoa case contains twelve (12) samples of cocoa, the corners being filled up with six specimens of Liberian coffee.

Cinchona bark and sections of trees are not things which one can make a pretty show of, but we have made a trophy showing off the splendid section of trees chiefly from Glenlyon, and the magnificent quills from Stair, Glenyon, and other estates and with sections of own space occupied by coffee barrels it has been pronounced by many connected with Ceylon a very effective Show; the rest of our coffee barrels are shown in a pile and show off very well too. I must mention that the show cases and the coffee barrels are very much admired and certainly exhibit their contents to great advantage. I have had a case made for cinchona shavings and pieces which contains the collections from Yarrow, St. Leonards and Mr. Lane's and the Lanka Company.

I have also had a couple of additional stands made for showing off our fancy teas, the samples of coffee for which there are no barrels, Mr. Borron's collection of anatto and Mr. Dickson's collection from Lebanon, and peppers, cotton and other things which we have no special room for. There was a tremendous rush to get things at all in order for the opening, but when I next write I hope to be able to tell you that everything, as far as arrangement goes, has been finished.

The pamphlet is in Messrs. H. S. King & Co.'s hands and the colored paintings were submitted to me yesterday. I do not like them and do not consider them natural, nor does the artist, who says they could be better done if the photographs were departed from altogether, but as what I presume we desire is a faithful representation rather than a work of fancy I have declined to agree to this.

The Ceylon tea room, adjoining my office, in Kandyan palace style, is much admired and frequented, but this is only the third day after opening and there are details which are not yet quite satisfactory but which we shall, I hope, soon adjust. A great many people connected with Ceylon have visited the Exhibition already and they have all expressed satisfaction with our space and arrangements.

I have not yet been able to shake down in my office so I must ask you to excuse this letter which I cannot close without recording the valuable co-operation I have received from Mr. Harry Whitham and also the assistance I have received from Messrs. Birch Davidson, and Goodwin, (Messrs. Henry S. King & Co.) who have all helped me in many ways.—I remain, faithfully yours, (Signed) J. L. SHAND.

P.S.—Messrs. Gow, Wilson and Stanton have supplied us with two large diagrams illustrative of the progress of Ceylon tea which have been placed one adjoining our tea-cases and one close to the tea trophy.—(Initialed) J.L.S.

TOBACCO CULTIVATION IN CEYLON.

The fact that Parliament has decided under certain fixed restrictions to once again permit the cultivation of tobacco within the British Isles is evidence of the extension of the demand for the fragrant weed. In spite of all that has been urged against its use, there seems to be no chance of a diminution. No doubt—as is the case with most of the other gifts of Nature—it is the abuse, *i.e.*, the inordinate use of tobacco, which is injurious, and probably as long as the world lasts, some indulgence in "the weed" will continue. There is no room for doubting that the supply of genuine Havana and Manilla tobacco is no longer sufficient to meet the tastes of the many thousands who restrict their smoking to the product of Cuba and the Philippines. But the expense of the superior Havana tobacco, compels men of moderate means to forego its enjoyment, and, as the result we find the growths of many other countries possessing a place in the tobacconists' shops in London which has hitherto been wanting to them. We may naturally ask why our island tobacco should not compete successfully with these—why it is that among the varieties now offered to the patronage of English smokers Ceylon tobacco finds hardly a place?

There is no cultivation, perhaps, the resulting qualities of which are more dependent upon peculiarities of soil than tobacco. The finest seed, if deposited in unsuitable soils grows up coarse and rank, its leaf departing in a special degree from the original type. But good authorities regard as certain that in Ceylon there are certain localities as well fitted to the growth of the finer descriptions of tobacco as are the West Indies. It only needs that those should be sought out with the same care, and with the same scientific discrimination, as have been given to other forms of cultivation in this island. We have learned from experience how varied are the capabilities of the soil of Ceylon, which in years past had been condemned as suited to scarcely more than a single product for the hill-country and one or two for the plains; and the results which have arisen out of that experience should certainly lead us to extend the information we possess in respect of the growth of tobacco. Such extension can only be gained by full enquiry, and it may be hoped that Dr. Trimen, when he returns, may be enabled to prosecute it. An industry which has for so many years afforded occupation to a large body of native cultivators in Ceylon should not be allowed to lag behind for want of the research for which the means exist ready to our hands.

Among the exhibits forwarded to the exhibition at Kensington from this island was a considerable quantity of the coarse Jaffna tobacco, which was labelled as for "chewing" purposes only. We are told that when the case containing it was opened, the remark was made:—"Oh! this is only that common Jaffna tobacco. It can be put anywhere." It is a pity, we think, that with the capabilities possessed by Ceylon any such remark should be warranted. The coarse and strong tobacco referred to has its market, and an extensive one, among our Indian neighbours, who highly appreciate it, but those who have tried the finer sorts of tobacco which have been successfully grown on our uplands, and especially in the Badulla and Dumbara districts, know how widely the qualities of Ceylon grown tobacco may vary. Mr. J. K. Ingleton, we believe, sent to the Exhibition, samples of his Dumbara cigars, but we do not hear of their being noticed as yet. Experimental shipments of the Central Province growth and the cigars as well as cheroots made of it, have been sold in the London shops under the name of "Lankas." But they did not take the public taste, and we learn from a correspondent that they are now rarely to be seen offered for sale. We are told that this was chiefly due to the appearance of the cheroots. It seems certain that there is a fashion in English smoking circles, and that there are many who dislike to smoke a cigar, however good its flavour,—and that of the Ceylon importation was admitted to be good—because it could be recognized not to be of the Havana type. We are assured that there is a very extensive sale of cigars made in England and on the Continent of Europe, from the Havana leaf, because, although their flavour is poor as compared with genuine foreign cigars, they satisfy the critical eye by their appearance.

Now there are divers and strong reasons why home-made cigars, however fine the leaf from which they are manufactured and however perfect their manipulation in rolling may be, can never aspire to the quality of those prepared in the countries where the leaf is grown. That leaf, after packing and shipment, becomes dry and hard, and it is necessary for its preparation—and especially for the removal of the stronger ribs—to re-steep it in saltpetre and water. This militates against its flavour when soaked, so markedly, that any tyro in the art of smoking can pronounce against the genuineness of it as a foreign cigar. Then, again the spots on the tobacco which are the result of dew falling on the leaf during drying, are lost by the second stripping referred to. We see, consequently, that home-made cigars ought not to be able to compete with those prepared when the tobacco is naturally soft and yielding.

We would urge therefore, that endeavour should be made so to select soils suited to our island growth as should ensure it a fair competition with the West Indian products in flavour, and that, secondly, the dictates of an imperious fashion should be complied with, so as to overcome the dislike to the use of cigars which betray by their appearance that they are not of the coveted growth. Efforts we know have been made in this direction, and successful efforts too, by a gentleman in the Dumbara valley,—but they want further pursuit to ensure such a success as would mean the establishment of a profitable industry of permanent value to the island and to no insignificant number of its people.

PURE JAPAN TEA.

In the articles on "Tea and Tea Customs in Japan," concluded in this issue,* the statement is made that "tea in the West and tea in the far-off East are, two quite different beverages." This is largely due so far as the United States is concerned, to hasty and imperfect preparation for market and the prejudice of consumers. It is thirty years since Japan tea was introduced into this country. The first large cargo of 3,100 half-chests, about 124,000 pounds, was imported by Messrs. A. A. Low & Bro., and consisted entirely of a leaf of a blackish color, in which no coloring matter of any sort was employed. These teas won their way into popular favor because the people objected to the then highly-colored China teas, made so by the use of Prussian blue, gypsum, etc. In 1866-67 the Japanese commenced to adopt the Chinese method and pursued it so diligently that they overdid the matter, the highly colored teas causing a scum to form on the infusion. The trade remonstrated and the abuse was modified, but to this day the bulk of Japan tea sold in the United States is more or less arti

* Republished in full, see pages 40-41.—ED.

ficially colored, it being claimed that the coating of the leaf, to some extent preserves the flavor.

The fact that colored Japan tea retains it flavor more tenaciously than pure tea, or natural leaf, is, we believe, due to the more thorough twisting of the leaf by the manipulation necessary to properly coat it with plumbago or other substance, than to the coloring matter.

Elsewhere Messrs. A. Schilling & Co., Chicago, Ill. agents for the Japan Tea Syndicate, call attention to efforts now being made to place before the trade Japan tea that is free from coloring matter, that is not manipulated by hand, and that is packed in Japan while hot in a patented package and shipped only by direct consignment to merchants in this country.

The nearer the native method of packing Japan tea is followed the better it is for flavor. The large earthenware jar used in the producing country is impracticable for export by reason of its expense and liability to breakage. The next best package is tin, and if the tea is packed therein when hot and sealed it must reach our market in better condition than if sealed in lead-lined chests, which the retailer must open, emptying the contents into a large tin canister, where it is more or less exposed to the air, causing a rapid loss of flavor. If there is no exposure between the packer and the consumer the full flavor of the tea must be preserved.

The use of Prussian blue or gypsum for coloring tea is wholly for the purpose of pleasing the eye of the consumer. The time has come when the use of articles in the preparation of food, requiring explanation or defence, must stop. The use of plumbago, Prussian blue, gypsum, etc., in an article like tea, that must always be judged by its cup quality, and not its appearance in the leaf, is indefensible. Does any one doubt that purer teas mean an increased consumption? Or that a better understanding on the part of consumers of methods of preparation will not tend to popularize the beverage? The country increases its per capita consumption of coffee every year, while that of tea does not increase, but rather diminishes. We therefore welcome any move calculated to raise the standard of the tea supply.—*American Grocer.*

COCOA.—Accounts from Surinam are very favourable respecting the Cocoa-culture; even the young trees, planted only five years ago in the Districts of Surinam and Commewyne on abandoned sugar-fields, have surmounted the many difficulties, and promise a good crop. The one-year-old trees, on the contrary, are in a less favourable condition, owing mainly to insufficient sheltering against the heat of the sun, and are partially lost. Additional plantings of cocoa are constantly being continued. There is great scarcity of available manual labour, and this want is felt most severely in proportion, as the estates are farther from the capital.—*Indian Mercury.*

JAVA PLANTER ARRANGING FOR RETAIL SALES OF QUININE BARK.—A Cinchona planter in Java, of high repute in the course of a business letter, under date 2nd May, writes to us as below: his news will be of interest to "A. M. W." and other Ceylon planters:—"Nobody can tell what will be the future for us, but as a powerful means to keep up prices, we are trying to increase the consumption of quinine by taking the retail-sale of this drug as much as possible in hand ourselves, and for this purpose have got up a Committee. No doubt the necessary funds will be forthcoming, because some trials have given good results. Quinine from the Brunswick manufactory was offered in very beautiful gelatine quills at 155 guilders a kilo, and within a very short time sold out. We, moreover, got sulphate of quinine crystallized in tin-boxes of half a kilo each for 60 guilders, and the Amsterdam manufactory offers quinine in paper parcels of a gram each—very neatly packed, for 100 guilders a kilogram, delivered at Batavia. If there are, perhaps, among your countrymen such that want to escape too high prices from apothecary or druggists, I shall only be too happy to interpret their wishes to the said Committee. You will find more a bout it in ——— ——."

THE DECADENCE AND ADVANCE OF COFFEE CULTURE IN BRAZIL are thus noticed in the *Rio News*:—

The commerce of Santos has been making rapid advances, and as a coffee-shipping port is rapidly overhauling Rio itself. In a few years, fewer perhaps than most men realize, the port of Santos will be even more important than that of Rio in the coffee trade, and a close second in the import trade. The reasons for this are clear. While the coffee-producing areas of Rio and Minas cannot be much further extended and are already showing signs of decline because of the exhaustion of the soil and the character of the country which requires the slave and his hoe for its cultivation, the coffee-producing areas in Sao Paulo are being rapidly extended and still have extensive tracts of arable land yet untouched. In Rio the steep hillsides preclude the use of the plough and cultivator, while in Sao Paulo nearly all the coffee lands can be cultivated with these tools, thus rendering the employment of free labor practicable and profitable. While therefore the coffee product of Rio and Minas must decline with the extinction of slavery, that of Sao Paulo will surely increase. Besides this the speading railway system of Sao Paulo is bringing an enormous section of the Empire into direct communication with Santos, and as the districts within this area become settled with free laborers, and as their industries are developed, their consumption of imported goods will tend to swell the trade of that port. It is clear, therefore, that the future of the city of Santos is most promising, and that no time should be lost in anticipating the needs of a great commercial port.

AGRICULTURE IN JAFFNA.—We are in receipt of a pamphlet containing an essay on agriculture by R. O. D. Asbury, Esq. delivered several years ago before the Jaffna Christian Association. We have perused it with much interest, and have no doubt that a careful study of its pages would repay any one of our numerous gentlemen farmers in Jaffna. Of course none of the ignorant class could profit by it nor would they if they could. After discussing the importance of agriculture and agricultural science, and setting forth its true object, the author discusses at some length the operations of tilling the soil, manuring weeding and watering. In treating of ploughing some very just criticisms are made of the native plough, and such ploughs are recommended for importation as have been since introduced by the Director of Public Instruction. With reference to the yoke, it is suggested that it would be well to adopt the European method of yoking bullocks, viz., by substituting a wooden bow, shaped like the letter U for the wooden pins and rope now in use. We confess to a feeling of surprize that no native, with but a single exception, and that Mr. Asbury himself, has ever tried or even thought of trying such a yoke, its advantages are so manifest. The bullock can then pull naturally and easily with the shoulders and hence can put forth all its strength. The cattle of the country are so weak and puny that some such method of yoking would seem indispensable in order to enable them to do proper work. There are many sensible and practicable hints scattered through the pamplet, on the necessity of knowing the ingredients of the soil in any particular field, so that the crop and the fertilizer may be adapted to its qualities and needs; on the care that should be taken of manure on the rotation of crops; and on many other matters connected with agriculture. Appended to the essay we find a list of topics for future investigation, the following up and discussion of which might be very valuable.—Jaffna "Morning Star."

IN SEARCH OF A HOME IN TASMANIA.

(By "Old Colonist," F. R. C. I.)

"Near yonder copse where once the garden smiled,
And still where many a garden-flower grows wild."

"Is this place in Chancery?" I enquired of the driver of the trap in which I had a few minutes before left Longford railway-station.

"Chancery?" he replied, "I downt knowe what you call chancery, but them places here be all much aloike now, they be different in ould toimes."

I could have guessed as much. The dilapidated gate we had just passed, had evidently in its day no small pretensions to gentility, though now it hangs on one hinge, pulling, in its downward course, the ornamental pillar off the plum. The approach is no longer approachable, the thistle and sweet-briar having taken possession of what had once been the neatly gravelled walk; along which, in brighter days, guests may have been welcomed and children merrily played. The garden, alas! is now a jungle of the most motley description. The once carefully introduced and nurtured European plants, degenerated into weeds of ungainly shape, the strongest crushing down the weak, though all flowering with a brilliancy strangely out of keeping with the sombre surroundings. The great hedge-rows have long ceased to get their annual trimming, and now open at the bottom, branch out at the top into huge gormandizers, heavily laden with haws. The buildings themselves—originally a comfortable compromise between an Indian bungalow with godowns and a Scottish homestead—are now sadly dilapidated. The "stich in time" has evidently been omitted, and there seems a settled air of decay and despair around the gloomy place.

I challenge any living man to say if this is not a faithful picture of the homesteads in this, the oldest, and one of the best agricultural districts of Tasmania. Nor is the cause far to seek. Take one case in point. Mr. M—— came here from India 40 years ago, with a little money, and a nice young family. The Government rule in those days was, *show your money, and we make you a free grant of land, an acre to every pound of capital you possess.* A system which led to very obvious abuses, and old chums still chuckle as they relate how they hoodwinked the officials, by lending to each other for the moment; so that, in the same way that one hat did duty with a dozen planters at the levee in Kandy, £1,000 would secure to many the coveted thousand acres. And the paternal Government in those good old times, not only supplied the land free, but the labour too, or at a merely nominal price, and as the demands of Victoria for all kinds of produce were then all but unlimited, prices rose to a fabulous figure. Under such circumstances, he would indeed be an indifferent farmer who did not rapidly make a fortune.

Mr. M—— was a good farmer, and, moreover, a man of honour, great energy and good taste; his carefully husbanded capital might be looked upon as accumulations of *self-denials.* One great object in his life being to make a fixed and comfortable home for his family, and gain them a better start in life than he himself had. His farm of 600 acres became a model in the district, and the admirably laid out fields still testify to his taste and skill as a practical agriculturist. But, as is too often the case, the sons of this thoughtful and frugal man, grew up with tastes the very antipodes of their father's: never having been accustomed to work, they had no belief in the dignity of labour; never having earned money, they had no compunction in spending. *Horse-racing* was more in their line, and the days of their early manhood were chiefly spent in galloping round the country, settling up for the past or arranging for the coming races. In course of time, the old colonist died—for, even in this best of climates, the best of men do die on reaching the end of their allotted space. The youths now had full swing and indulged their tastes without restraint. The usual result rapidly followed: the money-lender, the foreclosed mortgage, "the worst inn's worst room,"—one such "gentleman" was pointed out to me the other day in the capacity of sub-stableman at a village Drunkerage.

But I beg my readers' pardon, all this I own has got nothing to do with *bona fide* farming and the decline. No, there are other causes for the collapse, the chief of which, is the labour difficulty. Prison labour is no longer available, and no supply as yet to take its place. I note that farmers are advertising for hands at 6s 6d per day to gather potatoes. Meanwhile Victoria much more than supplies all her own requirements, in all kinds of farm produce, and prices are down to a limit that leaves no margin to the cultivator. Such is the present condition of farming here, and I am convinced that things have not yet reached their worst; for ask the price of land and fully 50 per cent more is asked than for similar land in England! The prosperity of the past is not yet sufficiently distant, nor the true cause of the present depression sufficiently realized. And yet, I am no pessimist, I feel assured, indeed, there must be a glorious future for this beautiful island generally, and particularly for this rich agricultural locality, but the conditions are not now present, and probably will not be in our brief time.

Longford lies 113 miles north of Hobart. I have said nothing of the intervening country, the scene of desolation is really too painful to dwell upon. District after district has been cleared of its inhabitants by the remorseless sheep-owner, the frugal little farmer forced into town. Villages extinguished in their infancy and the people compelled to emigrate elsewhere. But there is an agency at work which may in time break down the power—which fostered as it was by corrupt legislation—the people were helpless to resist, and it is wonderful to think of the apparently insignificant agents Providence often employs to work revolutions. We all know what a very minute fungus can do. In this case, the *Rabbit* is the honoured instrument and has already been put in possession of the abandoned fields, the result being that instead of so many sheep to the acre, as estimated by the grasping wool-grower, it is now a case of so many acres to the sheep. This, together with the great fall in wool, has recently brought sheep farmers to their hunkers, whining to Government for help to exterminate "the pest." The only cure, I believe, is *population*, and the ultimate outcome will probably be the breaking up again of the big runs and encouraging the return of the people to a contented country life. I only wish all our "pests" were as curable as the rabbit infliction.

Longford is the largest surviving village in Tasmania, containing a population of 1,286 spread thinly over a level space, sufficient for the site of a mighty city. To the S. W. the "Great Western Mountains" rise abruptly from the plain at a distance of about 15 miles, while in the distant N. E. Ben Lomand raises its blue head 5,000 feet above us. The Arthur's Lake river winds its way sluggishly through the flat fields in which the well-conditioned cattle leisurely browse. An air of extreme stillness pervades the scene as I sit listening to the measured peal of the church-bell, and am reminded that only last week (April 27th) the

remains of a gentleman long connected with Ceylon found a resting-place in yonder churchyard.

Poor *John Frederick Gibbs*! I knew him well. It seems but the other year I met him at 34, Craven Street, London, where for 20 years he had been a valued servant, now being induced—somewhat reluctantly—to try his fortune in Colombo. It seems but yesterday I took him for his first ride into the interior of Ceylon, even into the heart of the distant Morowak Korle, where he first beheld with evident delight the promising young estate into which he had hopefully cast the savings of a lifetime. The Colombo connection was not a success. Rather late in life and feeble in health poor Mr. Gibbs did not transplant kindly, and it must be confessed he was most ungraciously received. A man of scrupulous integrity and systematic industry, he ought to have proved invaluable to his firm, if generously and fairly treated, but this was impossible under the circumstances, he was unequally yoked, and the connection came prematurely to an end. Of the fate of "the wattie" it is needless to write. Opened by that prince of careful planters, Le Cocq, it promised well, but ere it had yet time to give its maiden crop, *Hemileia* overtook it, and—*ruin*, was the word written upon the Abbey Rock. With failing health and, doubtless, depressing spirits, Mr. Gibbs struggled yet a few years in Ceylon. At length, in search of a quiet retreat in a genial climate, he, four years ago, came to Tasmania. Last year he underwent a painful surgical operation, and has since been quite an invalid, frequently suffering much which no medical aid nor circle of sympathizing friends could do much to alleviate. His relief came on 25th April, at the age of 54. Mrs. Gibbs and family of six receive much kindly sympathy in their trouble from the good neighbours amongst whom they are deservedly much esteemed.

I wrote the above before I had seen the following figures, fresh from the hands of the Government Statistician. They are certainly not encouraging reading, and only confirm my growing impression of the country that it is doomed, for a time at least, to suffer seriously from the gross errors of the past, that it is indeed on the verge of disaster. Lovely country, no doubt, but what's the good of ruffles when we want shirts? The area under wheat during the last season, is smaller than it was 50 years ago, when the population was only one-third of what it is now. It is probable that the whole yield of wheat for the last season will fall short of local requirements by 440,000 bushels :—

	Results from 52 districts.		Season 1885-6.	
	Season 1885-6.	Season 1884-5.	Increase.	Decrease.
Wheat—				
Acres... ...	17,029	19,535	...	2,562
Bushels ...	312,247	382,899	...	70,652
Bushels per acre.	18·34	19·60	...	1·26
Barley—				
Acres... ...	3,963	3,103	860	...
Bushels ...	124,186	93,208	30,978	...
Bushels per acre	31·33	30·03	1·30	...
Oats—				
Acres... ...	18,386	17,796	590	..
Bushels ...	512,788	542,899	...	30,118
Bushels per acre*	27·83	35·06	...	7·23
Hay—				
Acres... ...	22,876	24,477	...	2,101
Tons	29,180	31,311	...	2,131
Tons per acre...	1·30	1·28	0·02	...
Potatoes—				
Acres... ...	7,510	6,067	1,443	...
Tons ...	35,385	26,271	9,114	...
Tons per acre ...	4·71	4·33	0·38	...
Hops—				
Acres... ...	601	657	...	56
Lbs.	699,110	850,391	...	150,981
Lbs. per acre ...	1163·54	1294·33	...	130·59
Apples—				
Bushels ...	199,713	197,521	2,192	...
Pears—				
Bushels ...	12,043	9,536	2,507	...
Land in crop, acres	86,462	85,750	713	...
Land in permanent artificial grasses, acres... ...	117,086	120,607	...	3,521
Total land in cultivation, acres ...	252,850	257,571	...	4,721

So far behind the rest of the world is Tasmania, that the wave of depression which years ago overtook all other civilized regions. has only now reached this Ultima Thule. Much of the best capital of the Colony, its bone and sinew, is leaving for more favoured lands, and until property here is re-valued and re-arranged there is little hope for the investment of capital. Indeed, I am more and more convinced that the only thing to save Tasmania from endless trouble, is *to get united to Victoria*. Victoria needs more land. Here is the natural outlet for her superabundant capital and energy. Here is scope for her active agriculturists and a sanatarium for her dust-choked invalids. At present Victoria is only teasing and squeezing the poor silly little sister, by her cruel anti-reciprocity, taxing almost the only thing she (Tasmania) has to sell at 100 per cent A. V. See a case tried last week in Melbourne, where it is decided that par-boiled Tasmania fruit—with or without sugar—is jam, and subject to duty!

Poor misguided Tasmania! with all her expensive paraphernalia of Upper and Lower Houses. Government House and London representatives, too weak to cope with colonies too strong for her own weak and scanty population. The mimicry is as painful to the on-looker as it is costly to the taxpayer.

"THE TEA ROLLER OF THE FUTURE," according to a rumour round the Fort yesterday, is 'Davidson's and Law's"—that is the roller to which we referred as doing its work well on Gikiyanakanda estate. But today we have the following testimony from the purchaser of one of Kerr's "new and improved" rollers :—

"I consider the roller a vast improvement on the old one; it rolls the tea beautifully with as small a percentage of broken leaf as I have seen from *any* machines. I rolled 700 lb. of green leaf to day in five charges, the shortest time was 40 minutes."

The rolling here referred to was done by hand

CORTEX CINCHONÆ.—The direct imports of cinchona barks into France as compared with former years have greatly dwindled, and that country has ceased to be a factor of importance in estimating the situation of the article, while Great Britain has gained in importance as a market, owing to the increased production of quinine bark in Ceylon. The United States are now almost entirely dependent upon London for their requirements. Another factor of importance is found in the increased exports of Java barks, mostly to Holland; the total exports of the island amounting to 1,321,569 lb. 989,158 lb., and 735,381 lb. during the seasons 1884-85, 1883-84, and 1882-83 respectively. An increase in the supplies of better class Columbia bark is anticipated this year, the course of exchange favouring exports from that country. No importance is attached to the rumours recently circulated regarding the discovery of a forest of cinchona trees in the neighbourhood of Rio de Janeiro. It is a fact that some two years ago specimens of bark were brought to Rio by an engineer employed in the construction of a railway in the interior; but upon examination they proved to be devoid of quinine although closely resembling the cinchona bark.—*Chemist & Druggist* for May.

TEA AND TEA CUSTOMS IN JAPAN.

A very interesting historical and descriptive article on the cultivation of tea and on tea customs in Japan, by F. A. Junker von Langegg, appeared in the February number of the *English Illustrated Magazine*. He places the time of the introduction of tea in the first half of the eighth century, A. D., basing it upon the record of a religious festival in 729, at which the Mikado entertained the Buddhist priests with tea, a hitherto unknown beverage from Corea, this country having been for many centuries the high road of Chinese culture to Japan. Plantations were laid out in 815 by order of Saga Tenno, the Mikado. The product was prepared after the Chinese custom by being first steamed, then dried and ground into a fine powder. Subsequently it became almost unknown and was not permanently cultivated until 1199-1210. In 1200, tea seeds were brought from China and planted in the northern province of the island Kiu-Shiu, the climate of which was particularly favorable for the growth of the tea plant. Uji in the province of Yamashiro has since that time been famous for the superior quality of its tea. The growers in that village still show their appreciation of the abbot of the monastery who introduced the plant by annually offering at his shrine the first-gathered tea leaves.

Prior to 1570 it was the custom to immerse the leaves in boiling water, immediately after picking, and, after having dried them in the sun, to make them into powder.

In 1570 a tea merchant invented an apparatus called Hoiro, for drying the leaves, but it was not universally used for "firing" until 1716. Until the year 1700 tea leaves were fired in a pan, which process was called Nabe-iri, "pot roasting."

"The same tea merchant also first distinguished two sorts of tea, the Usu-cha, 'light tea,' and the Koi-cha, 'dark tea. The word 'Usa' in this instance means 'light, thin,' and, although spelled in Japanese like 'Usu, to pound,' is written with a different Chinese character. He likewise was the first who introduced matting covers raised on poles about eight feet high, in order to protect the plantation in winter against hoar frost, and in summer against the sun. Such covers are still universally in use. When riding, in June, the time when the young leaves, which yield the first quality of green tea, are fully developed, the whole country about Uji is under matting, over which the head of the horseman just rises, so that, with the exception of the distant hills and mountains and the roofs of the homesteads, the landscape is hidden from his view.

"In Japan green tea in leaf is universally used. Powdered tea, which at present is most expensive luxury, is reserved for rare ceremonious occasions. Tea is not prepared by making an infusion with boiling water, as is habitual with us, but the boiling water is first carefully cooled in another vessel to 176 deg. F. The leaves are renewed for every infusion, the same never being used for inexhaustible replenishings of the teapot, as is our custom. Tea prepared in the Japanese manner is of the color of pale Sherry or Sauterne, and constitutes a most refreshing, reviving beverage, especially when travelling or when fatigued by exertion. The Japanese, like the Chinese, drink tea without milk or sugar, which, they contend, spoil the delicate aroma; but they recommend the use of both with black and green teas of inferior quality, prepared after the Chinese method, in order to cover their roughness.

"The preparation of good tea is considered by the Japanese almost an art. Persons particularly expert in this accomplishment are called 'Chajin,' lit., 'tea-man.'

"Tea is cultivated in Japan as far as to 40 deg. N. The best tea land is the district of Uji in the province of Yamashiro, after which the plantations of the other provinces rank in the following order:—Those of Omi, Ise, Shimosi, Echiu, Totomi, Kadzusa, Inaba, Suwo, Surugo, Nagato and Musashi on the main island Hon-do, and those of Hizen and Higo on the Island of Kiu-shiu, 'Nine lands.'"

The tea plant must be raised from seeds.

"The first leaves are gathered in the fourth year. The harvest commences in the beginning of the summer, when only the youngest leaves are picked. Thirty days after the first gathering the second takes place. Some tea growers have lately made a third picking, in consequence of the rise in the price of tea, but this proceeding ought to be energetically discountenanced, as it has proved most injurious to the plant."

The success and excellence attained by the Japanese in many undertakings, is ascribed by F A. Junker Von Langegg, to their treatment of details they being, "great in small things." He describes their treatment of tea leaves as carried on at Uji as follows:

The leaves, immediately after having been gathered, are taken to the factory. The tea plant abounds in stipules, and is thus unlike other plants of the order of the Ternstroemiaceæ, which are usually ex-stipulate. Here the stipules are separated by means of a bamboo sieve, and all impurities are removed. This done, the leaves are exposed to the action of steam, by placing them on a bamboo hurdle over water heated to 200 deg. F. in a covered pan. Those intended for tea in leaf are steamed for fifteen seconds, those intended for powdered tea for half-a-minute. After this, they are uncovered, turned and aired by means of fans in the shape of the wellknown palm-fans of the leaf of th *Corypha rotundifolia*. Lam. These fans, which serve for a great many purposes, are called Uchi-wa, and are made of a frame of spilt bamboo covered with paper.

Before the steam has ceased to escape, the leaves are placed in a basket, "the cooler," in which they are continually turned and fanned. The fanning must be particularly attended to, else the leaves would turn yellow and lose their fine aroma.

When perfectly cooled, the leaves are taken to the Hoiro, the apparatus for "firing the tea." The Hoiro proper is merely that portion which contains the fuel, but this term is generall extended to the whole apparatus, in which sense I likewise shall use it in this paper. It is a wooden frame measuring six feet by four, lined with a layer of cement, and covered with an iron grate, a short distance above which a copper-wire net is stretched. On this the desiccator holding the leaves is placed. The desiccator is a box of exactly the same dimensions as the Hoiro proper, formed of a wooden framework and paper.

The fuel, of which twenty-three pounds are used for every firing, consists of equal parts of charcoal of hard and of soft wood. When the fire is quite bright a sufficient quantity of straw is burnt to obtain a layer of ashes in order to prevent the direct action of the radiating heat. During the process of firing, the leaves are continually rolled between the hands until they commence shrivelling and are nearly dry, when they are transferred to a second Hoiro for complete desiccation. In preparing the sort of tea which is known by the name of Giyoku-ro-cha, lit.: "Dew-drop tea," the leaves are steamed but for an instant, and while drying over a slow fire, each single leaf is most carefully rolled betwen the fingers.

The leaves when perfectly dry are removed from the Hoiro, into sieves of copper-wire, in which the petioles, which may have remained attached, are separated by gentle rubbing between the palms of the hands.

After having been winnowed the leaves are assorted into three qualities, and sifted through bamboo sieves, of which there are six different degrees of fineness. Common tea is sifted but once, the better qualities from six to seven times, and the powdered tea even as often as ten times, which expenditure in time and labor renders this kind of tea extremely dear.

The leaves for the powdered tea are likewise desiccated on the Hoiro, but in a somewhat different manner. The apparatus consists merely of the lower box for the fuel, with a grating of bamboo instead of the iron grate and the wire-net on the top. On this is placed a bamboo hurdle covered with a sheet of cardboard of the same size as the Hoiro proper, on which

the leaves are spread. Instead of rolling the leaves between the fingers, they are alternately collected in the middle of the cardboard, and spread out again by means of tiny pincers in order to secure the uniform drying of every single leaf.

The temperature of the room in which the Hoiro is placed, must be very high, and the doors and windows kept closed against the cooler outer air and draught. When the leaves are nearly dry, they are removed from the Hoiro and fanned, then all the faulty ones, and those which had turned yellow, are carefully picked out, and the remaining placed again on the Hoiro until perfectly dry, when they are spread on shelves near the fire and left for some time without being touched. Finally the leaves are sifted through a series of seives from No. 4 to No. 10. The mode of the ultimate picking likewise differs from that employed with the tea in leaf. The leaves are placed in a square dish, spread by means of a feather, and the faulty, ones removed with a pincer. For the first quality of powdered tea even more precautions are taken. The dish remains covered with a sheet of paper, and only those leaves are exposed which are taken up one by one with the pincer.—*American Grocer.*

INSECTICIDES: KEROSENE EMULSIONS.

It cannot be too strongly impressed upon all who use kerosene as an insecticide that it can be considered a safe remedy only when properly emulsified. The formula for the kerosene and soap emulsion, as found most satisfactory by Mr. Hubbard, is as follows:—

Kerosene	2 gals.	=67 per cent.
Common soap or whale oil soap.	½lb.	=33 per cent.
Water	1 gal.	

Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force-pump and spray-nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling, and should adhere without oiliness to the surface of glass. Dilute, before using, one part of the emulsion, with nine parts of cold water. The above formula gives 3 gallons of emulsions, and makes, when diluted, 30 gallons of wash.

The kerosene and soap mixture, especially when the latter is warmed, forms upon very moderate agitation, an apparent union; but the mixture is not stable, and separates on standing, or when cooled or diluted by the addition of water. A proper emulsion of kerosene is obtained only upon violent agitation. It is formed not gradually, but suddenly; in short, to use a familiar phrase, "it comes" like butter. The time required in churning depends somewhat upon the violence of the agitation, but still more upon the temperature, which, however, need not be much above blood-heat.

When obtained, an emulsion of kerosene and soap is known by the perfect union of the ingredients and the absence of oiliness, so that the liquid clings to the surface of the glass or metal. It resembles a rich cream, more or less thickened, according to the proportion of soap used in the mixture.—*American Entomologist.*

MONTSERRAT.

"And now, on the leeward bow, another gray mountain island rose. This was Montserrat, which I should have gladly visited, as I had been invited to do; for little Montserrat is just now the scene of a very hopeful and and important experiment. The Messrs. Sturge have established there a large plantation of limes, and a manufactory of lime juice, which promises to be able to supply, in good time, vast quantities of that most useful of all sea medicines * * * * and I for one heartily bid God speed to the enterprize—to any enterprize, indeed, which tends to divert labor and capital from that exclusive sugar-growing, which has been most injurious. I verily believe the bane of the West Indies."—"*At Last,*" *by Rev. Charles Kingsley.*

The little island of Montserrat, considered the most healthy of the Antilles, is situated in 16° 45″ north latitude, and 62° west longitude, and about eight miles in length from north to south, by a breadth of five miles from east to west. This island was discovered in 1493 by Columbus, who gave it the name of Montserrat, after the noted mountain of Montserrat in Catalonia.

The island of Montserrat is composed of a small cluster of volcanic mountain tops, rising out of the Caribbean Sea, to the height of 3,000 feet, the summits being more often concealed by floating clouds. Their steep sides are covered with virgin forest, abounding in graceful cabbage palm—"the glory of the mountains"—exquisite tree ferns and wild bananas, with their magnificent broad leaves, and are intersected by deep rugged gorges, in which the tree fern, banana and mountain palm flourish.

The negroes now form the greater part of the population. They, most of them, own land and cattle or sheep; and cultivate the sugar cane and ground vegetables on their own account, so that their position is far more independent than that of the European peasantry. They are a light hearted, good tempered race; so accustomed to work in gangs that it is almost impossible to get them to do anything alone.

The first lime tree orchards were planted in 1852, by Mr. Burke, an enterprising planter then living in the island, but the speculation was at first by no means profitable, as this is an enterprize that involves a large outlay of capital, which is for a number of years unproductive, and even then only remunerative on a large scale, although the low rate of wages and extent of uncultivated land in a salubrious climate render the island of Montserrat particularly suitable for the purpose.

The lime tree (*Citrus Limetta*), is a member of the orange tribe, which grows wild in many tropical countries but does not flourish even so far North as the Azores. It is a thorny, bushy, evergreen tree, with handsome dark green leaves. These are so fragrant that they are universally used in the West Indies to perfume the water in the finger glasses at dessert. The small white flowers resemble orange blossoms, and the scent is equally delicious. The lime flourishes best in light soil, near the sea, and comes into full bearing about seven years from the planting of the seed.

From the *International Magazine* we learn that the plantations of the Montserrat Company already cover more than 800 acres, and contain 160,000 trees. These are generally planted fifteen feet apart, and the high road passes through them for a distance of more than two miles. No more beautiful sight can be seen than these orchards, when the trees are laden with their bright fruit, and at the same time the air is pervaded by the luscious fragrance of the blossom. The fruit is gathered by the negro women, and they carry it down in baskets on their heads.—*American Grocer.*

FRUIT CULTIVATION IN CEYLON.

Our correspondent, "Oranges and Limes," brings forward a subject which periodically crops up in the public prints, and, receiving no further attention, fades out of sight for a time, until it is again revived by some one who recognizes in it a public want which he imagines could be supplied without very much difficulty. There can be little doubt that Ceylon could supply an abundant variety of tropical fruits, if suitable situation were selected and care were taken in their culture, and we should think their production might be made a fairly profitable one, if undertaken on a large scale, and with a sufficient supply of capital to enable the cultivators to wait, as they would have to do, for 6 or 7 years before receiving any appreciable returns from their investment. We know that orange and lemon and many other kinds of fruits trees begin to give crops in three to four years, but they cannot be considered to be really in bearing in less than double that age. It must not, however, be forgotten that during the time the gardens are growing a very considerable trade might be done in native-grown fruit, from which preserves of various kinds could be manufactured, and sold in the local market as well as exported in large packages to be put up in an attractive form in Europe. This is the course adopted by Messrs. Moir and sons in regard to their marmalade. They prepare it in Spain or Portugal, and forward it to Aberdeen, or some other of their large factories,

where it is put up in the smaller tins with which we are so familiar. We must, however abandon any idea of growing European fruits at Horton Plains or near Nuwara Eliya. There is no doubt that such fruits can be grown, and in fact are grown, near Nuwara Eliya and the higher elevations of the surrounding districts; but they are grown under considerable difficulty, the crops are very uncertain, and the fruit but seldom of any value, wanting as it is in the flavour and piquancy of fruit grown in England. There is much more probability of success as regards European fruits by making arrangements in the Australian colonies for a supply of apples and pears to be sent up by the mail steamers. The "Kaiser-I-Hind" from Australia last week took on a quantity of magnificent pears, one of which shown us was as large as an ordinary Chaumontel grown in Jersey, and in splendid condition; and nothing we can grow in the Island could be expected to compete with such fruit as this. As regards these tropical fruits alone, it would be necessary to have more than one orchard, in which different varieties of fruit could be grown on a soil and in a climate best suited to their respective characteristics. In the lowcountry no doubt a suitable locality might be selected, say at Mahara or Heneratgoda, whilst for oranges of all kinds a very favorable situation would probably be found in the vallies of Kadugannawa, should it be found necessary to go up so high in the hills. For native-grown fruit, suitable more especially for converting into jams and jellies, Kandy would probably be the best possible centre for collecting a large quantity. With agencies in Matale, Gampola and other places, a very considerable trade could be done by agents understanding the people and their language. Suitable sugar could no doubt be obtained in quantity from Baddegama at a comparatively low rate, and its purchase would doubtless give a stimulus to the production of sugar amongst the competitive native growers who do a little in that direction already. Many of our readers will recollect the jams which old "Francis Appu" of Staiuton's Hotel used to retail in pickle bottles, and for which we believe he had a brisk demand. Experiments on a small scale for testing the Colombo market have not been by any means remunerative hitherto; the latest we believe in the way of tomatoes did not by any means prove satisfactory to the enterprizing grower; and in another case within the twelve months, a grower of Malta lemons upcountry failed to obtain a single response to notices and samples sent down. Without pretending to give an opinion upon the suitability of the climate for the preservation of fruit in the shapes of conserves, we would suggest that the headquarters of the enterprize should be Colombo itself, where, in failure of obtaining a market for the fruit, it might be converted into preserves instead. As long as the steamers in harbour, or the ordinary local demand, supplied a market, the produce might be sold in its natural state, and when that demand fell off, say for a day or two, it would be put into the hands of the boiler and confectioner. In addition to anything to which we have already referred, attention might be paid to the manufacture of lime-juice and the different varieties of citric acid and similar preparations, for which there is an immense demand. Pickles again should prove an additional source of income, though possibly the demand would be rather limited.—Local "Times."

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

PARIS, May 15.—The strength of a horse is in proportion to its health, and the latter depends on its food and stabling. Some cases of blood-poisoning have been reported, and which are traceable to sudden change in diet, and to the drinking of stagnant water. Some farmers conclude, that so long as animal refuse is kept out of the drinking pond, no bad results can ensue. It should never be forgotten, all putrid matters are sources of disease. Insufficient air is a cause of sickness in horses as in human beings. It has been estimated than an ordinary-sized horse, needs 130 cubic yards of air per day. But that it requires 33 cubic yards per hour to get along comfortably in general stable life. The aim then should be to induce a constant supply of fresh, and to expel the viciated air. A high, rather than a low-roofed stable accomplishes that end best.

This being the season for green fodder, the subject naturally suggests itself, how far is such, good for working horses? There cannot be any question about turning them into a meadow there to feed. That plan is excellent only for colts—that rest and liberty develop. M. Gronier held that green forage acted on horses, like mineral waters when employed as medicaments on individuals, A Vichy, Apollonaris, &c. efficacy. Fresh grass, &c., kept away imminent illness, cured existing ones, and discounted convalescence. It forms a kind of annual salad refreshing for animals of an irritable temperament, that have narrow intestines or the system heated from too copious oat rations.

If hay be taken as the standard to test the comparative value of the various green feeding stuffs, there will not be found any very great difference between them, in point of nutritive power. Certainly, some will vary in point of volume, that which implies, not to overload the stomach, but to multiply moderate repasts. The green fodder is most apt to produce flatulency, when after being cut, it has been allowed to lie exposed to the sun, or even some time in the shade under a shed. Many believe that it is good to let the "wild freshness of morning" disappear, before using green food; enable the dew to evaporate, &c. On the contrary, it is more prudent before using to sprinkle faded grass, elover, tares, but above all luzern, which have been exposed to the action of the sun with water. M. Reynal has demonstrated, that fodder rich in sugar, ferments more readily in the digestive organs, in proportion as it has been preliminarily heated.

In spring, stock have a natural longing for fresh food. Occasionally, that desire may even be the symptom of disease; an indication of a morbid condition of the digestive organs. The change of diet will facilitate the falling-off of the old hair; develop transpiration; induce brilliancy of coat and freedom in the intestines. Fresh forage has also the reputation of getting rid of cutaneous affections and thus of purifying the blood Old horses, accustomed to a dry and substantial dietary, do not benefit by a green bill of fare. Animals of a weak constitution ought not to receive green forage.

From experiments tried on cavalry horses at Versailles, it was found that the green forage when coming into flower, was the stage most propitious for consumption. A sharp eye ought to be kept to notice how the change operates on the animals subjected to green soiling. If laxity or weakness appear, the ration of oats should be at once augmented. Never, in the case of working horses diminish the oats, when entering on the green feeding. It costs dearer to feed badly, than to nourish well, and the latter system secures more health and strength that which implies more profit on capital.

The practice is extending in France and Switzerland, to cut or castrate cows, so as to ensure, after a certain age, for a definite period, a uniform yield of milk, simultaneously with the putting up of juicy flesh for the butcher; to transform in a word, the cow into a veritable milk and beef machine. M. Charlier is the great advocate of the new plan of *ovariotomy*, which is effected by a special instrument, and is never attended with danger in the hands of a Vet. The cow will be ill about eight or fourteen days after the operation. During this period, the animal should be kept covered, to guard against cold, and on half-diet, to avoid indigestions. On recovery, the cow will be found less liable to diseases, since gestation and parturition have been rendered impossible.

M. Seippel of Switzerland has adopted ovariotomy, or splaying, executed by the new instrument, since 1885, and with decided success. On twenty cows, he has had a daily yield of 10, and hopes to reach 12, quarts of markedly rich milk. But he has above

all obtained, a quality of meat, tender and succulent, which the butchers have reluctantly admitted, to be equal to the best ox beef. To bring the cows up to the slaughtering standard he had to employ neither a special diet nor extra rations. The cut cows were ever in excellent condition. In ordinary cases, a cow after producing the usual number of calves, only produces beef of a poor quality, which is hard under the tooth, rebel in point of digestion, and devoid of nutritive power, and all this despite their fat appearance. Ovariotomy should be practised when the cow is 5 or 6 years of age; when she can be kept on milking and simultaneously fattening, for eighteen months and then sent to the butcher, with the certainty of proving remunerative.

Dr. Frank was delegated by the Prussian Government to investigate truffle culture. He bore in mind the ideas of Müller and Schlösing as to the role of animalcules in the nutrition of plants and the nutrification of soils. He now shows that in the case of some trees, oak, ash, and pine, the two last especially, their rootlets are composed of bands of microbes, which form a veritable screen, and devour the humus, prepare the food, while forming a "felt" round the interior cellules of the plant. In the case of wheat, the rootlets are capillary fibres, which secrete an acid, to dissolve the mineral matters, in the soils preparatory to their absorption by the plant.

CULTIVATION EXPERIMENTS IN THE ARAKAN HILL TRACTS: NEW PRODUCTS.

Mr. F. C. Fanshawe, acting Deputy Commissioner of the Arakan Hill Tracts, has submitted an interesting report on experimental cultivation of certain economic products in these outlying tracts, but the results obtained by him do not encourage the hope of bringing these remote regions, peopled by ignorant savages, within the pale of civilised cultivation of useful products for the market.

There are two gardens in which these experiments were carried on; one at Paletwa and the other at Kyoukpandaung. A sum of R1,000 was allotted for the year 1884-85, of which R889 were expended. Since the last report was submitted in May 1884, the gardens do not show any marked improvement. The money is chiefly spent on gardeners' wages and cooly hire, as it is found very difficult to keep the gardens free from weeds and grass during the rains, and nearly half the allotment is spent on cooly hire for this purpose.

The Paletwa garden occupies an area of 4½ acres. Its situation is unfavourable, the ground being low and swampy in some parts. The *Tea* plants here are said to be looking healthy, and have been leased out for one year for R100. The *Potatoes* proved a failure; but this was owing chiefly to the seeds having arrived in a bad state; another reason being that they were not planted as they should have been, *i.e.*, in light, sandy soil, and on ridges; but sown on heavy soil, on low ground, and in trenches. In a country possessing a naturally humid climate, with a heavy rainfall, this result was to be expected under the circumstances. Mr Fanshawe, however, is of opinion that the experiment is worth trying again this year. The *Pepper-vine* seems to have done fairly well, and it is intended to plant it extensively on the Burmese method of growing betel-vines. The *Cinnamon* has been a complete success, and "a small forest of them" is said to exist at Kyoukpandaung. The variety of *Caffee* grown was the Liberian, and the plants appear to have done well. The *Arabian coffee* was also tried, but it did not get on well. *Manilla hemp* is said to get on well, and the same is said of the *Betel-vine*. Two *Cocoa* trees have reached the height of 9 and 4 feet respectively, and may be pronounced a success. There are no *Sugar-canes* in the Paletwa garden, but Mr. Fanshawe thinks it would pay to plant them. Among *Fruit*, the *Mango*, the *Plantain*, and the *Pine-upp'e* are mentioned. The last-named is said not to do well. An important feature in the report is the remark about *Khaki cotton*. A little of it is grown for home consumption, but very little is exported. Mr. Fanshawe thinks some seeds might be given to the cultivators as an experiment, as the price is double that of white cotton; and that when the peasants find that it will pay well, they would probably take to cultivating it regularly. The Chief Commissioner has sent seeds to Mr. Fanshawe, and we shall be glad to hear the result of the experiment. There were no new experiments during the year.

Mr. Fanshawe, we regret to see, does not seem to take a hopeful view of the utility of the garden at Paletwa. He says:—

The experimental cultivation in the Arakan Hill Tracts has done little or nothing, I am sorry to say, to induce the peasantry to try new products, and I am afraid that, as long as they live the life that they do at present, they will never attempt anything new. Their staple products are of course rice and seesamum for home consumption, and tobacco and cotton for both home consumption and export. Their time is pretty well taken up in their taungyas and tobacco fields, and the month or two in which they have nothing to do they spend in a series of feasts. The ground used for the cultivation of tobacco could not be used for permanent garden land, as it is all under water during the rains; and if taungyas were cut far from the water, the labour would be immense to keep the ground properly watered during the hot weather, and that is just the time that they are all hard at work cutting their taungyas for planting paddy, &c. They are too lazy and indolent to put themselves out in any way, and as long as they have enough to eat and drink, with a few rupees to spend yearly, they are quite contented. Different kinds of tobacco and cotton they would willingly sow, I think: and if Mr. Bridges supplies seeds next year, as he has very kindly offered to do, I have no doubt that the experiment will be a success.

Even if planters were induced to settle up here, I do not think they would find cultivation profitable, as the great difficulty of course would be cooly labour. The peasantry here simply would not work regularly, and all the labour would have to be imported, and even then I am afraid the coolies would be constantly down with fever, for the first year or two at any rate, and unless they were paid at ruinously high rates, they would desert whenever they got a chance. Burmese peasants are, as a rule, of the stamp Mr. Fanshawe has described, and much cannot be expected of them. With regard to the garden at Kyoukdandaung, which is of more pretensions, it may said that *Tea* and *Cinchona* thrive well, and may be cultivated with success. The tea garden is already assuming fare proportions, and the time is coming when, with a little skilled labour for curing processes, the trees will yield a return which ought to make the garden more than self-supporting. The number of trees and young plants exceeds 12,000, and this number is capable of large extension, so as to form the nucleus of a fairly good tea estate, which would pay well in any part of the country where labour was procurable at ordinary low rates. The fact, too, that there are over 400 cinchona plants at Kyoukpandaung, all doing well, particularly the larger ones, seems to prove that the locality is favourable to the growth of this very important vegetable product.

Potatoes and *Coffee* were failures. *Fruit trees*, such as raspberry and apricot, have done well. *Tobacco* seems to have proved successful, and Mr. Fanshawe has been supplied with seed for extended experiment. The tobacco produced is said to be very good of its kind, and fetches a good price in the local market. Looking at the experiment as a whole, it may be said to have been fairly successful: but in our opinion something more than merely official supervision, such as that exercised by a Deputy Commissioner, is needed to prove to demonstration whether the results obtained cannot be improved upon. The Commissioner, Colonel Sladen, is of the same opinion, as he says:—The experiment need not for the present be repeated until the conditions are more favourable, and we can count upon more skilled supervision. It has, however, been decided to continue the grant of R1,000 for another year. Let us hope that the results of the next year will be more satisfactory.—*Indian Agriculturist.*

TEA WITHERING BY MEANS OF HOT AIR

is advocated by Mr. Percy Swinburne, late of Sylhet, Cachar and Assam, who writes:—

Natural withering, as generally understood, means that the leaf is placed in open or closed houses in which the draught of air may be regulated; while artificial withering includes the use of heated air, or of machinery.

A large proportion of the best tea which is sent to the market is now made from artificially withered leaf, that is to say, from leaf which has been withered by heated air. The lofts of the pucka tea houses are heated by the sun, to a temperature of over 100 degrees, and are often intolerably and suffocatingly warm. In dull and wet weather also, the temperature in these places is still considerably higher than that of the surrounding atmosphere, as they are heated by siroccos or other firing machines, the chimneys of which pass through them.

There has for a long time been a strong prejudice against artificial withering. Closed hot houses were used because the weather so often proved unfavourable, but natural withering, under favourable circumstances, is always supposed to give the best results.

In natural withering, the faster the process the better the result, so we may conclude that perfect withering would consist in removing all superfluous water from the leaf instantaneously, without disturbing the oils, juices &c., while sufficient heat was applied to reduce the fibre to the soft condition required for rolling.

A series of careful experiments have been made in a small house heated by smoke flues, with one maund of leaf spread on about 15 square feet to a pound. It was found still, that the faster the operation the better the result. That the greater the heat the thinner the leaf must be spread, and the more care and nicety required.

The finest tea was made from leaf withered in 3 hours, at a temperature of 140 degrees. The tea was on several occasions carefully assorted, and true samples of the bulk were sent down to Calcutta to be valued, and the quality of the liquor as well as the appearance were pronounced excellent. The average valuations were about 14 annas, and the leaf was good, but not finer than that plucked on most estates in Darjeeling, or Sylhet, or Cachar, being two leaves and a bud. The market at the time was depressed, and the average price of the teas of the districts named was, at that time, between 9 and 10 annas.

In 1883 the entire crop of the Kainagar Estate, Sylhet, just under 900 maunds, was withered in hothouses, heated by smoke flues, and realized 11 annas per lb. average. The houses were "kutcher" ones built of bamboo and plastered ekur. They were 14 feet high in the roof, 7 feet high walls—breadth 20 feet. Two four ,feet wide, passage, and 4 rows of chalnies 3 feet wide. The pipes were 9 inches in diameter, and $\frac{1}{8}$ inch thick and ran along both sides of the house underneath the outer row of chalnies. The heat was much greater near the furnaces than at a distance from them, and the house gets thoroughly heated for a distance of about 15 to 20 feet only from the furnace.

The heat is also uneven. and the greater it is the more difficult it becomes to equalize the withering. The leaf must be thinly spread and carefully watched. One part of the house withers much more quickly than another, and if the leaf is left for an hour only, after it has reached the right stage, much quality is lost.

These houses, defective as they are, are preferred to those of the old style.

When the men have learnt how to arrange the leaf, and work the fires, the rolling can be commenced at 5 a.m. every day in all weathers.

The leaf does not turn red unless it is bruised in some way during the withering process, and its juices become exposed to the air. This may happen from the leaf being gathered up a second time, and removed from one place to another.

If it is once established beyond dispute that the best tea can be made from artificially withered leaf, there should be no difficulty in making a hot chamber in which the leaf could be very thinly spread out, and the heat equalized and regulated, and the moisture removed.

One of the great disadvantages of open houses is, that the damp cold air which checks the withering is admitted, as well as the warm air which favours it. Withered leaf absorbs moisture, and is refreshed by it—as a bouquet of faded flowers is revived by sprinkled water. But when the leaf has withered a second time, it loses its freshness, and when the flowers have again faded, they begin to give out an offensive smell; the first stages of decomposition having set in in both cases. Leaf which has once lost its volatile freshness and delicacy, never recovers it, and can never be converted into fine tea.

The fine qualities in the leaf may be chemically altered in the hot withering process, but they are not lost altogether as is proved by the quality of the tea produced by it.

In the same way, however, as the flavour of the tea is affected by different firing processes, so it is probably also affected by the degree of heat applied in the withering, as well as by the manner in which it is applied.

Good tea can be made of leaf which is carefully withered, rolled, fermented, and finally baked, but, although strong, it is peculiar, and has not the delicate flavour and smell of tea, which is roasted over charcoal in the usual way, and this again is not so aromatic in flavour as that which is dried by the rapid hot-air draught of the "Sirocco."

It would appear that the best withering would be accomplished by a strong draught of moderately warm and quite dry air passing over the whole surface of the leaf.

If the juices can be kept uninjured, the more the leaf is withered, the better the quality of the tea. The presence of water in the rolled leaf appears to affect the fermentation injuriously. It is not accurately known at present what chemical changes take place in the various systems of manufacture, but we know that we are more or less dependent on the weather, and that the changes which take place satisfactorily one day, will not do so on another, under apparently exactly the same condition. Lightly withered leaf makes tea without strength or body, and this is probably due to the presence of too much water in the rolled leaf, which causes an injurious fermentation. On the other hand, over withering or bad withering, by which the juices have been injured or destroyed have the same effect, and produce weak pale liquored tea. As far as we know, the feeling amongst Ceylon Tea Planters is adverse to hot air?—*Planters' Gazette.*

FRUIT-GROWING IN CEYLON.

I noticed in a recent issue of your paper, an article upon fruit-growing for the Colombo market, and, as one who has more than once tried to meet this want, I will relate the chief reasons why hitherto all attempts have been failures. Everyone has noticed how universally unsatisfactory the fruit of Ceylon is, and how the whole might be characterized throughout as inferior. Indeed, it may truly be said that few in Ceylon have ever tasted really good Ceylon ripe fruit, and those who have lived all their lives in the island have never developed the taste.

I once grew some very fine limes, each of them equal in size to three of the usual bazaar specimens, and these I offered for sale in the market, but no one would buy them for more than the usual rate per 1,000 for limes. I now sell them to natives who pay me by the thousand, irrespective of size or quality, and I might almost add the greener the better. Indeed, the more inferior the fruit the better it will pay the producer, for ill weeds grow apace. This is very different to a fruit shop in Europe, where excellence overrules everything; there, if you

observe a particularly fine basket, you may be sure the price will be double or treble that of any ordinary representatives of the same fruit. Here, as I say, a thousand limes, whether large or small, are a thousand limes, and, even though a better price may be obtained for the higher qualities, it is never commensurate with the real intrinsic value—not even weight for weight or measure for measure.

It is difficult to say how this can be remedied; for my part I am most passionately fond of fruit, being practically an abstainer from alcoholic beverages. I have a very great craving for fruit, yet I do not care for the tough pulped oranges with their jackets of Lincoln green with skin upon them that will only come off with the greatest exertion, and, when removed, what remains is but a stringy casement, filled with an acid sweet orange-peel flavor not of any decided lusciousness, making me always think, as I do when I eat tomatoes, "because the doctor says they are good for you." This last opinion is, however, only personal, for many are very fond of tomatoes. To make a long story short, fruit cannot be too good for real enjoyment; the better it is the more pleasure it gives and the more wholesome it is. Indeed, it is like the middy's idea of eggs—"better have one good one than a dozen bad."

To repeat, how it is that good fruit is unprocurable in Colombo? I reply as follows:—

1st.—Those who have never been out of the island cannot appreciate the true value of good fruit, consequently they do not know that there are pines *and* pines, oranges and oranges. Fruit is to them like every other commodity, sold in bulk. 2nd.—Our good European housewife will not go to market herself: consequently the only way she can purchase it is through her appu, and he buys a pine or a dozen oranges or mangoes just as he would buy a bundle of Mauritius grass or straw. Indeed, I may tell the good housewife that I can buy better fish than she gives me in Colombo when I dine with her at Nanuoya, and for not a higher price than she pays her appu or butler, or whatever she calls the supreme being who controls her dinner table.

To return to fruit: if it is required good, it *must* be cultivated, and cultivated fruit cannot be produced in small quantities as cheaply as that which grows like the jungle around it. In time, however, if a market spring up for better kinds, the prices would scarcely be more if the consumption were greater, and this latter would inevitably be the result of really good fruit coming to market. Whoever saw a more disgusting spectacle than the mangoes exposed for sale in the Colombo market? Swedes for sheep and food for pigs in Europe are more attractive. Then take the pines; they are one-fourth of them unfit for human food and should be condemned as such, and I doubt if one-half can be called even wholesome. Now, if it were necessary, owing to some defect on part of the climate, to blame things thus it would be another matter, but fruit ripens as well in Ceylon as elsewhere. Certainly I think the producer very badly protected, for I have sold my fruit to natives for far more than they could grow the same themselves, and they say they have to pluck it green to save it from depredation. Does it not naturally follow that in every probability the bulk of the fruit in the Colombo market is stolen property? For my part. I believe a very large proportion is; but my experience in this case is that "stolen fruit is far from the sweetest." A careful reflection over all I have written will show the number of adverse circumstances against which a grower of superior fruit would have to contend. He would naturally, with European notions, begin, as I did, with quality until he found it was not appreciated, and then he would, as I have done, go in for quantity. The large shipping Companies, such as the P. & O., Messageries and B. I., might do something, for they require a steady supply of fruit, and, if they had it carefully inspecting and rejecting what was not up to the standard, the public would benefit, and they before the public. Of all places where good fruit is appreciated boardship in the tropics comes first. With or without sea sickness, I know nothing more delightful than a good orange or pine-apple, and from time immemorial it has been an understood thing that fruit is beneficial to counteract other influences which without it are prejudicial to health.

To summarize: good and ripe fruit is not obtainable in Ceylon for several reasons. When grown, there is no way of putting it into the hand of the right consumer who will pay its value for it. The natives cannot grow it because depredators would steal it before it was ripe. If placed in the market, the indifferent, though self-interested, appu who caters for his master or mistress will naturally not buy it, as it would cut down the margin of his clippings. If all the large shipping companies would take the matter up, being more particular than they are as regards the quality of their fruit, in no very long time the necessity to produce a better quality would be recognized everywhere, and stolen property of this nature would become less and less in request.

Another point not to be lost sight of is the length of time before most kinds of fruit-trees reach the bearing stage. I know of some of the kinds most in request, besides the plantain, that bear no appreciable quantity of fruit before they are from six to eight years old. Upon an estate I am interested in, in the low-country, orange trees planted seven years ago have only given a partial crop. Limes of the same age gave their first good crop last year. There is no market for my limes, so I have to squeeze them and ship the juice, which in London has fetched one shilling a gallon for unconcentrated, and 3s. for concentrated to a fourth its original bulk. This is scarcely good enough for what it costs. The chief reason why country-grown pines are not so good as those grown in hot-houses in Europe is that no care is taken of them, for I have occasionally tasted this fruit in Ceylon. When carefully tended, they are as rich and full of flavor as could be found on a dinner-table in England.—A BELIEVER IN FRUIT.—Local "Times."

A SOUTH AFRICAN BOX TREE.

In the last number of Hooker's *Icones Plantarum* is figured and described (t. 1518) a new species of Buxus under the name of Buxus Macowani. It is of special interest (says Professor Oliver) as the first representative of the genus in that region, as also in certain structural characteristics, but it is more particularly on account of its possibly furnishing a supply of Box-wood for engraving purposes that we call attention to it, as the supplies of Box-wood from the Black Sea districts is rapidly being exhausted. The following extracts are from the "Report of the Superintendent of Woods and Forests (Cape of Good Hope) for 1884." The Conservator of Forests, King William's Town reports:—

"The coast forests have come into notice during the year by the discovery that the so-called Cape Box is of value for engraving and other purposes for which Box-wood is used. The area of Box-producing forest in the Buffalo River valley is estimated at 15 square miles. Box also occurs in the valley of the Keiskama River, near the coast, but has not as yet been detected west of this in the valleys of the Fish River, Kowie River and Bushman's River."

And again, under "East London Forests:"—

"The event of the year for these forests has been the discovery of the commercial value of Cape Box-wood. This is a small tree like the generality of trees in the East London forests. It is rarely met with over a foot in diameter by 25 of bole, but it is sufficiently abundant to furnish a large supply of wood. Submitted to an expert, it has been declared to be worth about one-penny a cubic inch, if seasoned free from cracks. Cape box (Kafir, Gard-gara) does not appear to coppice, but has a good natural reproduction from seed. The tree was placed on the reserved list a year ago. Previous to that it had been sold at 5s. the waggonload for firewood. See also note by Mr. Jackson on a 'New Box-wood,' *Journ. Soc. Arts*, 1886, p. 465."—*Gardeners' Chronicle.*

PLANT CULTIVATION AND MANURES.

The roots of plants will only absorb from the soil such materials for food as are in a liquid or gaseous form. No matter how richly plants may be supplied with food-substance, they cannot avail themselves of it, or assimilate it into their structure while in a solid condition. Bearing these facts in mind, it is not difficult to understand the great success which has attended the application of Liquid Manure for garden purposes in Flanders, Jersey, and in various parts of our own country, soils that previously were proverbially barren being by this treatment rendered enormously productive.

The late Dr. Voelcker said, "Any one who has passed through Belgium, and examined the nature of the soil, must have been struck with the wonderful change which liquid manure has produced there." The gardener in his practice must, however, alway remember that soils containing a fair proportion of clay, and more especially stiff clay soils, are diametrically opposed in their chemical and physical character to those which are porous and sandy. Generally speaking the retentive and stiff soils contain not only the more common mineral elements which we find in the ashes of plants, such as lime, magnesia, soluble silica, sulphuric acid, &c., in sufficient abundance, but also the more valuable mineral substances, such as phosphoric acid and potash. They, moreover, possess in a high degree the power of absorbing nitric acid, and retaining it for future use; and in addition, under good garden cultivation, the vegetable remains left in such soils, in the shape of roots and leaves from former crops, yield much nitrogenised organic food for succeeding plants. The decided benefit which is usually found by the gardener to result from a liberal dressing of stable-dung is owing to the fact that by the very bulk of the manure the physical and chemical characters of the soil are so altered that in reality the plants feed upon a new and artificially formed soil.

Particular cultures may demand particular manures, but the standard manure, such as well made farm-dung, affords all the ingredients necessary to the development of plants. Such manure contains all the usual elements which enter into the composition of plants, and all the mineral substances which are distributed throughout their tissues; in fact, carbon, hydrogen, nitrogen and oxygen are found therein united with the phosphates, sulphates, and chlorides, &c.

In order to be directly efficacious, every manure must present this mixed composition.

The nitrogen of nitrogenised organic substances only benefits plants when converted into nitric acid, hence no material can act as a powerful fertiliser until it passes into a state of oxidation or decomposition, and the presence of any ingredient which hastens the material applied as manure into that condition, although in itself probably comparatively unnecessary to the plant in that particular soil, yet forms a useful manure. It is in this way we often may explain the great benefits derived from an application of lime, marl or gypsum. Straw, Bracken-Fern, Potato haulms, turf and vegetable refuse, are sometimes mixed with quicklime and earth, to form a compost, in order to facilitate their disintegration and decomposition. The utility of this practice cannot be disputed while confined within reasonable limits, but it is sometimes abused; for it is beyond question that alkaline salts, such as that supplied by lime, mingled indiscriminately with manure, become in reality very mischievous on certain classes of very light soil, where the business is rather to preserve than to destroy the substances that are used as manure. Such soils part too easily with the stores of fertility committed to them; consequently we find soluble plant-food is washed away by the rain, or even evaporated into the air. Mechi aptly remarked that "the best portion of manure is always attempting either to run away, or to fly away;" and time tends to increase this action.

The most suitable manure for the looser and more friable classes of soil, is some substance which will combine intimately with the fertilising materials, and thus husband them securely for future plant use. Thus hungry loose sands are rendered fertile by the application of clayey composts or materials for consolidating the mass, so as to impart a greater resisting power to atmospheric action.

One great objection to the extensive employment of composts, however, is the amount of labour they require in the repeated turnings which are held necessary in their preparation, and in the large quantity of matter which has to be transported.

In order to show why potash, lime, phosphoric acid and nitrogen are the most important elements of plant food, it is necessary to consider the chemical composition of our of various garden productions, and the amount of each constituent they remove from the soil in order to build up their vegetable fabric.

The following table, compiled from various sources, brings before us at a glance the amount of these constituents removed from the land in 1 ton of each crop in a fresh condition as taken from the garden, which of course includes a very large quantity of water.

Amount of Selected Chemical Constituents in Produce Removed from the Land, in Pounds.

In 1 Ton of each :—	Nitrogen.	Phosphoric Acid.	Potash.	Lime
	lb.	lb.	lb.	lb.
Potato tubers	5·6	3·4	12·3	1·5
Carrots	4·5	2·0	6·3	1·8
Parsnips	4·9	4·3	8·1	9·0
White Turnips	4·0	1·1	6·7	1·6
Peas (including pods) ...	64·8	10·3	12·5	5·7
Cabbage (edible portion) ...	6·7	2·9	2·9	5·2
Jerusalem Artichokes ...	5·3	6·7	22·6	1·3
Asparagus	5·0	2·0	0·7	0·5
Onions (bulbs)	5·4	1·6	3·4	1·3
Cucumbers	0·7	2·0	6·7	0·7
Broccoli (heart)	4·4	5·6	10 8	1·1
Cauliflowers (heart) ...	4·6	4·0	5·2	0·5
Spinach	2·5	3 6	4·5	6·0
Radishes	5·0	5·8	3·1	1·4
Kidney Beans (including pods)	61·5	2·3	5·6	1·7
Lettuces	2·5	1·7	8·9	1·2
Celery (stems)	4·5	2·8	5·4	3·1
Beets	4·4	0·7	6·5	0·5
Rhubarb (stalks)	3·1	2·0	5·2	1·6

The true economy of manure can be understood only when we become aquainted, as by the statistics given above, with the special characters of the crops we cultivate; but we not only have to consider the materials required to form a crop, but the power the particular plant we are cultivating has of assimilating the ingredients applied in manure.

For this reason farmyard dung, purchased or home-made, which supplies all the essential elements of plant food, and particularly the constituents shown to be required to such a large extent by the vegetables we cultivate, is so largely used by growers. But on the other hand the immediate return from an application of farmyard manure is much less than from the same amount of plant food applied in well selected artificial manures. We shall hope to continue the subject on a future occasion.—*Gardeners' Chronicle.*

OUR AMERICAN EXCHANGES say that golden millet (*setaria germanica*) is the best of annual grasses for hay, as it yields largely can be cut in six or eight weeks after planting. This is borne out by Queensland experience.—*Planter and Farmer.*

FARMERS should plough their lands a trifle deeper every time they are worked to thereby secure more of its dormant fertility. The deeper the land is ploughed the more productive it will be.—*Planter and Farmer.* [A rule with marked exceptions. In no case should the subsoil be brought to the surface, and ploughing or digging deeper than 18 inches, is generally a mistake.—ED.]

ABOUT HARDINESS.—Many kinds of trees quite hardy after they attain some age are very tender when young, and need protection until they are five or ten years old. It is hardly to be supposed that the growth of the previous season is better fitted to withstand cold on an old tree than on one five years planted. The fact seems to be that most young trees have an excess of plant food. This produces a vigorous though sappy wood, wich does not ripen and cannot resist cold. In a few years the tree becomes partially starved, and grows no more wood than it can ripen. The moral of this experience should be to manure and cultivate young trees somewhat less, and old trees more.—*Southern Planter.*

SILK CULTURE.—There are hundreds of families in Virginia who might add a good many dollars each year to their annual income by engaging in silk culture. Raising a few pounds of cocoons each will not materially interfere with household duties, and how many farmers' wives and daughters would gladly avail themselves of so good an opportunity to add to the family's income if they only knew what silk culture was and how to go about it. To all such, I will say, first purchase yourself a book on silk culture. By following instructions in these books, success is sure to follow. Either of these books can be bought for twenty-five cents. Last summer I bought $1 worth of silk worm eggs. I was so pleased with my success that I am now feeding about 60,000 worms, which I will be spinning in about two weeks from this date. All persons interested are cordially invited to visit my cocoonery, and any information I can give I will cheerfully do so. The time from the hatching to the spinning of the cocoons will vary from thirty to forty days. The food for the silk worm is mulberry, either the white or the common purple mulberry. The latter grows in abundance in the fields and forest of Virginia, and they can also be fed on osage orange—*The Rockingham Register.*—Very Respectfully, *Cross Keys, Va.*, June 15, 1885.—MRS. S. A. CONGER.—*Southern Planter.*

GUTTAPERCHA.—Sir John Kirk, writing in December last, forwarded a sample of native African guttapercha, the produce of a yet unknown tree which he found at Mombasa. From the papers now published, it would appear that after examination of the specimen there remained no doubt that the substance would prove an acceptable addition to the present supplies, its value being about 10*d.* per lb. At the same time Sir John Kirk also forwarded a specimen of some india-rubber taken from plants supplied from Kew Gardens about five years ago, these having flourished and propagated freely at Zanzibar. The report on this specimen valued it, if taken from the trunk of the tree, at about 1*s.* 9*d.* to 2*s.* per lb. As Sir John Hooker, the Director of the Royal Gardens at Kew, remarks, "the attention of Her Majesty's Consular officers in these countries (india-rubber producing states) cannot be too closely addressed to matters of this kind, which are not merely of great scientific interest, but may form the basis of a lucrative and beneficial trade."—*Chamber of Commerce Journal.*

BRAZIL.—Mr Acting-Consul Hampshire, writing on the Trade and Commerce of Santos for the year 1884, refers to the subject of the investment of British capital in that province, and points out that would-be investors should first ascertain from disinterested sources the particulars of the enterprise before accepting all that is stated in the prospectus. "Railways, sugar mills, and gas companies are quite sufficiently developed in the province of Sao Paulo for actual needs. With regard to the first of these, any further augmentation of the present lines that is necessary can be carried out without applying for foreign capital unless the result is of doubtful issue. Only a more diversified agriculture, with an extensive immigration, could warrant any considerable augmentation of the present railway system. Sugar mills are already established in sufficient numbers to provide for local consumption, and present values abroad are far from encouraging any exportations. In some directions there exists a strong feeling in preference of native to foreign undertakings: this, in itself, is a natural and laudable sentiment, but in its application it constitutes, by further development, a possible rock ahead to foreign enterprise, unless the concessions of privileges which have attached to some are clearly irrefragable and safe from any interference or molestation."—*Chamber of Commerce Journal.*

SALT FOR CATTLE IN BURMAH.—We noticed briefly last week the enquiries instituted by the Chief Commissioner of British Burmah concerning the extent to which salt is usually given to cattle in that Province. We print this week the entire correspondence that has passed on the subject, omitting only the detailed replies of cultivators in the seven districts where enquiries were made. It appears that salt *is* given to cattle, and that they not only need it as a salutary diet, but take to it with avidity, thereby proving that it is an essential necessity in the internal economy of cattle. It is a practice that should, we think, be encouraged largely in all districts. From the correspondence before us, it is abundantly clear that salt forms an important element in the diet of oxen, and from the fact that it is administered when the animals are tired and worn out, after a hard day's work, shows the necessity there exists of impressing upon cultivators the wisdom of employing salt more largely than appears to be the case.—*Indian Agriculturist.* [The curious part of the matter is that although the salt duty in Burmah is only one-tenth that of other parts of India, yet the Burmese do not give more salt to their cattle than their neighbours. All, including cattle owners in Ceylon, need to have the benefit of salt given to cattle, pressed them.—ED.]

THE USEFULNESS of the *Sar Kanda*, or *Munj* plant, in the south-east of the Punjab is, according to the author of one of the recent settlement reports of that part of the country, hardly less than that of the bamboo and palm in other localities. The leaves, we are told, are used for thatching houses, the reeds being bound round the edges and across to strengthen the thatch. The reeds are also used for making furniture, such as chairs and stools, and for agricultural implements, such as trays and baskets, and the frame-work of receptacles for chopped straw. The plant, further, often affords the only pasturage available for cattle, and though the dry leaves are said not to be very fattening (a statement which may be readily credited) they suffice to maintain the cattle in condition. The green leaves naturally yield greater nourishment; but these appear only when the plant is fired; and as reeds are seldom produced after the plant has been so treated, the villagers rarely resort to this process, except in the case of inferior plants. But the principal value which munj possesses in the eyes of the cultivator lies in the inexhaustible stores of fibre which it produces for ropes and string, without which no agricultural operations could be carried on, and no comfort would be found in their homes. In the autumn, the view is closed in on every side by the high flowering stems of the p'ant, and then is the chance for the zemindar to lead you a rare dance in search of his fields. Of late years, the villagers have taken to selling the *sar kanda* of their lands, and in many cases a very considerable income is realised from disposing of this natural product.—*Indian Agriculturist.* [All travellers in Northern India are struck with the prevalence of this bamboo-like reed, growing along divisions between lands. It makes splendid thatch for houses, being laid on the roofs thickly in bundles. It also makes nice chairs and small couches. If it would answer in Ceylon; it ought to be of considerable value to farmers and others.—ED.]

STATISTICS OF THE TEA ENTERPRISE:

THE CARD-BOARD TEA ALMANAC.

The Card-board Almanac issued by Barry & Co. of Calcutta, is calculated to be very useful, hung on the wall of an office, showing, as it does, the main facts connected with the great tea industry of China, India and Ceylon. The almanac proper simply gives the days of the week and those of each month, the latter coloured red when Government holidays fall on them. July of all the months is the only one not brightened with a red coloured figure. January, May, June, September, March and August, have each one; February and November two; April and December three each; October is nearly half-red, with fourteen days, twelve of these consecutively from the 2nd to the 13th, and again the 26th and 27th. The total result is that, in addition to the 52 Sundays of the year, the Indian Government and its servants have 28 holidays, for two of the October (Doorga poojah) holidays are Sundays; that is to say, 80 non-working days out of the 365, the working days being, consequently, 285. The figures for tea are given for each month of 1883, 1884 and 1885, a blank column being left to be filled up with similar details. Our readers may care to be reminded that the imports into Britain of Indian tea (Ceylon included) were

1883	.. ..	61,666,000 lb.
1884	.. ..	67,153,000 ,,
1885	.. ..	66,863,000 ,,

There was, therefore, a very material check to previously rapid advancement of production in 1885. But there was no check but a wonderful advance in deliveries in Britain (for export to some extent, but mainly for home consumption), thus:—

1883	.. ..	59,097,000 lb.
1884	.. ..	64,217,000 ,,
1885	.. ..	68,896,000 ,,

An increase of over 9 millions of pounds in 1885 as compared with 1883, and over 4 millions above the deliveries of 1884. The stocks were reduced in proportion, the figures being:—

1883	.. ..	24,116,000 lb.
1884	.. ..	27,076,000 ,,
1885	.. ...	25,780,000 ,,

The highest deliveries of Indian tea which ever occurred were in March 1885, 8,654,000 lb., and in April following 8,704,000 lb., or 17¼ millions in two months. But this was the consequence of a budget scare, and the average for 1885 was somewhat over 5,700,000 monthly. We have good reason to hope that the average for the present year will equal, and, perhaps, exceed 6 millions per month. Lately there has been renewed liveliness in the China enterprise, the wretched peasantry being apparently contented to produce the article at a price which would seem to leave no margin for even the smallest profit. But in the three years in which Indian and Ceylon teas were in such increased demand, there was retrogression in China kinds; the imports having gone down from 160,873,000 lb. in 1883 to 139,940,000 in 1885; the deliveries sinking from 155,820,000 lb. to 151,877,000. The consumption of tea in Great Britain rose rapidly in the 20 years between 1864 and 1885; beginning with 81½ millions and ending with 175¼ millions, a considerably more than doubled consumption in the score of years. In the first year of the series Indian teas constituted only 3 per cent against 97 per cent China: last year the figures were India 39 per cent, to China 61. The rise in the consumption of tea in Britain has been, per head of the population, from 1¼ lb in 1840 to 4⅝ lb in 1885. The probability is that the round 5 lb. *per caput* will be considerably exceeded in 1886. The "district averages" realized in Calcutta, show a steady difference of at least an anna per lb. in favour of the Darjiling and Terai teas, the figures for 1885 being:—

Darjiling and Terai,—	annas 10/10 per lb.
Assam	9/8 ,, ,,
Kachar and Sylhet	9/3 ,, ,,
All other districts ..	9/4 ,, ,,

The area under tea (in all stages, no doubt) are given at

Assam	107,000 acres
Kachar and Sylhet ..	83,000 ,,
Darjiling	53,000 ,,
All other Indian Districts	15,000 ,,
Total for India ..	258,000 ,,
Ceylon	100,000 ,,
Grand total, India and Ceylon	358,000 acres.

If all this area were in bearing at 300 lb. per acre we should get a total "production of 107,400,000 lb." It will be observed that in acreage Ceylon is already on a par with Assam, where the tea enterprise commenced half-a-century ago, only that of course a much larger proportion of our acreage is immature, and some of it,—a good proportion, being not yet exclusively tea. The yields of the various districts in 1885 were:—

Assam	31,209,000 lb.
Kachar and Sylhet ..	19,328,000 ,,
Darjiling	11,346,000 ,,
All other Indian districts	4,526,000 ,,
Ceylon	3,797,000 ,,
Total India and Ceylon ..	70,206,000 lb.

There was a moderate increase in the three years everywhere, but in the case of Ceylon, the produce of 1885 was considerably more than double that of 1883. The estimated average yields per acre were:—

Assam	331 lb.
Kachar and Sylhet ..	263 ,,
Darjiling	214 ,,
Other India districts ..	302 ,,

The Ceylon average figures cannot yet be given, but we think the general anticipation of 400 lb per acre will be more than realized. For estates on virgin forest soil the calculations have been:—700 lb. lowcountry and 500 high, with 300 lb. on old coffee estates, more or less worn. Looking at the record of tea sales in Calcutta, we observe "Nil" against April, and low figures against Feb., March, May and June. The great sales season seems to extend from July of one year to Jan. of the next. The highest number of chests sold in any one month was 64,556 in Nov. 1885; while in London 104,000 were sold in Oct. 1883. The highest average price in Calcutta was 11 annas, 3 pies in June 1885. The lowest was 7 annas, 1 pies in March 1884. Against 371,000 chests sold in Calcutta in 1885, the number in London, including of course the great proportion of those sold in Calcutta, was 813,000.

The Indian Commissariat Department takes about 1,500,000 lb. of Indian tea per annum, at an average price of 7-3 to 7-3 annas per lb. The vast bulk of the Indian teas go to Britain, but we are glad to notice that the exports of Indian tea to Australia is increasing, thus:—

1883	..	699,790 lb.
1884	..	1,029,463 ,,
1885	..	1,939,069 ,,

The exports to the United States, on the other hand, have diminished from 208,000lb. in 1883 to 126,000lb. in 1885. The London and Lancashire Fire Insurance Company insure bungalows and tea factories at rates which differ according as the buildings are *pucka* (permanent and solid,) of brick or stone and iron, or *kutcha* (temporary) slight and combustible; the rates being given at,—

Bungalows and Contents...Pucka....	Premium from	½	% per annum.
Kutcha...	„	1¼	„
Factory Buildings.....Pucka...	„	1½	„
Kutcha...	„	2½	„

Our readers who have effected insurances, may be able to tell us how the above charges compare with those made by the Agencies of Assurance Companies in Ceylon. We learn from the almanac that a Gibbs & Barry Tea Drier, 10′ × 3′ 6″, price f. o. b. £240 to £250 (less 5 p. c.), is capable of "7/8th — drying" 160 lb. to 200 per hour. Nearly one side of the cardboard is covered with a table of equivalents for teas shipped on factory account, freight being taken at £2 5s per ton of 50 cubic feet, with exchange varying from 1s 6d to 1s 10d per rupee. As our readers are aware, exchange is now down considerably below 1s 6d and the signs of the times seem to point down to 1s 3d! In the three years under review exchange began with 1 7 21-32nds; rose in October 1883 to 1 8 1-16, stood between 1 8 and 1/8 5-32nds between March and June 1884 and in 1885 sunk from 1/7 19-32nds to 1/6 5-16th. How low silver may go in 1886, it seems impossible to tell. Tea sold in Calcutta in December 1885 at annas 11/11 per lb. At 1/6¾ per rupee, this was equivalent to nearly 1s 3d per lb.

Our readers will thus see that the Office Wall Almanac which Messrs. Skrine & Co. as the Agents of Messrs. Barry & Co., have sent us is replete with most valuable information regarding the great tea enterprise in which Ceylon is likely erelong to take a foremost position, its acreage already under tea being equal to 2-5ths of the tea area of all India, or 2-7ths of the aggregate tea area of India and Ceylon.

CEYLON UPCOUNTRY PLANTING REPORT.

WEATHER RATHER DRY AGAIN—TIMBER RESERVES AND TIMBER GROWING—GROWING OF FLOWERS.

June 7th, 1886.

The desirability of having timber reserves is too manifest to be questioned: but the difficulty in getting the timber to grow within any kind of a moderate figure is where the pinch comes. What to plant? and how to plant? are ticklish questions; for those who know anything about timber-growing tell us that valuable wood won't grow in waste lands without considerable care. And yet what a diversity of opinion there is about what should be planted. More than a year ago I was encouraged to try the "Wah" tree, which was said to be good wood and was a quick grower. I had this opinion confirmed by a high-class authority, while immediately after another man with a large experience laughed at the idea and gave it as his opinion that perhaps in thirty years or so it might be big enough for cutting for fuel. But as I was committed to a nursery I went on, and as far as I can judge from a year's growth of the planted out plants, I incline to think that the last man has rather understated the length of time required to mature for the furnace, and that half-a-century will be nearer the mark.* In this world of change it is a comfort to have a tree of this kind growing, for you might go home for a trip and stay away for a year or years, feeling quite satisfied that on your return things would be pretty much as you had left them.†

In the search for new products which will be a standby in the day of low prices, for our staples, there has been considerable ingenuity and energy displayed. What to grow which no one else has gone into is, however, the difficulty; for as soon as the rumour is abroad that from such things as pepper, tobacco or limes coin can be landed, there is a rush for them. I had a call the other day from a gentleman representing a Paris firm of perfume manufacturers, who had a whole bundle of suggestions for new industries, the most practical however being the growing of flowers, and the distillation of their essential oils. From among others he specially mentioned the sacred Champak of India (*Micchelia champaca*), the "sapu" of the Sinhalese. For these oils there was a ready market in Europe, and at remunerative prices. The quantity of flowers required to produce a pound weight, was something excessive, or at least it seemed so to me; but it would be pretty much a matter of experiment and a trial on a small scale would not be a costly venture. There was also in India a large market for rose water, it being so much used in native courts, and among the higher castes of the Indian people.

PEPPERCORN.

PROFITABLE COCONUT CULTIVATION IN CEYLON.

(*From an Old and Practical Coconut Planter.*)

HAPITIGAM KORALE, 9th June.

Since the monsoon rains opened on the 17th ultimo we have had few days without more or less, but today has capped all, in heavy squalls and a great fall of rain. This is probably the last effort of the season, and we are likely to have a dry spell now.

I was lucky enough to finish all the planting I can do this season, while the rain lasted, and the gowiyas have very nearly finished their sowings, so that our operations bid fair for success all round. The gowiyas having felled and cleared the land, the owners' work begins, and the following is the cost of my operations:—

Lining per acre	R0·25
Holing „	2·25
Plants „	3·00
Planting and carriage	0·37
	R5·87

Being only five miles from a railway station, I have, on this occasion, cleared R8·50 per acre for firewood for the engines, so that the operations of the season leaves me R2·63 per acre profit.

The gowiyas keep the land in hand for three years; they first sow kurakkan and muneta, and mamottie-weed the land by way of harrowing, then sprigs of sweet-potato vine are put ten or twelve feet apart, and bits of cassava stem five or six feet apart. The grain and pulse first take up the growing, and keep everything else down, while they occupy the ground; when they are

* We received the assurance of Mr. Strong of the Railway that in the lowcountry the "Wah" gave fuel in its fourth year. Of the value of the wood as fuel there is the highest testimony. We have seen the tree growing at 4,500 feet, but generally its range is up to 2,500.—ED.

† Our friend surely draws a conclusion from insufficient experience.—ED.

harvested, in the fourth month after sowing, the cassava gets its innings, and keeps the ground for about a year. The sweet-potatoes come in at the end and continue to be gathered for twelve months or more. Of all those crops, the land share is one-third, and the value may amount to anything between five and thirty rupees, according to the soil and seasons, but, taking the mid term of R15, we have nearly R20 per acre, to the good, at the end of the third year. As soon as the crops are finished, any germs of jungle, that survive in the land, rush up at once, lantana shoots up in all directions, and the seeds of kinds of weeds, common in the vicinity, find their way to the land. All these are easily and cheaply dealt with at first, but if allowed to spread, they soon close in and overtop the plants, and those that are not fairly smothered out, have to maintain a severe struggle for existence, being in no case the fittest to survive. At a cost not averaging more than R5 per acre per annum, a fine field of natural pasture grass may be established, and kept up till the trees come into bearing.

Of 200 plants I put down in May 1879, ten per cent are now in flower, and I have already gathered nuts from the most forward tree.

It appears then, that, though coconuts are not suited to the views of those who think to make rapid fortunes, there is no undertaking in the colony, where so much can be got, for so little outlay, by those who have the patience to *wait*, and there is nothing so suitable for such of the people of the country as have a little capital to invest if they will only do it justice during its early years.

CEYLON HIDES AND HOW TO CURE THEM.

Referring to your editorial on the subject of CEYLON HIDES (page 65), and the poor price which they fetch in the London market, I think you are wrong in supposing that the effect of pasturing on the salt grounds the island would of have an evil effect or otherwise on them. Perhaps the best hides in Australia come from the salt bush country, where water even is brackish—but, at the same time, if any dry salt was put on these hides when drying, it would, to a certain extent, spoil them. In curing hides of all kinds, bullock, sheep, horse, kangaroo, &c., I have been specially successful, and invariably topped the market with any batch that I had sent forward, and my plan of curing was always the same, which, in the case of bullock hides, was as follows :—The hide, as soon as possible after it has been taken off, was spread on a smooth piece of ground and pegged round the edge, driving the peg through the edge of the hide into the ground. The greater the number of pegs, and the tighter the hide was stretched, so much the better. Also the hotter the sun which shone upon it, and the sooner it dried, the better. No salt was required, but no wet or damp had to be allowed to get to it afterwards. I have no doubt, from what I have seen of bullocks in Ceylon, India and Italy, that the secret of the low price for Ceylon hides in London is the curing.

Before KING COFFEE becomes a thing of the past, I wish some planter would try the following remedy, just to satisfy one that no loophole has been left untried to save the annihilation of the old staple. I tried every conceivable method to overcome leaf-disease, in my planting days, but this one I did not try, and, although it may seem a tedious process, still, if it proved successful, no doubt a simpler process might be discovered of applying the remedy. I allude to the "infallible remedy" against the ravages of phylloxera on the vine, discovered by the able Rotland, of the department of Lyons, France. Strange to say, our old friend the blue gum plays an important part in the remedy, and the process consists of inoculating the vine with the pure essence of *eucalyptus globulus*. A broad incision is made through the bark at the neck of the vine, in which a few drops of the essence are deposited by means of a camel's hair brush. The result is that, in about three days, the *phylloxera* entirely disappears, while the vine is not in the least injured by the operation. The incision may be made through any other part of the bark, with equal success, but the result is more speedily attained the nearer it is made to the roots. If the remedy is so successful with *phylloxera*, why should it not be equally so in extirpating *Hemeleia vastatrix*.

COSMOPOLITE.

[The phylloxera is an insect pest, our leaf enemy a fungus like the vine *oidium* : still an experiment is worth making.—ED.]

NORTH BORNEO AND INDIA AT THE COLONIAL AND INDIAN EXHIBITION.

The Exposition made by the youngest of the Britsh colonies—that of North Borneo—though of comparatively limited extent, as might be safely predicted of a colony not yet five years of age, is a very striking example of the utility of the exhibition in making generally known the nature of the productions of the lands under the protection of the British Crown. North Borneo is not altogether unknown to the readers of *The Field*. In the issue for May 3rd and December 20th, 1884, Mr. H. Pryer, the brother of the Resident at Sandakan, described the extensive caves in the limestone rocks at Gormanton forty miles from the coast, which are inhabited by myriads of bats and swallows, whose droppings have produced beds of guano so deep that they are regarded as bottomless. Specimens of this guano have been exhibited by Mr. De Lissa and Mr. Dobson, who estimate its value as being from £5 to £10 per ton, it being excessively rich in phosphates. The caves also furnish a perennial supply of the edible birds' nests so dear to the epicures of the Chinese empire. Among the more striking zoological products of the infant colony is a mounted specimen of the orang-outang, the anthropoid ape of the Eastern Archipelago. This is one of the finest ever seen, and fully bears out the drawings of its prowess in combat with the natives which are given in Wallace's "Malay Archipelago." There is also the skull of a mature specimen that is of unusual size. Among the mineral products of a commercial character that are forwarded from the settlement may be enumerated the trepang, sea slug, or beche-de-mer, so largely used for food by by the Chinese; tortoise-shell, produced by a turtle not unlike the "hawk's-bill" species; and splendid specimens of the mother-of-pearl univalves, mounted as ornaments. The vegetable products are numerous; they comprise very good tobacco, both in leaf and manufactured; and cotton and hemp of excellent quality, the latter exceedingly long in fibre. The coal of North Borneo is abundant, and is found in several places cropping out on the surface; it is exceedingly hard, and resembles anthracite in its fracture, the small pieces that are subjected to the action of the waves on the sea shore being rolled into black pebbles that have a singular appearance.

Amongst the singular objects exhibited in the court is the model of the last piratical proa. This is excessively long and narrow, having an outrigger on each side. It carries an enormous square sail, supported not on a mast, but on a narrow tripod, consisting of three slender spars, two rising from the sides of the proa near the stern, and the other from the bow. With a reaching wind, these craft could make rapid progress through the water, and were admirably adapted to the piratical purposes

of their crews; but the advent of the white man has put a stop to these pursuits, and the flag of the last of the pirate proas of North Borneo ornaments the court of the colony at South Kensington. Ugly-looking creeses or crooked daggers are present in numbers, with dresses and shields and scabbards of the native warriors, ornamented with short fringes of the hair of their victims. There are specimens of the "sumpitan," or blow tube, more than six feet long, and as straight as a gun barrel.

Not the least curious amongst the products of this Eastern land are footballs about seven or eight inches in diameter, made of interlaced cane, so as to present the appearance of open network. These balls are struck only with the foot, and are kept up for a length of time. Of the magnificent timber of the country there are a number of samples varying in hardness and density, from the excessively hard "billian" which is heavier than water, and is procurable in logs 2 ft. 6 in. square and 40 feet long, to the tough "gagil," which though easily worked, has the desirable quality of being ant-proof.

The usual products of the islands of the Eastern Archipelago such as vegetable tallow, gutta percha, lac, &c., are to be found in the small court off this colony but these require no special notice.

The Indian commercial or, as it is called in the catalogue, Imperial Court, is an admirable exposition of the economic resources of the Empire of India, with its population of 250 millions. It is entered through an archway composed exclusively of Indian timber; the table, formed of one complete section of the Andaman redwood tree, shows the gigantic size attained by this valuable timber. At the back of this trophy is a magnificent pair of buffalo horns. A second trophy consists of a platform on the top of a transverse arch formed entirely of bambus, no less than thirty distinct species being employed in its construction. Among the most interesting objects in this court are the four Indian stores, which illustrate, in the most real and truthful manner, the customs of the native trader. The first shows a grain merchant, surrounded by his baskets of produce, which he vends to his customers. Close at hand is a group of women, grinding corn in a hand mill, according to the method which has been in use since the time of the patriarchs. In another store is reproduced a dealer in the culinary vegetables used in the East. A third shows us the fruit-seller, with his wares in circular baskets; but still more indicative of the life in the East is the druggist's store, in which an old herbalist, with his drugs in bags reproduces with the utmost exactitude of a scene familiar to every Indian resident. Opposite to these stores is the model of an Indian fish-wife, surrounded by most admirably modelled and coloured representations of fish; they are so well executed that they appear to have been just taken from the water. The natural history articles in the commercial court are not remarkably numerous, but the collection of Indian game birds, such as the Argus, bustard, &c., from the Indian Museum, may be noticed, as also the plates from "Gould's Birds of Asia," which are hung about the walls.

Amongst the most interesting exhibits, though how it obtained a place in the commercial court is difficult to perceive, is a collection of the earth snakes (Uropeltidæ) of southern India and Ceylon, exhibited by Col. Beddome. These singular reptiles, which are local in their distribution, not extending farther north than 20° north latitude, burrow in the earth and live underground, coming to the surface in wet weather. The earth snakes have pointed heads, well fitted for penetrating the ground. The necks are stout, but the head is not unfrequently found turned to one side, as if it had been partially displaced by the vigorous efforts of the animal to penetrate the soil when in pursuit of the earthworms, which constitute its chief food. The tail is short, and usually cut off at an angle, so as to form a flat terminal plate, admirably adapted to form a *point d'appui* from which the burrowing efforts of the animal can be exerted. These snakes are by no means rare, but are rarely seen, as it is necessary to dig some feet into the earth to obtain them. Those in the court are well shown in long bottles, having been preserved in spirits. On the opposite side of the court is a glass case containing models of snakes in action. These are well shown, the cobras striking and others gliding along or in diverse natural attitudes. The ethnological models in this court are exceedingly numerous, and give a better idea of the various races inhabiting the peninsula of Hindustan than could be acquired by any other means, except visiting the country. Of no less interest is the collection of agricultural implements in the annexe to this court, and the models of agricultural life, such as the representation of a village in Northern India.

The models illustrating farm operations in Bengal, which are all most faithfully represented, should be studied by the aid of the special catalogue. The distinction between the modes of cultivation followed by an agricultural population of many millions, which has remained unchanged for thousands of years, and those pursued in our own country, is most interesting to follow.

Ploughs which only scratch the soil without turning it over are still in use, and improved instruments, such, as are used at the Government experimental farms are rejected by the natives, who prefer to plough the ground over half-a-dozen times with their effete instruments to adopting the more efficacious and improved appliances.—*Field.*

THE ASSAM COMPANY.—The directors of the Assam Company recommend a dividend of 15 per cent., or £3 per share, to be paid on the 1st July to shareholders registered on the 15th June, making, with the interim dividend of 5 per cent paid in January last, a total of 20 per cent for the year. —*Home and Colonial Mail.*

TEA.—At the Liverpool Exhibition a Liverpool firm of tea dealers, Messrs. Roberts, have a tea exhibition. In a Chinese house, with neat lattice work façade, they display samples of almost every known tea, including Indian, Ceylon and even Yerba, tea used by the South Americans, side by side with which are the vessels made from pumpkins, in which the tea is concocted, and the silver pipes through which the liquid is supped. A decided novelty to English consumers are the samples of brick tea. It is not the semi-divided cakes of ordinary pressed tea sometimes sold in England, but large cakes as hard as stones, consumed in Siberia and the North of China, and sometimes passing current as money.—*Home and Colonial Mail.*

COFFEE IN VENEZUELA.—President Crespo's Message to the congress of Venezuela. Speaking of the economic situation of the country the President said:—I regret that our economic situation is not good, owing to causes entirely beyond the control of the Government. Agriculture, which is the main source of our riches, is completely prostrated at present by causes which could not be foreseen, and which threaten to continue; for example, the great and increasing depreciation in the price of coffee, the cultivation of which has long been the support of many of our citizens. We look for alleviation of this unhappy position when the great public works, such as the Port of La Guayra and the great railways now in course of construction, are finished. In the meantime we must have recourse to the most rigid economy, and as in the present state of the country the public cannot stand further taxation, we consider it better to reduce our expenses by at least one-third. There is another circumstance which leads us to this conclusion. The duty upon imported cereals usually yielded 150 to 200 Bolivars per month, but in view of the destruction of our crops by locusts the Government considered it to be advisable to suspend this duty for a season. This has now been in force for five months.—*S. A. Journal.*

TEA-PLANTING AND TRANSPLANTERS.—A tea planter writes and there is much force in what he says :—"I have been thinking a good deal lately about transplanters and am greatly surprised they are not more commonly used. This change in the weather has shown the advantage of them and in one clearing where I put out about 40,000 plants with transplanter I will not lose forty plants, as against 15 to 20 per cent. with hand work in another field. People imagine that the use of transplanters adds to the first year's expenditure greatly. It is the greatest fallacy going, as at a moderate estimate on an average there are 10 per cent of failures and with transplanter there are literally none at all, the extra cost of using them, say R3 per acre, being more than coveed by the saving in supplies, and besides this tea put out with transplanters has a start of at least three months over other tea."

A LESSON IN AN EGG-SHELL.—Five hundred million dozen of eggs are annually consumed in the United States ; their value, at 8d. per dozen, being considerably more than £16,000,000. These figures are to some extent accounted for by the national fondness for pastry, of which Ude declared eggs to be "the great original." One of the best signs of a thriving industry is the little public fuss made about it ; and American poultry-farmers have for a long time been naturally and profitably silent. But a cause of disquietude has at length arisen. No duty is imposed on foreign eggs, and some 16 million dozen of these are annually imported into the United States. The competition is not very severe at present, the foreign supply being less than one-thirtieth of the entire consumption. Still, forewarned is forearmed ; and an American "trade" journal presumably expresses the sentiments of its subscribers when it indignantly asks whether the native egg industry is to be crushed by the rivalry of the "cheap pauper fowls of the Old World." There is perhaps more pique than propriety in this expression, though it suggests obvious matter for reflection on our side of the Atlantic. If we may judge from the innumerable treatises founded upon the problem "How to make poultry pay," poultry seldom does pay in England. In regard to this matter there is a singular if not a painful contrast between English indifference and American enthusiasm. American producers are excited by the fact that a quite insignificant proportion of foreign eggs finds its way into their markets. English should-be producers are in no way disturbed, although every retail shop in the kingdom has practically to rely upon the foreign supply The statistics of these imports tell their own significant story. During the summer months, from fifty to eighty tons of eggs are landed every twenty-four hours on the quays of Harwick. These come almost exclusively from North Italy, by way of the St. Gothard Tunnel. The daily cargoes occasionally amount to as much as 130 tons, representing about 2 millions of eggs, of which London is almost the sole destination. Besides these, from 50 to 60 millions of eggs are sent into England every month from Denmark, Germany, Belgium, and France. The last country does a thriving export trade after supplying the egg-loving Parisians with the 40 million dozen which is their annual consumption. It may be instructive to note some of the points on our coast at which this foreign produce is discharged. Weymouth receives from 3 to 4 millions of eggs per month. Newhaven and Southampton over 8 millions each ; London (port of), 5 millions ; Hartlepool, 8 millions ; Grimsby and Newcastle, 5 millions each Leith, 2 millions. The duty on imported eggs was repealed in 1860.

EXPERIMENTAL TEA A FAILURE.—For many years an experimental farm has been in operation in South Carolina at Government expense, devoted to the attempt to introduce tea culture into this country. It has never met with more than indifferent success. The tea plants would grow well enough, but curing the tea required much labor and skill, and neither could be cheaply obtained near the tea farm. The severe cold this Winter has prematurely stripped the plants of their leaves, and the plantation is now in a more discouraging condition than ever. Commissioner Coleman of the Department of Agriculture thinks the farm had better be abandoned. If more thought had been given the subject the experiment would never have been tried. We cannot compete with China in tea growing, for the reason that wages in that country are only five to ten cents per day. If the Chinese will consent to leave our staple products unmolested with their competition, we can well afford to leave them the monopo of tea-growing. Much of the price we pay for tea goes to middlemen, as the trade in tea has always been enormously profitable.—*American Cultivator.*

CIGARS AND "CIGARS."—What Mr. Sala has to say about the making of Havanna cigars is appetising, what he hints at about the making of cigars which pretend to be from Havanna, but are not, would almost put an end to smoking. "If you offer a Spaniard a cigar—not with the view that he should smoke, but that he should criticise it—he will, after expressing a preliminary wish that you may live a thousand years, produce a sharp penknife and slice the weed through diagonally. Then with a strong magnifying-glass he will scrutinise *las tripas* and tell you as confidently as any Loudon or Linnæus could the precise order of vegetation to which the cigar belongs—whether it is of the superfine vuelta de abajo, the clos vougeot of Nicotia, or of some inferior growth, either from the island of Cuba itself, or from Hayti, or Porto Rico, or Virginia, or Maryland, or the Carolinas, or, haply from the south and east of Europe ; for that vast quantities of Hungarian, Austrian, Sardinian, and Bessarabian tobacco do find their way to Cuba, and come back to us in the guise of prime Havanas—that is certain. A minute investigation of *las tripas* may also lead to the painful disclosure that the cigar is not composed of tobaccoat all.—*Australasian.*

NEW MARKETS FOR CEYLON TEAS.—For the benefit of any of our planters or merchants who wish to do business in a new field, we repeat an extract from a letter addressed to us by Alderman Lobb of Toronto (Lloyd's Ontario Agency) after he had tested samples of Ceylon teas, under date 8th August 1884:—

"I have submitted them (the samples) to some of our leading merchants and they have been very highly approved, some of them remarking, 'they were the finest black teas they ever put the water on.' They are undoubtedly a high grade of teas and could be sold here, if price would not be an obstacle. Having no idea of your valuation I can give no definite opinion, but if any of your friends would like to consign an assorted parcel of, say, 100 half-chests I could test the market here and elsewhere and should hope to make satisfactory returns. I can refer you to the Bank of Montreal here, the Imperial Bank and Messrs. Fra. Peek, Winch & Co. of London, England, whom I represented for nine years. Trusting you are again safe at home much benefitted by your trip, I am &c., J. LOBB."

As already stated, the supply of Ceylon teas in 1884 was so limited in proportion to the good demand for them in London, that no one thought of looking to other fields; but the case may be different now and perhaps Alderman James Lobb of Toronto, may hear from some Ceylon friend with reference to business.

THE ISLAND OF BARBADOS is the most densely populated part of the earth. With an area of 106,600 acres, it contains a population of over 175,000 souls (9 per cent of whom are whites), or an average of 1,054 people to the square mile. The Chinese province of Keang-su, which was at one time imagined to be the most uncomfortably-crowded district under the sun, contains but 850 Celestials to the square mile, while East Flanders, in Belgium the most thickly-populated neighbourhood in Europe, can boast of only 705 inhabitants to the square mile.—*Madras Mail.*

A NEW ELIXIR OF QUININE.—One of the greatest objections to the use of preparations of quinine, especially in the case of children, is the intense bitterness of all its salts, more particularly of the sulphate. A ready and effective means of overcoming this difficulty will be found in a compound wine or elixir of quinine containing glycyrrhizin, the sweet principle of liquorice root In preparing this combination Sherry, Orange or Malaga wine may be used at discretion; the latter is perhaps. the best. Two ounces of dried and decorticated liquorice root, in coarse powder, are macerated for seven days in one pint of Malaga wine. The wine is then filtered, enough fresh wine being poured over the marc to procure a full pint of filtrate. Forty grains of sulphate of quinine and sixty grains of citric acid are then dissolved in two ounces of the filtrate, and added to the bulk. An elixir of this strength, containing one grain of quinine in the table-spoonful, will be found of the most convenient strength for administering to children, and will be pleasantly sweet and almost entirely free from bitterness. If the Malaga wine be good, and of a full alcoholic strength, the preparation will not be found to deposit much on keeping, if at all. —*Burgoyne, Burbidges, Cyriax & Farries' Monthly Export Prices Current.*

THE CHEAPENING OF GRAM.—It appears that in a few localities gram was dearer in 1884 than in 1873, and doubtless this is capable of easy explanation; but generally speaking, the article had declined in price to the consumer, and consequently was not so well worth while growing in the latter as in the earlier year. This is remarkable, for the rupee has declined most seriously in value in gold using countries with which India has an enormous business connection. If the shilling in England were reckoned at its intrinsic value, instead of at a statutory token value, it would now buy only three-fourths of what it would have bought twenty years ago; or, whereas in 1866 it might have bought twelve penny loaves, it would now buy only nine of such loaves. In India the rupee has no statutory value, but it is left to find its own level, and yet, notwithstanding the great decline in its external value, it buys more, or goes farther in regard to gram, than it used to do when exchange was nearly 6d, or 25 per cent. better than it now is. It is, however, the general belief that it costs more to keep horses now than it used to do, or that the rupee does not go so far as it did in filling the gram-bag. —*Madras Mail.*

NOTES ON PRODUCE.—Commenting on the opening of the new season for China teas, the *Grocer* says:—"Wonderful bargains in China teas have been secured under the hammer, and purchasers have been enabled to execute their orders for any description of tea at almost their own prices. How the merchants or consignees here can reconcile this policy of 'smashing' the London market, with their more exalted opinions of the value of the article, in giving at the recent opening of the new season at Hankow rates 10 per cent above those of last year, we cannot tell, but leave it to them to explain, and can only say that by such a contradictory course as this they are multiplying their own risks and spoiling the market for the completion of their regular operations. The mistake of paying high prices at the opening of the Chinese market should always be carefully guarded against, as, to quote the words of advice we used early in March, it causes the shippers there 't form an exaggerated idea as to the true market value of the article, and is greatly to the detriment of the dealers and others here. Purchases for a time go on very briskly, to be followed by considerable shipments to England, when, as fast as the teas arrive, they are probably forced off by auction at rapidly declining rates, and cause a deal of depression to prevail all round.' This is what is likely to happen between now and the end of next July, if holders do not exercise more tact and judgment in buying in one market and selling in another; and what comes of all the complaints or idle boasting about severe losses (?) when they can afford to realize their teas at a material reduction, and thrive without making the smallest gain or profit? Either the reports of higher prices are without real foundation, or the prices themselves are watered down by discounts and allowances which leave them practically at a compartively safe level. If so, it is so much the better for all concerned, whether they are large or small operators in tea, and it is to be hoped that the condition of the trade generally is sounder and more satisfactory than at first sight appears. As, therefore, most circumstances encourage the belief that quotations for China tea in the ensuing season will be very moderate, if not positively low, it is a matter of good augury for the wholesale and retail trade, who will thus be able to supply the consuming public with a serviceable article at a cheap price."—*H. and C. Mail.*

UNIFORMITY IN TEA.—The *Grocer* is publishing a number of letters upon the subject of the want of uniformity in tea. Some of these throw some light upon the blending operations of the grocer. One correspondent writes:—"To show the utter impossibility of any wholesale blender being able to produce suitable blends of teas for all neighbourhoods, it is only necessary to remember the very great difference in the water of different localities. Why, sir, the effect of the water on the same tea on the south side of the Thames is totally different from that produced on the north side; and this I confidently assert after very many years' experience as a tea traveller. Sir, it is not a vital question to me whether I sell my mixers or not; my living in no way depends upon that. All I am desirous of doing is to impress upon every grocer the extreme danger of listening to the advice of those who tell him they can do his business for him better than he himself. No grocer can possibly have the smallest title to the distinction of 'tea dealer' unless he sells an article which, so far as the blending is concerned, is the product of his own skill and judgment." Another says:—"What grocer would ever dream of exposing good tea? My business was not a very extensive one, but in teas my sales were chiefly at 2s 6d and 4s per lb.—at the latter price far in excess of the former. Competition with persons who had tea sent direct from Civil Service stores, and supplied old women in the villages, as well as competition from London wholesale houses who send 20-lb. cads to gentry in the neighbourhood—these never materially affected my sales. My customers returned to the good tea, stating they would rather use less, pay more, and have it good, as one spoonful of 4s went as far as two at 2s 6d of the London teas, besides being excellent in flavour. Now, the grocer must be a dunce at his trade if he cannot mix six pounds of fine Kaisow, six pounds fine Moning, and six pounds good Assam with a pound and half of the finest Pekoe. This mixture I always found to give satisfaction. My friends who sent occasionally for a 20-lb. cad could never understand why they could not get tea like it in the large towns where they lived at 4s—there was so little difference in the 2s 6d and 4s: the same strong capery or Pekoe flavour pervaded both. Too much of either spoils fine China teas."—*Home and Colonial Mail.*

Correspondence.

To the Editor of the "Ceylon Observer."

AN EX-CEYLON PLANTER'S EXPERIENCE OF A HURRICANE IN FIJI.

Taviuni, 3rd April 1886.

DEAR SIR,—On the night of the 3rd March last the most severe hurricane that has been experienced in Fiji for many years past, swept over Taviuni and other islands in the group, doing an enormous amount of damage to property, and the following account from one who went through it, and still survives, may prove of some interest to your readers, especially to those whose inclinations may prompt them to come and settle in Fiji. My only desire is to quit it. In 1881 it was my fortune, or misfortune, to pass through what I thought in my innocence to be a regular proper hurricane, but that was only a gentle zephyr compared with the one of last month. To resume. I was on a visit to my brother at the time, who has charge of the wellknown Alpha tea estate, and was getting quite *au fait* with rolling, withering, firing, etc., and in fact with everything appertaining to tea cultivation.

I beg to state, en parenthesis, that the above is *not* an advertisement, but if there is any tea estate proprietor in your part of the world who wants a manager who can show him an infallible method whereby he can reduce the cost of production to nothing per lb., he can apply to the undersigned.

I can fancy Mr. Editor, your exclaiming "How this fellow *does* blow, why *does not* he tells us about the hurricane?" Well! on the 2nd March, it commenced to blow hard from S.-E. and continued in this direction all day, the wind gradually increasing in violence, until on the morning of the 3rd, it was blowing half a gale. It increased all that day, and at about 2 p. m. my brother informed me that we were in for a regular hurricane. I felt quite cheered at the prospect at 6 p.m. The labour houses, hospital, &c., were all level with the ground, and most of the unfortunate coolies took refuge in the upper floor of the tea house (which was formerly the pulping house when the estate was in coffee), they could not get into the store which was a high double-storied building, as my brother had all the doors and windows battened up early in the afternoon, a vain precaution as events turned out. Our dwelling-house, the walls of which were wattle and daub, lined over, stood it out well until 11-30 p. m. when the first sheet of iron was torn from the roof. The wind all this time was blowing with great fury from S.-S.-E. and S.-E. accompanied by rain. We managed to keep the doors on this side of the house secured, by means of tables, chairs etc., and it took us all our strength to keep same in position. We heard a crash about this time which proceeded from the pantry in the verandah. The walls had given way and the plates, lamps, etc. were having a lively time of it. At about 1-30 a. m. on the morning of the 4th, there was a lull for about one hour. It got quite calm, and I really thought the worst was over. About this time a good many of the labourers who had taken refuge in the Tea house, came and informed us that that house had been blown over, but fortunately for them it fell against the Store which supported it, and they were enabled to make their escape, with the exception of one man who was killed by a beam falling on him and several others were seriously injured. After this short spell, the wind veered round suddenly to N.-W. and recommenced to blow with terrific violence. We saw that the house would not protect us much longer for the sheets of iron were being ripped off one after the other, and the walls looked as if they were going to fall in every moment. It was really hard lines having to leave the house, and I sincerely wished at that moment that we were both in a comfortable bungalow not 100 miles from Gampola town, but there was no help for it, so taking up a blanket we vacated the premises. I had no sooner got outside than off went my hat, and I thought my scalp had gone too, but on passing my hand over my cranium, I found that the few locks of hair which nature has left me, were still there. We managed to stick together although with great difficulty, and after groping our way a short distance from the house, we plumped down on the ground, and drawing the blanket over our heads, we waited as patiently as we could for daylight. How bitterly cold it was to be sure, the covering we had was but a poor protection to the furious blasts of wind which assailed us. I felt sorry for the poor labourers; there were over 100 on the estate and they must have felt the exposure terribly. The principal source of uneasiness to me was the reckless way in which the sheets of iron were flying about. I must confess I did n't half like it, not that I was afraid, but I would gladly have exchanged places with anyone for a short while. We were too near the house to please me. I should have liked to be about 5,000 miles away. Had one of those sheets of iron which were 8 ft. long × 2½ feet wide caught edgeways, it would in all probability have put an end to our career, and this valuable article would have never been written. Many of them were found over 200 yards from the house. At one time, while we were crouching together, I heard a curious clattering sort of a noise which I made sure was caused by a piece of iron coming our way, but which really proceeded from my brother's teeth which were chattering at a fearful rate, only caused by the cold I have to state. I thought daybreak would never come, but it made its appearance at last, and then what a scene of ruin and desolation met the eye! The walls of the house were still standing wonderful to relate, but they collapsed at about 8 o'clock smashing up all the furniture, and in fact everything we possessed; the work of destruction was complete, I can tell you.

We started down the hill that leads from the house to the store when a gust of wind got hold of me, and away I went at a fine pace. I am sure I must have covered 100 yards in not more than 8 or 9 seconds. We found the store and tea-house one mass of ruins, and we had to dig one poor cooly out who had sustained a severe injury to his spine. What a fearful night the poor wretch must have passed! The man that had been killed was only found the next day, he was badly crushed. It is to be hoped he did not suffer much. Most fortunately the machinery was not damaged to any serious extent. The chimney belonging to the Davidson's Sirocco my brother was using was smashed up and the upper part of the Sirocco containing the withering trays was dragged off the lower, or furnace portion, and one of the trays broken, but that damage is easily repaired. The Kinmond's roller escaped. Alpha estate belongs, as I think you know, to Mr. James E. Mason, who is at present in London representing Fiji at the Exhibition there. That gentleman has been most unlucky with his property. When I visited Alpha in 1881, it was one sheet of most magnificent-looking coffee. Leaf-disease soon after made its appearance, and the coffee had to be all pulled up, as the trees would not give any crop. Tea was

substituted and evidently the climate was suitable for it, for it flourished exceedingly when just as everything was progressing so satisfactorily, this hurricane must needs visit the place, doing the damage above recorded.

My brother is very busy getting cooly lines rebuilt, but a month has elapsed already, and it will take another six weeks at least before work can be resumed. It will cost £750 to £1,000 to put up the necessary buildings again. There are about 40 acres of tea 4 years old and 30 acres 2 years old; about 20 per cent of this has suffered severely, and will take some time to recover. There were 15 acres of splendid-looking cardamoms that had a large crop of fruit on them, the whole of which has been totally destroyed. The coconut planters have all sustained an immense amount of damage, and there will be no copra manufactured by them to speak of for the next 18 months at least, and it is not only their coconuts that have suffered. Many of them have lost their fine copra houses, etc., which for convenience of transport were built on the beach by the sea which rose several feet above its normal level, and came inland with an irresistible rush carrying everything before it. It is very hard on these men most of whom have been in the country for many years, and have worked from morning till night trying to make their plantations pay. I have spoken to several old residents of 18 and 20 years, standing, none of whom remember to have seen such a severe hurricane as this. I fear you will deem this letter too long, so I will bring it to a conclusion hoping you will spare me room in your valuable journal for the same. I append some barometrical readings which are reliable. They were taken by the Captain of a steamer who rode out the hurricane in a *sheltered* bay. People have not ceased to talk about the hurricane yet, and I expect it will be a long time before the 3rd March 1886 is forgotten in Fiji. Apologising for the extreme length of this letter, I am, sir, yours faithfully,

——— J. N. O. S.

(Barometer readings referred to.)

1886.		Time.	Bar. Regist.	
March	2	8 a.m.	29·75	
		5 p.m.	29·63	
„	3	7 a.m.	29·57	
„	3	10 a.m.	29·75	
		11 a.m.	29·49	
		2 p.m.	29·32	
		4 p.m.	29·22	Strong E. gale with fierce
		6 p.m.	29·15	do. squalls
		8 p.m.	29·00	do.
		9-30 p.m.	28·85	do.
		10-30 p.m.	28·68	do.

Between midnight and 0-20 on the morning of the 4th it fell suddenly to 27·62, and at 1-30 a.m. it was 27·57, the lowest point. J.N.O.S.

MR. JOHN HUGHES ON CEYLON PUBLICATIONS AND REPORTS.

London, E.C., 7th May 1886.

GENTLEMEN,—I have great pleasure in acknowledging the receipt of your valuable Ceylon Handbook and Directory for 1885-86, which I found awaiting me on my return from Egypt. It is indeed full of useful information, as all those who have had previous editions can well understand, while those who have never had the advantage of possessing a copy, should certainly lose no time in purchasing one, especially as the book can now be obtained through any of your London Agents.

I suppose no Crown Colony except Ceylon produces such a Directory which from the extensive index appears to furnish information upon every possible subject connected with the planting interests of your beautiful Island.

It always gives me pleasure to refer anyone requiring information respecting Tea, Coffee, Cinchona, or the other numerous productions of Ceylon, to the pages of your Directory. Of course you will have it well represented at the Colonies Exhibition, which I have not yet visited since it was opened, but hope to do so shortly.

I send you a page from this week's *Agricultural Gazette* containing a short paper of mine upon the amount of fat in Fish Guano. It may do for the *T. A.* I have frequently recommended the *Tropical Agriculturist* to persons who come to me for a useful book upon current information respecting Tea, Coffee, Cinchona, Sugar and Tobacco, and I doubt not that you find the circulation increasing. You are aware that it is now taken at the two Agricultural Colleges in this country, namely Cirencester and Downton.—Yours very truly.

JOHN HUGHES.

ORANGES AND CITRONS FOR FLAVOURING PURPOSES.

June 12th.

SIR,—I have pleasure in forwarding American recipe for making the above;

Cut the rind into thin shreds; half fill a wide-mouthed bottle with it, fill up with whisky or brandy. Cork tightly and shake now and then for the first month. This will keep good for months and be better for age. SANITAS.

DAVIDSON'S AND LAW'S TEA ROLLER.—One interested, refering to a paragraph we had a few weeks ago, writes:—"Your mercantile informant would have done well *not* to have made an assertion of the kind he did, as you may be sure that we have carefully taken the opinion of a competent engineer before patenting the machine, and we hope to arrange with Messrs. Walker & Co. for it manufacture, and at all events before any are sold the public will be satisfied that there is no infringement whatever.—It is rolling splendidly now and turning out more tea than we expected."

CHINA *v.* INDIAN TEA came into the opium debate in the House of Commons, the Under-Secretary for India using the following argument:—Not long ago a Government was turned out on the question of raising the duties on alcoholic drinks. There would, therefore, be a touch of Pharisaism in our dealing so drastically with the question of opium as his hon. friend would desire. He would, therefore, make two suggestions to his hon. friend. The first was that he should agitate for the increase of revenue at home from alcohol, and apply that increase to replace the loss occasioned to India by taking away the opium revenue; the second was more practical. The balance of trade as between India and China was against China, owing to the vast quantity of opium going from India to China. As between China and this country the balance was against the latter, owing to the Chinese tea consumed in this country. It had even been said that China paid for her Indian opium with the income derived from Chinese tea sold in this country. His hon. friend then ought to consider that when he drank Chinese tea he was encouraging Chinamen to consume opium—(laughter)—and his suggestion accordingly was that his hon. friend and others should use Indian tea, which he believed was very good, instead of Chinese tea. Even if the Indian tea were not good, his hon. friend should still drink it in the interests of morality—(laughter), and thereby practise a virtue for the benefit of those in whose welfare he was so much interested.—*L. & C. Express.*

TEA: CHINA CONSULAR REPORTS—1885.

Much interesting information on the China tea trade will be found in the following extracts:—

FOOCHOW AND ITS TEA TRADE.

Mr. Consul Sinclair reports as follows:— * *

Exports, of the same denomination as those in 1884, are, outside of tea, altogether the cargoes of Chinese traders engaged in the coasting trade. These cargoes represent a value of 1,548,369 Haikwan taels, and consist principally, of timber, paper, oranges, olives, dried fruit, &c. Tea, the staple article of export, gives employment to some twenty-eight British firms, who engage solely in this trade. Less wild speculation and more sober trading characterises the business of this year. There has been more judgment exhibited in the shipping of cargoes to London; instead of the old system of shipping off in a hurry. and clearing vessels in a heap, by means of combination, the departures have been gradual, so as to avoid too large arrivals at one time in London. The year 1885 has not been unsuccessful to most shippers of tea, and may be counted among the tolerably fair years. In many cases full charges and commissions have been realised, besides a slight profit on merchants' own account. That fortunes can now be made in tea speculation is beyond expectation, considering the low range of prices of the London market for the last few years, and the demand for common and cheap teas. Owing to shortness of supply on the London market, consequent on the large increase of home consumption, Foochow red-leaf teas have fared better than might be expected, looking at the poor class of teas, almost throughout, that were brought down from the tea-growing districts. The teas of both first and second crops were pronounced somewhat badly prepared, owing, it was thought, to the cold and wet weather during the spring months; the musters were generally clean and well fired, and fairly free from dust: they were, for the most part, strong in the cup, with a bright infusion. The most striking characteristics of the crop appeared to be the absence of really fine teas from any of the districts. The Paklings were hardly so well curled as last year's, whilst the Paklums were of similar quality to those of last season, with, perhaps, rather more strength. The other kinds, such as Kaisows, Suey-kuts, Sarynnes, Tong Fong-Tongs, and Yunghows were of poor quality, and were inferior to last year's produce, both in make and liquor. Of Souchongs the general quality of the crop was poor, the liquor being thin, and the leaf showng careless preparation. During the first fortnight on the opening of the market business was steady and active, but without excitement. Prices then commenced to decline on the advent of bad advices from home. Prices have shown considerable fluctation during the year, ranging from 17 to 49 taels and 12 to 32 taels at the opening of the market; and 16½ to 18½ taels and 13 to 20 taels in November. Australians were larger buyers this year than formerly, there being an excess of shipments beyond the wants of the population. Australian business is creating a serious competition to buyers for London, while it has an undoubted tendency to making bargains more difficult for the latter.

The manufacture of brick tea of varieties of tea-dust by Russian merchants only, for export to Siberia, is acquiring considerable importance. The low cost of the dust, the cheapness of manufacture, the low export duties upon it, together with the low import duties in Russia, combine to make this trade a success and a profitable business. The most expensive part of the business is the freight on the bricks by sea to Tientsin and the carriage on camel-back to Kiachta. The Russian merchants' export tea-leaf, but in small quantities, for Russia proper—their chief business being the making of brick tea, their commissions on orders from Russia being large, and no loss is incurred. The brick is so beautifully made, and is so portable, that it has surprised me the British Government does not get its supplies from this port; they would find it less expensive and wholesomer for the army than what is now given the army and the navy. I think a trial should be made, or that a Government agent should be employed on the spot to manufacture the brick tea in the same way that the Russians here and at Haukow do. For the whole year, according to Custom-house returns, the total export of every kind of tea—black, green, brick—is 733,599,66 piculs, at 133⅓, equal to 97,813,238 lb., inclusive of the import to Chinese ports, amounting to 93,581,42 piculs, for foreign export. According to the Chamber of Commerce Market Reports, the shipments from the opening of the market in June to the end of the year come to 80,110,418 lb. as follows:—

	Lb.
To London and Continent of Europe	52,839,309
Australian and New Zealand	21,936,755
United States and Canada	5,334,354

The market opened somewhat later this year, actual buying not commencing till June 19. The delay is specially attributable to the anxiety of the native tea brokers for the establishment of fixed rules in the conduct of the trade in regard to weighing and the date of payment. They had cause of complaint in these respects on the part of a few foreign buyers. After much discussion a set of rules was adopted by mutual consent, and came into operation on June 13. The hope that greater regularity would result from this fresh agreement with the buyers has not been wholly disappointed, and confidence has grown out of the new system between seller and buyer. I am indebted to a commercial friend for the following valuable letter on tea:—

"In reviewing the tea trade of this port for the season 1885-86 there are, I think, several novel features which it might be well to touch upon in the first place.

"1. I would mention the sudden and unexpected termination of the Franco-Chinese war, which upset many calculations; and more especially the reopening of Formosa altered the whole position as regards the trade in Oolongs with the United States, preparations for greatly extending which had been made both here and at Amoy but which were rendered nugatory by this action.

"2. The inconvenience attending the shipping of cargo by the closing of the port and the removal of the anchorage to Sharp Peak; but it is noteworthy that, although there was necessarily much delay, there was not a single accident of any importance, although the risk was greatly increased. It will be in your remembrance that the Pagoda Anchorage was reopened on Sept. 6 last.

"3. The New system of weighing tea, and of the cash payments for same, introduced under the auspices of the Foochow General Chamber of Commerce and the native Tea Guild, the time taken in the settlement of these questions causing great delay in the opening of the market, the teamen refusing to show samples until they were settled. You are aware of the nature of the agreement entered into, and I need not further refer to it beyond saying that the terms agreed upon seemed alike fair to buyer and seller—that experience has proved this, business as a rule progressing smoothly and pleasantly. And I am of opinion that, so long as it is carried out in its integrity, the agreement must continue to exercise a most beneficial effect on the trade of the port.

"4. The agitation in London last spring, caused by the expected increase in the import duty on tea, resulting in enormous duty payments and the consequent reduction in the bonded stock of this article to a very low point.

"5. Another novel feature has been the re-employment of sailing-ships in the carrying trade of tea, no less than five vessels, carrying about 7,000 tons, having been dispatched from this port during this last season. This was brought about by the action of the Conference Lines of steamers preventing competition and fair rates of freight, the average rate per steamer being £3 per ton of 40 feet, while by sailing-ship the rate was only 30s. to 40. per ton of 50 feet, the difference being a heavy percentage on the laying-

down cost of common teas. As far as can be at present ascertained, shipment by sailing-ship have shown a more satisfactory result than by steamer, and it may be predicted that, should the Conference system be continued next season, it will have the effect of still further diverting the carrying trade to sailing-ships. The new season's Congous began to arrive on May 13 last. With the exception of a few Paklins, musters were not shown until June 16, when about 315,000 chests had come to market, the result being that it was impossible to taste and value more than a very small portion of the samples before the opening of the market, which took place on June 19, the following being the quotations for the various districts as compared with the previous season:—

	Season 1885-86. Tls. per picul.			Season 1884-85. Tls. per picul.		
Paklins	11½	to	26	15	to	30
Paklums	17	to	49	20	to	35
Panyongs	12	to	32	15	to	33
Sueykuts	10	to	20	10¾	to	27
Yunghows	12	to	20	10	to	23
Saryunes	9	to	16	10½	to	19½
Scumoos	12	to	34	14	to	35
Tong-foug-tongs...	14½	to	16	10	to	17
Dust & Siftings ...	4	to	9	4	to	7½

Rates of exchange being 3s. 7¼d., against last season's 3s. 9⅝., for four months' sight credits; rates of freight to London, £4 to £3 per ton, or the same as last season; and to Australia 30s. per ton, against £2 and £2 10s. per ton. As regards the quality of the crop, the general impression was that, owing to the unusually wet and cold spring, there was again a scarcity of finest kinds, but that the teas generally were of fair average quality, and possessed considerable strength, the exceptions being those from the Sen Moo, Sar Yune, and Young How districts, which were below the average. For a few days after the opening transactions were not on a large scale, buyers securing their favourite chops of fine and finest teas, while medium Pan youngs were selling cheaply. Dust and siftings were, however, in strong demand at full rates. The "Gleneagles" was despatched for London on June 27, and after this buying became more general, very large transactions taking place for both England and Australia, prices for the lower grades being well supported while the better kinds went in the favour of the buyer. All through July the active demand continued, the low rates of exchange enabling a comparatively high tael cost to be paid; and early in August advices being received that fine and finest kinds had met with a favourable reception, both in England and Australia, the remaining first crop teas were cleared off the market at full rates. With heavy arrivals in London recourse was again largely had to 'public sale without reserve,' with the usual result of low prices and losses to the importer; still buyers on this side being satisfied, that with the increased export to Australia, supplies of Congou could not be in excess of the actual requirements, there was no falling-off in the demand here; and in fact, as the season progressed, rates for common kinds gradually hardened, and in November the highest prices were reached, when low dust realised 5 to 6 taels per picul, and low common Congou 9⅓ to 10½ tales per picul. And it was a matter of surprise to most merchants that, with such quotations, the teamen were unable to bring larger supplies to market; but, juding from the quality of the latest arrivals, it was evident that every available leaf had been collected, some of it being from three to five years old, and it still remains to be seen whether such low quality will be allowed to go into consumption in England. [Three to five years old leaf made into tea! Talk of bangy leaf after this.—ED.]

"The results to the tea men, they having profited by their severe experience of last season, must have been most pleasing, they having secured large profits on their first-crop ventures and a good percentage throughout the season; while so far it is doubtful if the foreign merchant has done more than come out clear. The supply of first-crop Congou was about 30,000 chests less than last year, but the total arrivals for the season were 660,000 chests, as compared with 642,250 chests last season. *Souchongs*, as a rule, could not compare in quality with those of the previous year; but fine and finest kinds found ready sale at very full prices, while the common grades throughout the season have, in sympathy with Congous, brought high rates as compared with taol cost of last season.

"*Oolongs*.—As noticed in the early part of the report, the teamen made preparations for doing an extensive business in these kinds; but the reopening of Formosa upset their calculations, and though the market opened at about last year's rates, the result was a heavy loss to them. And this remark will also apply to the fine strings, which sold cheaply as compared with former years; but the autumn crop being bought at very low rates in the country enabled sellers to recoup themselves. The quality of these teas throughout the season has been most disappointing, besides which there has been a much larger admixture of dust, which is most detrimental to their sale in the great consuming country, namely, the United states; and unless much greater care is taken in their preparation there can be no doubt that this valuable trade will be wholly diverted to Amoy, whose teamen are fully alive to the importance of the question.

"*Scented Teas*.—It would appear as if these teas were going out of consumption in England, for although laid down this season at a fairly moderate cost, the result has been most disastrous to the buyers.

"*Flowery Pekoes* proved to be a fine quality, and found ready sale at extreme tael cost. The circulars issued by the Foochow General Chamber of Commerce furnish you with full and detailed tables of statistics, so that it is unnecessary for me to append them; but you will notice that while to England the export shows a further small decrease, that to Australia and the United States is again larger, while the Russian trade in brick tea continues to increase; but of this we have no particulars beyond those given in the Customs Returns. You will have noticed the continued fall in the value of silver, the latest quotation for four months' sight credits on London being 3s. 3¾d. per dollar. In conclusion, I would draw your attention to the following startling figures as regards the import into, and consumption of tea in, Great Britain. For the eleven months ending Nov. 30, 1885, the total amount of tea delivered was 204,290,693 lb., against, during a similar period in 1882, 192,126,826 lb., or an increase in three years of 12,163,867 lb.; but the deliveries of China Congou alone had fallen from 120,345,012 lbs. for eleven months in 1882 to 111,644,820 lb. in 1885, or a decrease of 8,700,192 lb. The import of China Congous showed a still more alarming decrease, the figures being:—Imported into Great Britain, June 1 to November 30, 1882, 122,214,956 lb., against, for same time in 1885, 98,647,700 lb., or a falling off of 23,567,256 lb; while the consumption of Indian and Ceylon teas for same time were, in 1882 16,040,006 lb., and, in 1885, 63,387,384 lb., or an increase of 17,347,378 lb.

"The sole cause for this enormous decrease in the consumption of China Congous is undoubtedly the continuous falling off in the quality of the tea produced, and this should be a matter for the serious consideration of all concerned in the prosperity of the port; and you, Sir, would be doing a good work—Could you bring these facts home to the officials of this province?" To this highly-interesting and exhaustive letter of my obliging friend on the engrossing subject of tea there can be but little, if anything, to add. More than once has it been brought to the notice of the high officials that so little care is taken by the tea-growers in the upper districts to produce again a fine quality of Congou, as was the case some ten or fifteen years back, and that they should be encouraged to put in fresh tea-shrubs and root out the old ones, and otherwise to be careful in the cultivation and the rearing of the plants. I will again make a fresh endeavour to bring the Viceroy's attention to this important matter, and I hope it may meet with the desired success. But it must be said, on the other

hand, that buyers must expect to pay higher prices than they have lately been doing in this market; there has been so little encouragement on the part of the buyers in this respect, the demand being for cheap and common-class teas to suit the London market.

FREIGHTS IN 1885.

To London and Continent of Europe.—As regards tea, from January 1 up to the opening of the tea market at the end of June, there is nothing of interest to report. The first steamer for London direct left Sharp Peak on June 28. The scale of freights was on the same basis as the previous year, namely, £4 for the first and £3 10s. for the second boat. After these departures the rate was fixed at £3 per ton, at which figure it remained as long as the berth was occupied only by steamers belonging to the regular or Conference lines. At the end of July the British steamer "Ascalon" was advertised to load, when it was decided by the Conference to reduce their rate to £1 10s. per ton to meet the opposition, and, if possible, to prevent other steamers from calling. After the departure of the "Ascalon" the freight was advanced to £3, but was again reduced in the middle of August, as another non-Conference steamer took the berth. These tactics were again repeated at the end of November, since when the normal rate of £3 has been maintained. The feature of the season has been the fact that five sailing-vessels have taken full cargoes from this for London—about 7,000,000 lb., or, say, 10,000 tons of 40 cubic feet—whereas not a single sailing-ship was despatched last year. Many shippers have apparently come to the decision that it is necessary to regulate the arrivals on the home market, and have thus to a certain extent reverted to the old mode of shipment. This has, no doubt, had a beneficial effect on the tea trade of this port by strengthening the London market.

Australian Colonies.—The two principal lines attempted to prevent opposition at the beginning of the season by offering shippers the same inducement as is done by the Conference lines to London, to confine their support exclusively to them, namely, a return of 5 per cent on freight paid. This, however, did not take effect, as a third line entered a strong competition, and freights at the opening of the season were £1 10s. per ton, and have remained at this rate throughout. The first steamer got £2 10s. per ton; second and third, £2; but later in the season the quotation was as low as £1 per ton, consequent on excessive competition.

America.—The trade from this port, being small, is not of great interest to the shipping. Rates have ruled very low; the bulk of shipments have gone to New York, transhipped in London, at the very low rate of £1 10s. under through bill of lading, the competition at other ports having been very keen.

The value of the tea export trade in 1885 may be estimated roughly at $16,000,000, at 3s. 6½d. = £2,833,000.

PAKHOI.

Mr. Consul Allen reports as follows:— * *

EXPORTS.—Exports from Pakhoi may be divided into two classes—those whose final destination is a foreign country, and those which are intended for local consumption. The first class, unfortunately, requires but a very short list. Cassia and aniseed, with the oils extracted from the plants, head the catalogue. Our foreign merchants in Pakhoi are largely interested in these articles, and export considerable quantities to Europe and Bombay. The present export duty on cassia is a little heavy, being six mace on each picul, valued by the Customs authorities at three taels; in other words, 20 per cent., instead of 5 per cent., the estimated tax on each article of export when the Treaty of Tientsin was made. This might, perhaps, be remembered should there be a revision of the tariff at any future time.

TAMSUY AND KELUNG: FORMOSA.

[Formosa is so rich in soil and so genial in climate and the quality of its tea so good, that if good government gives protection to life and property the island may prove a formidable competitor to India and even Ceylon in the produce of tea.—ED.]

Mr. Consul Giles reports as follows:— * * *

The following table shows an enormous increase in the export of tea for 1885 over any previous year:—

	Lb.
1880	12,063,450
1881	12,859,467
1882	12,040,447
1883	13,206,727
1884	13,156,581
1885	16,364,000

The quality of the Formosa tea is steadily improving, and American buyers have written in glowing terms respecting the successful issue of the 1885 crop. There is, in fact, every prospect of the Formosa tea trade expanding before very long to little-dreamt-of proportions.

Since my arrival here in November last I have twice been into the interior to visit the savages. It is a very interesting trip, and the country in which the savages live is beautiful beyond description. At the boundary between Chinese and savage territory there are camps of Chinese soldiers to guard the agriculturists from savage depredations; and on my arrival the petty mandarin in command came to meet me, and disappointed the party very much by saying that no savages had "come out," or would come out for several days, so that we should not be able to see any on that occasion. He then advised us to come again another day, when he promised to send an escort of soldiers with us for safety's sake. An hour after this myself and party (which included Mrs. Giles, the first lady who ever crossed the border) were strolling along in savage territory, accompanied by some half-dozen savages, men and women, who were delighted to see us, partly because we showed no signs of wearing the hated pig-tail, and partly because of sundry strings of beads and other various odds and ends, an earnest of which had already been bestowed upon them. We were of course alone. Our chair-bearers had refused to follow, and wisely so, for it is certain death to any Chinaman who shows his half-shaven head on the wrong side of the line. We had a very pleasant ramble, and hoped at one time to reach a savage "village;" but time was against us, and we were forced to retreat, carrying with us the evident goodwill of our hosts, while they carried away with them other and more tangible spoil. One of them knew a few words of Chinese, but this vocabulary did not run much beyond "Chinaman bad man. You know Chinaman; you good man," &c. They were a pleasant-featured, healthy-looking lot. But they are doomed, and that in the near future. General Liu is carrying on operations against them which can only have one end; he is overwhelming them with numbers. Every now and again he sends in two or three thousand men, who come back minus one or two hundred, killed by the deadly fire of the savage matchlock, and having apparently accomplished nothing. Meanwhile, there are signs that the savage resources are not without a limit. In one direction eight large "villages" have already submitted, and while I write an expedition of no less than 10,000 troops, acting at different points, has been organised by the vigorous official whom even France will have good cause to remember. General Liu has wit enough to see that Formosa, under the civilised rule of China, has a grand future before her. The hills over which the savages are now sparsely scattered would grow thousands of tons of that delicate-flavoured tea over which even now New York purchasers are writing in such hopeful terms. So the savages have to go. They can, if they like, take grants of land, paying no taxes for a certain number of years, and being

all the time taught agriculture free of charge, through an agency specially established for that purpose. But if they do not like, and many prefer the old free jungle life and the excitement of the daily chase, then it becomes a question between their unerring but scattered matchlocks and the bristling breech-loaders of half-drilled Chinese troops. Through part of the territory already recoved the Chinese have constructed a good military road, and before long this is expected to debouch on the east coast, at Soa-bei, where, by the way, there is a fine spring of mineral water, of what value is not known, as none of the water has been subjected to analysis. The authorities are extremely jealous of foreigners visiting these savages. The petty mandarin above mentioned did all he could to prevent my party from advancing, deviating boldly from the truth in order to effect his object. Before long the occasion will hardly arise. Those foreigners who would study the Formosan savage in his native haunts must make haste; there will soon be none left to study.—*London and China Express.*

CULTIVATION OF TOBACCO IN GREAT BRITAIN.

As considerable interest is being taken in this subject at present, it may be interesting to agriculturists to know that about the year 1800 an attempt was made to cultivate Tobacco in Scotland, and it is recorded in the *Statistical Account of Roxburghshire* that "in one season a tenant-farmer in the parish of Crailing (about 6 miles west of Kelso) drew £115 for Tobacco plants, and afterwards grew a crop of between 12 and 13 acres, which he sold upon the ground for £320, but an Act of Parliament intervening, the purchaser was unable to fulfil his bargain, and the farmer was compelled to dispose of his Tobacco to the Government at only 4*d.* per pound, at which rate it brought him only £104." And it is further remarked:—"It appeared from the trials made at that time that Tobacco would thrive well in the southern part of Scotland." It was also grown largely in fields a little to the east of this town (Kelso), part of which is now a cemetery. A road at the west end of the cemetery is still called the "Drying-house" Lane from the fact that the house where the Tobacco was dried stood there. Mr, Brotherston, botanist here, informs us that between twenty and thirty years ago he used to grow regularly in his garden at Ednam (about two miles north-east of Kelso, as much as furnished him with smoking Tobacco; and at the present time we know of its being regularly grown in a nobleman's garden for the purpose of fumigating the greenhouse plants, the sort generally grown being the Virginian, a variety of Nicotiana tabacum, though there are many other sorts in cultivation, one being Nicotiana rustica, the common or green-flowering variety, which is much hardier than Virginica, and, we believe, the first to be cultivated in this country, though the Virginian was introduced fully 130 years earlier. We may say, that for this country the young plants require to be raised in a hot bed, and planted out about the end of May in deeply trenched soil heavily manured. The greatest enemy the plants have to contend with (but only in their young state) is the slug. We have no doubt whatever that Tobacco could in most seasons be profitably grown in this country, provided Government will be somewhat lenient as to the conditions and taxation. If we mistake not, the parliamentary Act referred to was passed almost solely for the benefit of encouraging the growth of Tobacco in the colonies; and surely our colonial friends have had a fair monopoly of its growing, and it is to be hoped that the Government will allow our farmers at home (who may wish to grow it) permission to do so on reasonable and encouraging terms.—LAING & MATHER. Allow me to say a few additional words on the cultivation of yellow Tobacco, which I omitted for the sake of brevity in my last communication. To a certain extent the writer of the pamphlet quoted by me is at one with Colonel Trevor Clarke, "that the colour of the ultimate product is due to soil and conditions of cultivation." Like colonel Clarke, he deprecates the use of farm manures, but strongly advocates the use of prepared fertilisers. Thus he says:—"Eleven years' experience in the use of the Anchor Brand Tobacco Fertiliser, manufactured by the Southern Fertilising Company, Richmond, Virginia, has convinced the writer that it is the planter's best aid in the production of rich, silky, bright yellow Tobacco. Lands capable of producing yellow Tobacco need just such help as is furnished by this fertiliser in hastening the growth and giving size, substance, and early maturity to the plant. From 100 to 300 lb. per acre of the fertiliser may be profitably used." Regarding the black colour of Latakia this is due to a great extent to the system of drying over the smoke of burning Oak-wood, by which it also obtains the smoky flavour characteristic of this Tobacco I am fully aware of the difference in the flavour of Tobaccos that have been fermented and those that have not, or only slightly so and I prefer the later because they are lighter and more fragrant.—John R. Jackson, Museum, Kew.—*Gardeners' Chronicle.*

ON A METHOD OF TRANSMITTING LIVING PLANTS ABROAD.

BY R. LINDSAY, CURATOR, ROYAL BOTANIC GARDEN.

"The method usually adopted in transmitting living plants, particularly where very long journeys have to be undergone, is to pack the plants in Wardian cases, *i.e.*, cases fitted with glass sashes, which, when closed, are nearly air-tight. This is no doubt the best mode of conveying plants safely, provided they are properly attended to on the journey. To do so it is almost necessary for some one who understands the requirements of plant life, to take charge of the case as, when sent without any special attention being paid to them, the results are frequently unsatisfactory. The dangers attending such structures appear to be want of ventilation and shading. The plants contained in them soon become drawn up and weakly in the steamy atmosphere of a close-fitting case, and often arrive at their destination in a dying or dead condition. One of the most successful importations of plants that I recollect of having seen was contained in a small wooden box sent to the Garden from Australia by Baron von Mueller, in 1866. The plants had been over three months on the journey, but were found to be in perfect health on their arrival at the Garden. This result we attributed chiefly to the simple manner in which the case was constructed. It consisted of a rough square wooden box, filled with soil, into which the plants (which had previously been grown in pots) were placed, two narrow strips of wood were nailed on to the sides of the box in an upright position, to which a cross-piece was attached, constituting a handle. The whole was then covered with strong cotton cloth, no glass being used. In vol. viii., p. 482, *Transactions of the Botanical Society*, a description is given of this case by the late Mr. McNab. In July last our associate, Mr. John Buchanan, when returning to Central Africa, being desirous of taking some economic plants out with him to that country, an opportunity was thus afforded of trying an experiment. This was rendered all the more necessary as on previous occasions similar plants sent to Central Africa from the Garden, packed in Wardian cases, although taken every care of on the way out, were found to be mostly dead on their arrival. On this occasion, a case similar to that exhibited was prepared. It is 18 inches long, 12 inches wide, 16 inches deep, has a ridge roof with a handle fastened on the top for carrying. The main difference from an ordinary Wardian case is in the substitution of cotton blinds for glass sashes. The blinds are nailed to the top of the ridge and tied down with cords to the sides of the case, so that they may be easily rolled up or down as required. The advantage of this method is the admission of sufficient light and air to maintain the plants in a healthy condition; the fine meshes of the cloth acts as a shade from strong sunshine, and do not admit so much air as to cause the interior to become quickly dried up. The plants sent on this trial consisted of India-rubbers, several Tea plants, Cinchonas and Ipecachuana. They were all turned out of the pots in which they had been growing previously, the balls of soil slightly reduced, and then

wrapped up tightly amongst sphagnum moss. The plants were then packed in the case firmly, in an upright position, using sphagnum for filling in the interstices. Thin strips of wood were placed across the balls, the ends of which were nailed to a flange inside the case for that purpose, thus preventing the plants from moving, even if the case was turned on end. After being well watered and allowed to settle for a day, the blinds were tied down and the case sent up to London, where Mr. Buchanan took it in charge. He was eighty-two days on the journey out, and in a letter to Mr. Taylor received in December last Mr. Buchanan reports that all the plants arrived in a perfectly healthy condition, except the Cinchonas, and that he had not given up all hope even of them. I may mention that the Cinchonas referred to were not very vigorous plants to begin with; they were the best we had at the time, but were merely young seedlings. It would be well to have this method still further tested, either by having a few plants sent to a distance alone, or at all events in charge of some one less skilful in the management of plants than Mr. Buchanan. For all but very tender plants (where special provision would be required), I think much more favourable results would be attained by the use of a case such as that described, always provided it were placed free from danger of sea water getting through the canvas, than if the usual Wardian case were used." *Edinburgh Botanical.*

FORESTS OF JAPAN.

The area of Japan is about 96,000,000 acres, and the forest area, exclusive of the Loo Choo and the Bonin Islands, is about 29,000,000 acres. The forests are held in nearly equal proportions by Government and by private owners. Forestry has long been made a study in Japan, and it is stated in a recent report of the United States Commissioner of Agriculture that no people are more skilled in grafting and dwarfing trees than the Japanese. The Government Forestry Department is now an important branch of the State. The head office is in the capital, Tokio, but in each of the forty-four *Ken* or States, into which Japan is divided, there is a branch office from which the respective forests and plantations are managed. During the days of the old rulers, each lord had his own forestry laws, all of which were very strict; one of these made it a punishable offence to be found in the forest after nightfall. Since the new *regime* the forestry laws have been consolidated, and their old feudal strictness somewhat abated; but the existing laws are still strict enough to secure the due preservation of the forests. In Tokio there is a Government school of forestry which was established three years ago, and is now attended by 150 pupils. Some of these pupils are preparing themselves for practical work in the State forests; others are the sons of landowners and farmers acquiring a scientific knowledge of arboriculture in order to qualify themselves for the efficient management of their own lands. The curriculum in the forestry school includes botany, the chemistry of the soil, a little natural philosophy, surveying, and the practical work of planting and rearing trees. Illustration is given to the pupils by Japanese officials, who have themselves studied forestry in the schools of Germany. Large plantations have been formed under Government auspices, and every year the area of forest land is being added to—cedars, oaks, spruces, and firs being the trees more generally planted. Within the last few years an important experiment has been made in the introduction into Japan of the seeds of trees and shrubs from other countries. Tea is extensively cultivated, but it was only in 1879 that the first coffee berries were brought from the Sandwich Islands and planted in Japan, and great hopes are entertained of the success of this experiment, from a commercial point of view. The cinchona tree was introduced from India in 1878, but the climate of Japan does not appear to be favourable to it, and in 1880 large importations of forest trees were made from Europe and America, and planted in the experimental gardens of the forestry department at Tokio. Some were failures, and others took favourably to the country—the list including several firs, oaks, and maples, the birch, the German larch, lime, ash, *pinus webbiana*, and other trees, which will in time form an important addition to the timber supply of the country. Extending over 15 degrees of latitude, and with high central ridges of mountains on the larger islands, the climate of Japan differs considerably in the north and south, on the plain and in the mountains, so that the vegetation partakes both of tropical and temperate zone characteristics. The country itself may be divided into five distinct tree regions or zones. In the first the temperature is high, and the forests consists of broad-leaved evergreen trees, then comes the zone of the oak and the beach, and other broad-leaved deciduous trees; next that of the family of cedars, among others the *Thuias* and *Retinosporas* for which the country is remarkable. Higher still is the region of the firs and pines, the conifers including many of the finest specimens of the *Abies veitchii*. Chief, however, among the trees of Japan are the *Cryptomeria japonica* and *Retinospora obtusa*, which attain to a height of about 120 feet, and a girth of 20 feet. The United States Commissioner of Agriculture says, that to those who have only been accustomed to see small dwarf specimens of the Japanese *arbor vitæ* and conifers used for lawn decorations, nothing is more astonishing than the great slabs of wood which such trees supply in their native country. Of such slabs many specimens are seen in Japan, and the ornamental woods are also very numerous. A very useful Japanese hardwood is the *Keyeki*, which has a reddish hue; and there are many varieties of oak. From one of the trees grown in Japan—the *Bronsonetia papyrifera*—the inner bark is taken and manufactured into paper, while from one of the climbing plants the woodmen make their clothing. The wood is steeped in water, then beaten with hammers, and the fibrous mass thus obtained is woven into cloth, which is dyed a deep blue colour. In the way of timber, the Japanese are able to supply the greater part of their own wants, and as the houses are largely built of wood, the quantity required is very considerable. A large quantity of timber is exported to China, and a small quantity is imported from America. In Japan there are large numbers of ponds in which timber is preserved. These are usually constructed near the mouth of a river, and into them fresh and sea water is allowed to flow, in the proportion of six parts salt to four parts fresh. Should there be a larger proportion of salt water, the timber is apt to become black; if a larger proportion of fresh water, the wood is liable to attack from worms. The ponds are about five feet in depth, and by means of canals many of them are often connected. The timber is piled in the form of a cube, and is kept in the pond from two to five years before being used; the trees most frequently treated in this way being the *Retinosporas* and *Cryptomeriæ*; a part of the preserving process being the thorough washing and re-arrangement of the wood twice a year. Some of the ponds are made large enough to contain 10,000 pieces of timber. —*Journal of the Society of Arts.*

VICTORIAN ORANGES.

The value of orange culture in Victoria is annually becoming more distinctly apparent. The quality of the Sydney fruit, upon which we are at present almost entirely dependent, has been deteriorating for some years; while the few of Victorian growth that are occasionally brought to market, testify to its profitableness. One of our correspondents, Mr. Sydney Williams, whose garden is situated to the east of Doncaster, has a small plot of oranges and lemons, that brings him in more profit than an equal area of any other kind of fruit in his extensive garden. Still finer oranges are grown in other districts, especially to the North of the dividing range, whence magnificent specimens have been sent from several parts of

the district; while from the neighbourhood of Swan Hill specimens have been shown in Melbourne surpassing in size and appearance any of the Sydney grown fruit. Therefore, Victorian fruit growers need not fear being starved off the face of the earth by the action of the reciprocity treaty with Tasmania, of which they affect to feel such a dread, while it remains in their power to utilise such a valuable source of profit as that of orange culture, which might be successfully conducted over a large portion of the northern plains, extending from beyond Wangaratta in the east to the extremity of the colony in the west.

The chief inducement to plant orange groves in Victoria, however, independent of Custom duties, is the fact that, the orange groves in New South Wales, at any rate in the neighbourhood of Sydney and Paramatta, the great centre of orange cultivation in that colony are rapidly decaying, owing to bad management, neglect, the use of unsuitable stocks, besides other causes. In a lecture on orange growing delivered in Sydney a short time ago, by Mr. S. W. Pye, it is stated that "orange growing in the county of Cumberland is a very profitable pursuit to those who understand it, but 99 out of every 100 who possess orange orchards know very little from a scientific point of view, *i.e.*, regarding its culture, the failure of crops, and the cause of many diseases affecting the whole of the genus." The great bane of orange culture is disease, and the worse kind is bark disease, which appears to affect the trees in all soils and situations when they are worked upon unsuitable stocks. In a letter to the *Mail*, Mr. Pye states that "an orangery at Lane Cove, 20 years ago contained 2,000 trees; of which 1,998 have since died out from various causes, and the only 2 that remain are Seville orange trees, now 40 years of age. In an orangery at Seven Hills, once the property of the late Mr. Pye, which contained about 1,000 trees, the whole of them, with the exception of 5 Seville orange trees, suffered so much from the rotting of the barks that they had to be destroyed; while the 5 Seville orange trees were in no way affected with the disease."

When the bark disease was causing such havoc among orange trees in Madiera, Portugal and other orange growing countries of Europe, Mr. Charles Moore, Director of the Sydney Botanic Gardens, was despatched by the Government of New South Wales to institute an investigation of its nature and the means to be used for its extirpation. In the report which he gave after his return in the early part of 1868, he showed that working the sweet orange on stocks of the Seville or bitter orange was the only method of preventing the disease. He instances a plantation near Alcira which had been a very fine one; but every tree was either dead or dying, with the exception of a group of a dozen all on the bitter orange, which were entirely unaffected and in fine healthy condition; while some of the surrounding trees which had suffered so severely from the disease were raised from seed, others had been budded, some on citrons, some on lemons, both of which have obtained preference as stocks; but so satisfied was the Spaniard, although singularly adverse to change an old custom, of the value of Seville stocks, that their price had risen to 2s. 6d. each, whereas the other stocks—citrons and lemons—were unsaleable at 6d. each. Culturists are therefore recommended to bear these facts in mind, for undoubtedly the bark disease is the greatest of all drawbacks to successful orange culture. Propagators of oranges appear to pay as little attention to the nature of the stocks they use as the Spaniards paid previous to the appearance of the disease amongst their trees. No one with the knowledge we now possess respecting the universality and the destructive nature of the disease and its cure ought to plant a single tree that he is not sure is on a bitter orange stock; it would be better to buy a few cases of Seville oranges, throw them in rot heap, raise seedlings and wait until they are propagated rather than risk the chance of having the whole or even a portion of his trees affected with disease, and giving out, one after another, as soon as they have arrived at their best.

The immunity from disease exhibited by the Seville orange is probably due to its hardiness, it being able to bear great extremes of both heat and cold with immunity. It is said to be the only variety that thrives and bears fruit in the neighbourhood of Calcutta. While in Italy, in the neighbourhood of Florence, where the cold is so intense that skating is sometimes practised during four months of the year, there are standards in the open air that have attained a height of 15 to 20 feet. It is in favour of seedlings of the Seville orange that they are easy to deal with, either in the nursery or in the transplanting, as they produce much fibre, which enables their removal to be effected with great certainty of success. An instance is given of their facility for being easily shifted, in which, an equal number of plants grafted on the common lemon, and the Seville orange were planted on the same ground by one man, and that, of the former, nearly all died in about six weeks, while the others throve, though another cause might have shared in producing the disastrous result.

In the cultivation of the orange, as in the case of most other fruit trees of somewhat delicate constitution, soil, aspect and shelter are the most important items. It is, however, very accommodating as regards soil, thriving in those of various qualities, disliking only the heaviest clays and such as have become soured through deficiency of drainage; showing that the subsoil is, in most cases, of equal or greater importance than the true soil. With these exceptions, we believe there is very little soil in the northern districts, unless where there is hardly anything but sand, in which the orange would not succeed. It, however, does best in a friable loam mixed with vegetable matter on a porous subsoil; it may be therefore assumed that the Oak Rises on the northern plains would be specially adapted to its requirements. The black and brown soils with clay subsoils, which occur so frequently in the colony, are also suitable if properly drained. It is stated by Mr. Pye, of Parramatta, that "a small proportion of salt in the soil sufficient to render the drainage water slightly brackish has a very beneficial effect upon the growth of the orange." Very light sandy soils are not to be recommended as they require too much manure. There is, at present, a drawback to the use of some of the soils in the northern districts, in the deficiency of moisture, which, however, is certain to be to a large extent remedied erelong; for though the orange invariably succeeds best where artificial water is not required, it cannot thrive on soils that are subject to drought during several months of the year unless water is used; but watering orange is a very particular process, and frequently produces results more injurious than beneficial when applied by the inexperienced. The novice should be therefore, particularly cautious in his first applications of water, and if regular, irrigation is to be practised then drainage is the first process to which the land should be subjected in its preparation. Regarding aspect and shelter the best aspect is north-east on a gentle slope, sheltered from south and westerly winds. In situations liable to be affected with spring frosts, it is not advisable to choose an aspect directly opposite the rising sun, its heat causing a too sudden expansion of the frozen sap, which may produce serious injury to the foliage. Should the situation chosen be a sloping valley, it is not advisable to plant the lower part, as there frosts are most severe; but if it should meet another valley running across its mouth with a good slope, and especially if it contains running water, the cold air would be carried away and no injury might result. The practice of smother burning might be also beneficial in such cases. Shelter from violent winds, from whatever quarter they may come, is absolutely necessary. It may be obtained—naturally—either from the conformation of the ground or from indigenous timber; artificially—from orchards, belts of plantation, high hedges, tall brush fences, or stone wall; of which the first two are decidedly the most efficient.

The site having been chosen, the preparation of the soil may be begun. If drainage is required, that must first of all finished. Early spring is the best season to commence before the drought has rendered the soil difficult to work. The depth to which the soil should be trenched or subsoiled depends to a considerable extent upon its nature. Though the feeding roots of the orange are to be found near the surface, it is nevertheless necessary to break up the soil to a considerable depth, mainly with the object of affording a free descent to water and air. Where a bed of clay underlies the surface soil at a depth of less than 2 feet, it should be dug down to and well broken up with fork or subsoil plough, and if, as is frequently the case, there happens to be a bed of gravel above the clay, a mixture of the two would keep the clay more open, but it should not on any account be brought to the surface. During the summer the soil should be pulverised with the scarifier, and should it be already tolerably friable but not very rich, one or two crops of rape may be sown and partly eaten off by sheep or the whole ploughed down. In the following autumn or winter the land may be ploughed into ridges of a width corresponding with the distance apart the trees are to stand.

The planting of orange trees demands the exercise of the utmost care, combined with a knowledge of the nature and requirements of the plants. To bury the roots deep in the soil is certain to cause either immediate death or permanent decrepitude, for the roots of the orange, at least the true feeding roots, are never found far from the surface, hence they should never be buried under more than a very few inches of soil, the tap roots or fangs, if there are any, being of course accommodated in regard to depth and position to those they previously occupied. The rule should be strictly adhered to not to place the stem at a greater depth in the soil than that which it occupied as a seedling. The graft should on no account be beneath the surface, otherwise it would be liable to take the bark disease.

As the orange is one of, if not the most valuable of fruit trees that can be grown in this climate, so it is deserving of the best kind of treatment. The soil in which it is grown should be kept in an open friable state, in order that the roots may be able to run through it with freedom, while rain and other meteoric influences are also more freely admitted. It should never be allowed to become injuriously dry nor dangerously wet. To prevent the former the soil should be mulched around every tree as soon as planted and continued year after year while the trees exist, for even the largest trees are liable to sustain injury from hot suns if the soil over their roots is not shaded by some means, while water must be applied during drought of extreme severity. With regard to manure, if the soil is of average fertility not much is required until the trees commence to bear beyond what is conveyed in the mulch, for gross growth is rather objectionable in young trees. But as the fruit of the orange contains a considerable proportion of mineral constituents, these must be replaced or reproductiveness will ail. It is found that the ash of the orange contains 36 per cent. of potash, 24 per cent. lime, 11 per cent. soda, 11 per cent. phosphoric acid, 3 per cent. sulphuric acid and 3 per cent. common salt. These figures and names of constituents enable the intelligent cultivator to supply the constituents required in proper quantities, and teach that it is useless to depend upon any one or more substances that do not contain the whole of the constituents the crop demands, for if one constituent alone is absent or even deficient, the full benefit of the others cannot be obtained. A large proportion of the necessary mineral constituents may be derived from the mulch, which must never be removed from the soil, neither is it necessary or advisable to dig it under the surface. Stable manure, which is the substance generally used, contains a large portion, though not all the necessary constituents. The leaves of trees form a still better mulch, containing a greater quantity of mineral constituents, especially potash and lime. In addition to the mineral constituents, nitrogenous substances are also necessary; these are found to some extent in stable dung. Blood, which contains 15 per cent. of nitrogen when dried, is reckoned one of the best of orange manures. Nightsoil, superphosphate and Peruvian guano should be occasionally used. Mr. Pye states that a mixture manufactured by Elliott Bros. from a recipe given by him is by far the cheapest and most valuable manure used; its use increasing the amount of crop six-fold in some instances.

The orange is a tree that requires very little pruning; it has, indeed, been said, "prune not at all," but that principle is only applicable in the case of full grown trees; in that of young trees, especially those that have been worked and transplanted, the well known proverb must be acted upon. It is a not uncommon opinion that the orange tree cannot endure pruning, but that is annually disproved in the immediate neighbourhood of where we write. The trees in the garden of the Horticultural Society having been too closely planted, to prevent them from interlacing and injuring each other, Mr. G. Neilson, curator, annually prunes the branches back to stumps without any evil consequences resulting, the crops being abundant as well as of good size and quality. While young oranges, like other trees, require pruning to some extent, all that is generally necessary is to form them into the proper shape; indeed some young trees form themselves, and therefore need not be pruned. Afterwards all that is required is to prevent any branch from outgrowing the others and to thin out useless spray. It is, perhaps, more important that sufficient space should be allowed for expansion in the case of the orange than in that of any of our ordinary fruit trees. Apple or pear trees when they become overcrowded and interwoven through deficiency of space, may be cut back root and branch and rejuvenated in a year or two; but who would think of planting oranges so that they would require to have half of each destroyed when they were as their best? The case previously referred to merely proves that the orange will endure somewhat severe pruning, when from any mischance it becomes necessary to do so, but it does not prove that trees are the better for it; had those trees been allowed sufficient space for development, and the growth that has been destroyed in the course of the last half dozen years been allowed to remain, they would now have been grand trees, many times larger, finer and more productive than they are at present. The orange, therefore, that is, the ordinary large growing varieties, should not stand less than 30 feet apart. Healthy, well managed trees will occupy that space before very many years; for every orange tree should have a clear space of some feet in width on all sides, otherwise, if the branches become crowded, they dwindle, grow weakly and unfruitful, atmospheric influences are shut out and insect pests increase. It is not to be supposed, however, that the remainder of the ground is to remain unoccupied while the oranges are growing, on the contrary, the more it is cropped, cultivated and manured the better for the soil and ultimately for the oranges. The only precaution necessary is to let nothing interfere with either leaf or root of the oranges. It need hardly be mentioned that the soil must be kept clear of weeds, but, as before mentioned, it should not be dug; the best growers are unwilling to admit the use of any tool that penetrates deeper than the Dutch hoe over the roots, but that must be frequently used; beneath the mulching and over the whole of the roots there should be a layer of dust in summer, except, of course, immediately after watering or rainfall. Irrigating the orange is a practice that requires the utmost nicety in its performance. In dry winters a soaking should be given that will penetrate to the deepest roots, but in summer time great caution must be exercised; in the case of young trees the soil should not be allowed to become dry until they have finished their growth, after which it should remain quite dry to enable them to ripen it. In the case of mature trees, summer irrigation should be avoided as much as possible; as the trees are liable to sustain severe injury from it; only when really necessary to prevent the trees from sustaining injury from drought should the water be applied, and then for only a very short space of time. Irrigating at a time that would cause a second crop to start must be altogether avoided, a second crop being "a calamity."

Under all circumstances oranges are liable to the attacks of scale insects, but, if taken in time, only a

slight amount of injury may result, otherwise they will presently cause the destruction of the trees. The brown scale is more easily destroyed than the white and is less destructive in its nature. Accompanying the scale their exudation forms a nidus for a disgusting black fungus, which does nearly as much harm and has a more disagreeable appearance than the scale themselves. A dusting of fresh slaked lime, applied when the trees are wet, will clear them of both the insects and the blight. The kerosene solution will produce an equal or more immediate effect. Gishurst compound or a strong solution of soft soap will easily destroy the brown scale. Even water alone, if at the temperature of 150 degrees, will clear the trees and cause no injury if applied after the cessation of growth. As previously mentioned, the orange is also subject to the dread bark disease, for which there does not appear to be a remedy, though the disease may be checked, if not quite stopped, if taken in time, and the whole of the diseased bark cut out, the cuts extending clear into the healthy bark. The trees should be, therefore, carefully examined every spring, the soil cleared away some inches in depth from the base of the stem, and the bark washed if necessary, so as to make sure whether the disease is present or absent.

It is objected to the orange that it does not come early to profit, but really, under proper treatment, it comes into bearing as early as many varieties of apple and pear, and, when once it begins to bear, it never leaves off, but continues to increase in fertility year after year for generations; for the orange far excels in longevity any other of our fruit trees. We believe there are numerous orange trees in Mr. Pye's garden at Parramatta upwards of 50 years of age still in full vigor, while on the continent of Europe there are living trees known to be several centuries old. In some of the best orchards at Parramatta, the crop of oranges has been valued at upwards of £400 per acre. Mr. Pye, some years ago, cut down a tree 40 years planted that for 20 years had yielded 300 dozens of oranges annually, and we have not the slightest doubt that equally good results may be obtained in the suitable portions of our own colony.

Those who cultivate oranges for market will, as a matter of course, grow such as will pay best, but they should certainly refrain from planting such inferior varieties as some of those offered in the Melbourne markets, which can be only grown for their productiveness, as they possess no other good quality and bring only half the price of the best varieties. Among the best market varieties are:—Parramatta Seedling, Poor Man's Orange, large and prolific, best adapted for marmalade; Siletto, Naval or Bahia, is also excellent for private use, being one of the best of oranges; St. Michael's is also suitable for both purposes; Mandarin, Emperor of China; the Blood Orange or Maltese is one of the best varieties; Teneriffe is similar in quality.—*Leader.*

MAHWA FLOWERS.—The export trade in Mahwa or or Mowha (Bassia latifolia) flowers to Europe for distillation, which attained such large proportions a few years ago, seems to have suddenly ceased. In 1884, 269,329 cwt., valued at £67,066, were shipped from India; in 1885, 30,372 cwt., valued at £6091, were shipped; now the export has stopped. These flowers constitute an important article of food among the natives.—*Gardeners' Chronicle.*

SUGAR REFINING BY LIGNITE.—The *Année Scientifique* states that M. Kleeman, of Schoeningen, has discovered a new method for purifying beetroot juice by lignite, which it appears possesses the property of purifying liquids. If pulverised lignite is mixed with a turbid fluid, or with one having a disagreeable taste or odour, a deposit is rapidly formed, and the liquid soon becomes clear and loses its bad smell. Cane, as well as beetroot sugar, may be refined by lignite, and the process is very economical. The sugars produced in this way have an agreeable taste, and the syrups completely lose their taste of beetroot.—*Journal of the Society of Arts.*

THE LARGE BAMBOO OF INDIA.—An a few days ago in the columns of the *Pioneer*, conveying a public-spirited offer from Mr. G. Jasper Nicholls, C.S., to send, at his own expense, to anyone applying a supply of seeds of the *Bambusa katang*. But probably few people not botanists appreciated the meaning of the offer. The *Bambusa katang* is not only the largest bamboo grown in India, outside of Burma and Assam, but from its habit of flowering only once in 55 or 60 years it is also excessively rare. Some specimens exist at Jubbulpore, where they are remarked by every visitor for their beauty and size; but until these should have arrived at the time for maturity and decay, in another 40 years or so, it was not known that there would be any seed procurable, in these parts of India at any rate. Mr. Nicholls, however, was fortunate enough to discover a clump in full flower recently on the banks of the Mahanadi, in Raipur, and knowing what it was, had all the seed scrupulously collected by the villagers, and in the hope of getting the tree widely distributed over Upper India, he is now offering it to the public. The *Bambusa katang* grows to a height of over 60 feet; its tall stem gives the best natural material for scaffolding and in beauty as well as size it may claim to excel all the varieties of bamboo known to the Ganges plain and Deccan highlands.—*Pioneer.*

SEED potatoes must be carefully selected if good results are to be realised. Scabby potatoes planted will yield a scabby crop, and disease put in the ground to grow does so while the increase from the seed potato is making. The "cheap and nasty" style of doing things in agriculture, as in many other industries, is not the most profitable.—*Planter and Farmer.* [Do the natives of Ceylon ever select seed in their agriculture? and has any one cultivator appreciated the pedigree principle? A good sweet potato is excellent: a bad one most ditasteful.—ED.]

HANDSOME TREES.—We have been informed of an atrocious piece of vandalism which merits condign punishment, if only the barbarous or malicious perpetrator or perpetrators of it could but be discovered. Two grand specimens of that beautiful ornamental shade tree—*Calophyllum inophyllum*—have been seen and admired for years past on the Cardwell beach by all who have gone on shore there, and the tree although indigenous to Northern Queensland and India is very rarely to be seen in this colony and does not take kindly to more southern latitudes. Old residents of the place take a great pride in these handsome trees, and they have deservedly been looked upon as being among the "lions" of Cardwell. To our astonishment we are informed that one of these trees has fallen by means of the woodman's axe, and that the remaining one is in danger of spoilation if not annihilation. The Divisional Board of the place say they have no control or responsibility in connection with the matter, and the entire population of the place is in arms against the spoiler; but the deed is done and cannot be undone, and unless power is granted—or exercised by those possessing it—to prevent the evil going further the remaining tree is as likely to disappear before this nineteenth century vandalism as has the other. The tree takes its name from its extremely beautiful foliage, the leaves being oblong with a rounded apex and fully six inches or more in length. It is known as a timber tree of considerable value, and often grows to the height of 100 feet in India, the wood being reddish, with a darker coloured heart-wood, and is moderately hard and close-grained. The seeds yield a dark green strong-scented oil, which is used in India for burning and also medicinally. Surely there are authorities in Cardwell who have sufficient powers vested in them to prevent and punish such outrages, and to allow such vandalism to pass unnoticed, unchecked and unpunished is, [illegible] disgrace to the colony and to nineteenth century [illegible] civilisation.—*Planter and Farmer.* [The tree alluded to, (mentioned recently in our columns, with reference to some fine specimens, recently in blossom, now in copious fruit in the Colombo General Cemetery,) is not, by any means valued as it ought to be as a shade and ornamental tree. It is one of the few trees which flourishes in the salt-laden sea-breeze.—ED.]

CEYLON LEATHER.

A London correspondent, writing by a recent mail, says that he finds it extremely difficult to satisfactorily account for the fact, that, while nearly every other description of Ceylon produce receives due appreciation in the London market, and fetches a price exceeding that of similar articles sent from other countries, the leather exported from this colony always realizes something below the rates obtainable for that sent from India and Rangoon. Strictly speaking, perhaps, we should have used the term "hides" in making this comparative statement. It may, however, be well understood, for of course, we do not export leather in its finished state as such. But why, he asks, can it be that buffalo hides sent from Ceylon as the rule only secure rates at the public sales something below those obtained for such as are sent from the countries abovenamed. He had heard it alleged that the quality of the hide may suffer from the fact that nearly all our island buffaloes, or a very large proportion of them, are pastured on the salt grounds on our coasts. Such pasturage as they obtain there, is no doubt to a very large extent subjected at certain seasons to the inroad of tidal waters; but then we may feel sure that even as regards India and Rangoon a very considerable number of the animals from which the hides exported thence are obtained, have similar feeding grounds.

This reason, therefore appears to us to be hardly a possible solution of the question. Indeed it would almost seem as if the effect of salt in the feed must go some way towards preparing the hides for subsequent treatment. We certainly do not see how it can exercise any prejudicial effect. Another reason suggesting itself is that the Ceylon shipments are greatly less in quantity to those made from competing localities, and buyers never bid so freely for small parcels as they do for considerable quantities of any description of article. But, apart from these two guesses, our correspondent feels there must remain some hidden cause which has not yet seen the light. As we have said, Indian and Rangoon or Moulmein hides top the market in competition with Ceylon; but again, Italian buffalo hides beat all others. The Italian buffalo leather, indeed, has a very marked pre-eminence in London sales. A friend of our correspondent once purchased a travelling trunk in Naples covered with this hide. That purchase was made 22 years back and he is assured that, notwithstanding the wear and tear of repeated overland journeys to and from India to which that trunk has been subjected, it is as sound and as serviceable as ever. Now there must be some reason quite apart from any natural peculiarities in the animal itself or from any circumstances arising out of the character of its feeding grounds, to account for the exceptional preference shown by buyers at home for Italian hides. It would make a considerable difference in the value of this article of our export list if any defect now present in our hides could be properly overcome. In respect of bullocks, we know that the scarifying and scoring of marks on their cattle by the Sinhalese not only disfigure, but greatly destroy the value of the hides, but this would not apply to buffaloes.

We are inclined to suspect that, after all, there may be difference in the character of the treatment by which the hide is prepared for shipment after having been stripped. All those who have prepared the skins of beasts that they have shot know how comparatively difficult it is to do this with efficiency if any time is suffered to elapse before the skin is pegged down after death. It would not be the first occasion by many in which our products have suffered in reputation for want of proper curing. There is an art undoubtedly in the preparation of hides as in any other form of preparing produce for sale, and, if our brethren in India, or the natives of Italy, possess and practise superior methods to ourselves, we can understand why London buyers give their skins the preference. The vast acreage of land which is available in Ceylon for the rearing of herds of buffaloes makes it desirable that an industry so suited to the instincts of a very large proportion of our native population should be fostered as much as possible. Can any of our readers give us information on the subject? Many of them have travelled in India or have visited the Straits Settlements, while not a few have spent some time in Italy. Were we able to make a comparsion of the various methods of curing adopted in those several countries with that in vouge in Ceylon, we should perhaps be able to arrive at a solution to our query.

All that bears upon means of improvement for our island industries ought to possess a great interest for every intelligent member of the community. As we have said, in many matters of the kind Ceylon has gone ahead of all competitors. When, therefore, we see that in one particular article of export she is lagging behind such competition, it behoves us to do our best to set the matter right. Is the question we have raised one arising out of natural disqualification, imperfections of breed, or some such agency? We strongly suspect not, and that, as artificial methods always admit of improvement, it only needs ventilation of the subject to induce those who may have some experience in the matter here and elsewhere, to come forward with their suggestions for effecting the needful improvement. The matter is one indeed so closely affecting the prosperity of the people, especially in the Uva and Eastern Provinces, that the Government might well be asked to cause enquiry to be made.

Uuca or Coca leaves in Peru have risen in price almost 15 per cent. The selling price being 1s 9d a pound, with an upward tendency. There is scarcely a months' supply of these leaves in the London market —such is the demand for cocaine.—*Nilgiri Express.*

Coffee in Southern India.—The unfavourable prespects of a month or two ago, have greatly improved since the rains began. Leaf-disease was prevalent throughout the district and was disheartening the coffee planters, but now it has disappeared and altogether indications are favourable. In the South and East crop will be as good as can be expected. Several small estates were recently sold in Ootacamund, by order of the Civil Court at ridiculously low prices. One coffee estate with a foreclosed mortgaged debt of 7,000 rupees realized 800 rupees only, and others proportionately small amounts. The continued depression in the coffee market at home prevents agents taking up the business and making advances, and for want of such assistance fine properties are lapsing into jungle. One of the Calicut firms is doing a little in the way of advances, but is feeling its way and picking and choosing. The Investment Company have taken over the business of Stane & Co. in liquidation, and the latter are setting up in the premises formerly occupied by the Cotton Cleaning Company. Their circular to their old constituents does not indicate any intention of travelling in former grooves,—*Ibid,*

CACAO: THE LONDON MARKET AND PRODUCTION.

In order to arrive at any correct appreciation of the movements in the cacao market it is necessary that the sources of demand for the product should be understood as well as the causes which lead to the fluctuations so frequently taking place in the value of the various kinds. Cacao differs from coffee in this essential, that it is used for purposes of manufacture, whilst coffee goes directly into consumption, though it may; perhaps, be urged that even if coffee is not manufactured it is considerably manipulated. Cacao is consumed by three classes of purchasers, each distinct from the other, and each having their special requirements. There is, first, the home consumption of the most ordinary description for the common flake cacao taken in very large quantities by the Government for use in the Navy, in Jails, Poor-Houses, &c., whilst the English makers of chocolates take only the lower-priced article. The chocolate-makers on the Continent are divided into two classes: those who flavor their goods with vanilla and other such substances for France and Northern Europe, and those who employ only cinnamon as a flavouring material. These latter make for Italy, Turkey, Spain, Portugual and other southern countries, and inasmuch as the lower kinds of cacao do not readily combine with the cinnamon flavoring, and more over *do* easily amalgamate with such substances as arrowroot, sugar, and vanilla, which enter into the composition of ordinary chocolates, these are in request in England and France, but not in the other countries named. You may notice that the highest-priced cacao is the Guyaquil, espceially the "Ariba" kinds, the reason being that this description is of the finest golden brown, and is of such a delicate nature as not to stand any adulterants or strong flavorings, and, as the Spaniards and Italians are extremely particular in regard to their chocolates, far more so than the French, Germans, or English, the makers for them will have none other, and do not care much about price in order to secure what they want. Ceylon cacao the most nearly of any approaches the Guyaquil description, especially in brightness of color; hence, when there is any short supply of the latter, there is found to be a stronger enquiry for Ceylon kinds of good quality. This was the case in the latter part of last year, when, owing to drought and consequent short crops in Guyaquil, shipments fell off from the ordinary average of 220,000 arrobas of 100 lb to less than one-half. The run upon Ceylon sorts, as you may remember, sent the market price over 100s. Since then, however, better times have occured, and this year it is expected the Guyaquil crop will amount to 340,000 arrobas.—London Cor. Local "Times."

CINNAMON: THE LONDON MARKET AND PRODUCTION.

After a protracted difference between the London brokers and the Cinnamon growers of your island, in respect of the holding of sales of spice, the practical men of the Lane have been enabled once more to adopt the old mode of quarterly, in perference to the ill-udged resort to monthly sales. On Monday next, the old system will be again adopted, that of selling on the last day of every third month, and so the 31st of May will henceforth be remembered as the restoration of the ancient order of things, whether it will help to restore the old scale of prices or any approach to them remains to be seen. A few days ago I had a long conversation with Mr. Kilby, of the old and well-known firm of spice brokers, whose acquaintance I had made forty years ago when First Sort Cinnamon was selling at eight shillings a pound. You may, perhaps, remember that Mr. Kilby, during the wordy contest *re* monthly Cinnamon sales, carried on for a long time, stoutly opposed the innovation on the ground that it would be detrimental to the interests of all engaged in the trade—growers, shippers and dealers. He reminded me that, in the controversy carried on upon the proposed change, he had predicted as a consequence a fall in the price of the article of thirty to forty per cent. And what has been the result? Second Sort spice was then a shilling: it is now seven pence!—a decline of quite forty per cent. In reply to my enquiry as to the effect of reverting to the old system he remarked that it was always a most difficult task to work up prices from a fall. The trade, once centred entirely in London, was now scattered over the world, and, although Ceylon still enjoyed the monopoly of the article, which no other country produces, there is a keen competition amongst sellers in various countries. Orders are now executed in Colombo for foreign houses at fixed rates, and those continental firms put their spice on the market in Competition with the London article, and so the price is lowered as well as the market. This system, added to the monthly sales, was exercising a disastrous effect on the cinnamon market. Whilst admitting his facts, I suggested that the diversion of the cinnamon trade had no connection with the change in the order of sales, but had taken place long previously, and was one consequence of the opening of the Suez canal, and it could no more be brought back to its old and accustomed channels than could that of coffee. I reminded him also of the existence of foreign mercantile firms in Colombo, who will, of course, conduct their business relations direct with their continental constituents rather than through the circuitous route of London. He, however, maintained that a proper conduct of the Cinnamon trade on the part of growers in Ceylon might be the means of raising the standard of prices to what they were five years ago. In reply to my further enquiry as to the competition of Cassia, he said he attached no importance to that; it was such a different article, and could only affect the fourth class of spice. As for the effect of over-classing cionamon, he said it was quite inoperative. The trade was not to be deceived by any such device, nor did the making up of low qualities of spice in small thin quills to resemble the finer sorts exercise the slightest influence on market prices, which depended on the intrinsic quality of the bark and not on its make up.—*Ibid.*

VEGETABLE PRODUCTS AT THE COLONIAL AND INDIAN EXHIBITION.

We propose in these notes to draw special attention to anything novel or striking in the collections of vegetable products from the several colonies and dependencies that may be likely to interest our readers.

Commencing with the West Indian Colonies, the finest collections of fruits are those of New Grenada and Jamaica. Those of the former colony are not only large and well preserved samples, but the fruits themselves are fine and extremely well grown. The Nutmegs (Myristica fragrans) are remarkable for their size as well as for the development and colour of the Mace. Here are also enormous clusters of fine fleshy Cloves (Eugenia caryophyllata), splendid Cola nuts (Cola acuminata); in the fruits, remarkably fine Liberian Coffee (Coffea liberica), Tamarind (Tamarindus indica), Bread Fruit (Artocarpus incisa), Sweet Potato (Ipomœa Batatas).

The Jamaica collection, though not such large specimens, are well preserved, and are a very interesting series. Besides many of those already mentioned are several others of considerable interest, such, for instance, as Anacacha tubers (Anacacia esculenta), an umbelliferous plant cultivated in the mountainous districts of Nothern South America for the sake of the tuberous roots, which form a staple article of food amongst the people. When boiled they are said to have a flavour between that of a Chestnut and a Parsnip. The arnatto seeds (Bixa orellana) shown in this collection are very fine and bright red in colour. As these seeds are valued for the colouring matter which surrounds them their commercial value is considerably increased by their plumpness and high colour. Arnatto seeds are imported into this country from the West Indies, East Indies, and Ceylon, besides which Arnatto paste is also brought from the last-named island, but as this commodity often reaches us in anything but a fresh state, and as it is used largely in cheese and butter-making it would be to our advantage were planters to send the seeds themselves, and of such quality as is shown in the Jamaica collection. It is,

however, only just to several of the other colonies to say, that their exhibits of Arnatto seeds are for the most part of good quality. Amongst other products less generally known are fruits of the Akee (Blighia sapida), a sapindaceous tree, native of tropical Africa, but introduced to the West Indies by Captain Bligh, of H. M. S. "Bounty" in 1793. These fruits are fleshy, somewhat Pear-shaped, but flattened on their sides. When ripe they are of a reddish colour with a yellow tinge. They dehisce by three longitudinal slits, each division containing a shining black seed partly enveloped in a white fleshy aris, which is the edible part and has an agreeable sub-acid taste, which seems to be developed only in tropical countries; those grown in hothouses here are said to have no such flavour, but to be very insipid. The collection from the island of Dominica is one of much interest, some of the exhibits being of excellent quality and unusual size; this is notably the case with the pods of the Purging Cassia (Cassia fistula), the soft, pulpy dissepiments of which is used in English medicine as a laxative, being imported from both the East and West Indies. The tree is well known in tropical and warm countries on account of its ornamental character, for which purpose, as well as for a shade-tree, it is much grown. In this court are shown some specimens of Cairo ginger in remarkably large brands, indicating, that if this quality of the ginger is equal to that of Jamaica it might be worth some attention. Antigua, St. Lucia, Tobago, and St. Vincent all make a good display, and each has many interesting exhibits which want of space alone prevents us referring to more in detail. There are also some striking exhibits from British Honduras, notably a magnificient slab of figured Mahogany, 10 or 12 feet, by about 4 feet wide. Honduras, it is well known, is a Mahogany producing country, from whence large quantities of this valuable wood are sent to England, but the dark transverse wavy lines as seen in this specimen, are exceptional in Mahogany, and if it were more frequent so as to be procurable in sufficient quantity a demand would soon be created for it for superior cabinet-work. A large and interesting collection of water-colour drawings illustrating the flora of the West Indies, by Mrs. Blake, wife of the Governor of the Bahamas, most of which are extremely well done, are displayed in the centre of the court. The whole of the West Indian division is well arranged and its general aspect pleasing, reflecting very great credit on Mr. A. J. Adderly, C.M.G., the Executive Commissioner for the West Indian Colonies.—JOHN R. JACKSON, Museum, Royal Gardens, Kew.—*Gardeners' Chronicle.*

SHADE-DRIED AND SUN-DRIED COFFEE.

NEARLY a year ago we commented on the alleged deterioration of colour in Indian plantation coffee, and endeavoured to find an explanation of the bad prices that had been realised by the previous season's crop. The numerous letters which we received about the same time from correspondents proved that planters were well aware of the importance of the subject. As might have been expected, unusual care was taken during the last season on estates and in curing establishments, and, as a result—although the season was on the whole unfavourable, owing to heavy rain in December—the account sales already to hand show, in most cases, a marked improvement, which we hope will be maintained to the end. At the beginning of crop, when everyone concerned was casting about for some means of improving his treatment of the coffee, information was received from London —so circuitous are the modes of communication between planting districts in this country—that the most surprisingly good results had been obtained by a few Coorg and Mysore planters from a new, or revived, system of drying their parchment under shade. The improvement was so marked, that some coffee done in this way realised £20 per ton better than another shipment from the same estate dried in the open. One planter, whose coffee sold for over £100 a ton, was said to have not dried it at all, but to have loaded it into carts from the pulping vats. We presume that in this case the estate was near the curing-works. The experiment strikes one as rather a dangerous one, though it has been tried, we believe, in Ceylon on estates near the railway, where coffee can be delivered at the Colombo works a few hours after its despatch. The plan, however, that is said to have answered best was to drain off the water in the sun for about twelve hours; then to dry down to about 40lb. per bushel under shade pandals; after which, the parchment could be reduced to any convenient despatching weight in the sun. The London brokers testified to the superiority of this coffee over the ordinary sun-dried, and the question arose, if it were worth while to adopt the system generally, or if the better price realised was merely accidental, and connected with the locality where the coffee was grown. The district which suffered most from the low prices in 1884-85 was Wynaad, and the Planters' Association there appointed a Committee to make experiments with a view to discovering where the fault in curing lay. The Committee's report has not yet been published, but it is understood that neither it, nor the Coast firms who cured the Wynaad crop, are able to detect any marked difference in the shade-dried over the sun-dried coffee. It may be admitted that nobody can speak with absolute certainty as yet, because the full results of the London sales have not yet reached India, and, in several cases, owing to the shortness of notice that was given, only the latter part of crops could be shade-dried; but it is worth noticing that the crop from Coorg, where the new plan was presumably more generally known and adopted, is spoken of in the brokers' circulars as very disappointing, and as inferior to last year's.

Without, however, attempting to guess what surprises Mincing Lane may have in store for planters, there are two facts which lead us to suppose that the good prices given for a few shade-dried crops last year was due to some other cause than the drying, and that it will be found unprofitable and impracticable to carry out the process on most estates. The first is, that from the time the parchment is taken from the vats till it reaches a fair despatching weight of about 35 lb. per bushel, the colour of the bean remains perfectly good, whether it is sun-dried or shade-dried, and nobody who has taken samples at different weights is able to perceive any difference between specimens undergoing the two processes. For peeling it is necessary to dry the coffee further down to about 28 lb. per bushel, and as it is impossible (except on an experimental scale) to accomplish this in the damp climate where the coffee is grown, it has to be done in the curers' yards. There is no doubt the colour does fade to some extent between these last weights, but, as far as experiments go, it fades in the case of shade-dried as much as in the other. Tedious as the process would be, this last reduction might be made under shade—it must be remembered that it was not done so in the cases we reffered to from Coorg—if the certainty existed of better prices being obtained, but, as far as we know, there is no evidence of this. The second objection to shade-drying is its great cost. In the ordinary process, and with fair weather, the parchment can be put into store after about three days' sun, and, on most estates, the barbecue space is only available for a quantity based on this calculation, so that even as it is, planters often find themselves a good deal hampered in rainy weather. Now, the Coorg advocates of shade-drying calculated that from thirteen to seventeen days are required for their system; hence at least four times as much room would have to be provided, and before people begin to cut out coffee to provide this, they will need some stronger assurance than they yet possess of the certainty of improved prices, and the absence of all risk, for, in a good many cases where the experiment was made last season, the shade-driers found themselves on the verge of disaster from their parchment heating.

It may, perhaps, be asked what steps may be recommended for avoidance of the repetition of the low prices realised in 1884-85. To a great extent,

doubtless, the difficulty is one that planters can grapple with without going much outside the ordinary groove. As we have said above, a great improvement is already visible in prices from the extra attention paid to curing this year. It is presumed that this will continue to be given in future seasons, and that whatever improvements may be possible will be made in buildings. Coffee should not be kept longer on estates than is absolutely necessary; it is often so kept in order to avoid sending small quantities down to the coast, as it is considered more convenient for the curing firms to receive a large consignment. But coffee kept amidst the alternating heat and wet of the planting districts would seem almost certain to deteriorate. The questions of manuring and shade, which have been persistently dragged into the controversy have, most probably, nothing to do with the question of colour; they are important in themselves, and cannot be too much attended to by planters; but a study of the prices realised in 1884-85 show that in some cases parchment from semi-abandoned estates commanded as high prices as that from highly-manured and well shaded ones. Shade and manure are two of the chief factors in making an estate pay now-a-days, but the colour of parchment has nothing to do with them.—*Madras Mail.*

AGRICULTURAL EXPERIMENTS.

At the present time much attention is being directed to the subject of agricultural experiments, and several county societies are organising various schemes with a view to verify or disprove the teachings of Rothamsted and Woburn, as regards their particular localities. Thus the Norfolk County Society are going to experiment on root crops; the Yorkshire Agricultural Society are following in a similar line; whilst the Bath and West of England have induced a large number of their members, in different parts of their extensive country, to go in for what we trust may prove most valuable work. At such a time, then, it may interest som of our readers to hear what have been the results of the work of the Sussex Association for the improvement of agriculture in 1885. It will be remembered that this association was formed a few years since, partly in order to test the correctness of results obtained by Professor Jamieson in Aberdeenshire as to the comparative effects of finely ground coprolites and superphosphate, and the question of division or dissolving in the case of steamed bone flour versus dissolved bones, inasmuch as the northern investigation appeared to indicate that the use of sulphuric acid was not only unnecessary, but actually injurious. This was indeed a result so surprising, and, if correct, having such an important bearing on future practice, that it was most important that similar experiments should be carried out under climatic conditions as widely dissimilar as possible; hence the Sussex experiments, which have been under the management of Professor Jamieson, whose opinions have naturally met with much opposition from many agricultural chemists.

The laying down of permanent pasture and the improvement of old pasture land were the subjects decided to be dealt with, as of great importance in a county where tenacious clay prevails to a large extent, and where nearly three-fifths of the entire agricultural area is occupied by pasture. Dry summers, though highly advantageous for most purposes, have not favoured the work either as regards seeding down, or applying manures to old pastures. Thus, at the Harvest Hill Station, where the experiments are on old grass, the drought prevented any beneficial influence from drainage; indeed, the undrained plots gave best results. Harrowing in renovating seeds was also a failure. Manuring, however, did good; the light and active annual dressings of manure gave better results than from the heavy and slow dressings, and from dung; and that the best results followed from annual dressings containing dissolved phosphate and nitrates of potash and soda. At this same station, a plot of the worst portion of the old grass has been ploughed out and resown, but, owing to climatic conditions, the results so far are anything but satisfactory; the plant is thin, though vigorous, and, in consequence of blank spaces, smothered with weeds. It will be desirable that this experiment should be carefully tested, because we believe that however poor old grass land is, it is capable of improvement by judicious treatment, which may include well harrowing the surface, and possibly in some cases subsoiling, rather than by breaking it out.

There are many interesting matters treated of in the report, the question of cost of different grass seeds for example. A table is given stating price per lb. and per million germinating seeds, which show that whilst catstail (Phleum pratense) costs only 3d. per million seeds, meadow foxtail (Alopecurus pratensis), which is at the other end of the table, cost 7s. 11d. per million seeds, and prices range from 2½d. to 1s. 6d. a lb., the lowest rate being that of Italian and perennial rye grass, which sufficiently explains why these grasses figure so largely in many seedsmen's mixtures. A table is given showing the cost per acre of different grasses for a full seeding of eight million seeds per acre, equal to one seed to three-quarter square inch: Phleum pratense, 2s. 3d.; Poa trivialis, 7s 2d.; Lolium perenne, 7s. 9d.; Dactylis glomerata, 13s. 4d.; Cynosurus cristatus, 19s.; Festuca pratensis, 33s.; Alopecurus pratense, 63s. 7d,

The experiments of the Sussex Society are not confined to grasses. On very poor sand at Hassocks a series of experiments are in progress, to prove the comparative durability of different manures on a rotation of crops comprising turnips, barley, hay, grass and oats. The results on the turnip crops in 1885 were as follows:—

		Weight in tons per acre.
(1)	10 cwt. ¼in. bones	12·61
(2)	15 „ dissolved bones	13·86
(3)	9 „ steamed bone flour	15·84
(4)	9 „ steamed bone and 1 cwt. nitrate of soda	16·96
(5)	1 „ nitrate of soda and 1½ cwt. nitrate of potash	5·13
(6)	10 „ ground coprolites	16·18
(7)	22 „ dissolved coprolities (superphosphate)	17·18
(8)	No manure	·53
(9)	5 cwt. bones, 3 cwt. dissolved bones; ½ „ Nitrate potash and 12 tons dung	16·18
(10)	6 cwt. steamed bone flour, ¾ nitrate of soda; ½ „ nitrate of potash, 12 tons dung	17·97

The interesting features of these results are:—First, the absolute necessity for phosphorus; secondly, the effect of ground coprolitis, and the very slight increase when they are dissolved, as seen by comparison of Nos. 6 and 7.

A subject of even greater interest is the comparative tendency to disease in the crop when treated with coprolites and dissolved coprolites, which was shown by similar experiments in Aberdeenshire, where in two plots, each 100th of an acre, that treated with coprolites contained only five diseased plants, a similar plot with superphosphate gave twenty-three diseased plants. We know that some sheep breeders have attributed increased tendency to diseases in their flocks to the use of artificial manure. It may possibly prove that, as regards one form, which contains free acid, there may be some truth in this idea. Experiments as to the comparative value of finely-ground coprolites, and similar quantities of coprolites dissolved, and steamed bones against dissolved bones, are so easily carried out, and the results are financially so important, that local societies will do well to advocate such tests. Yield of crop, proportion of disease, and chemical composition are the questions to be answered. Farmers are only beginning to understand the importance of such questions, or to have an idea of what a correct knowledge of manure, values means financially. We recently met with a

farmer who, by great industry, had studied the question and learnt the commercial and agricultural value of manures and farming on a large scale, who estimated the value of such knowledge as he possessed at a saving of fully £200 a year.

The Manchester and Liverpool Society are carrying out a series of experiments to determine the best mixture of seeds for (1) permanent grass, (2) for leys of two or three years, (3) the comparative value of different artificial mixtures on oats, and experiments on varieties of potatoes, and plots for the growth of the different grasses. Land has been provided on Mr John Roberts's farm near Chester, owned by Mr. W. E. Gladstone. The grass seed mixtures have been sown in a crop of oats, and each member of the society has been furnished with a plan of the plots and full particulars. The arrangements have been made by Mr. Robert Holland, the society's botanist; and in carrying out the details he has been ably assisted by Mr. John Roberts, the tenant of the farm, one who fully appreciates the immense importance of the work. The following extract from the report of the Experimental Committee will show the object in view:—

The committee suggest that, in addition to the practical test of grazing the permanent grass seeds next year, which the council and members may judge of for themselves in occasional visits, the society's botanist, Mr Holland, should make periodical visits of inspection, and report annually in the Journal on the quality of all the pastures, their growth in this and subsequent years, the degree in which the grasses are grazed to stock, their comparative value as pastures, their relative cost in seeding, and such other facts as would lead to a better knowledge of the best kinds and proportions of seeds to sow for permanent pasture.

We anticipate very important results from this movement on the part of local societies, and we feel sure that, if carefully and conscientiously worked out, these experiments will in time give data which will influence our practice, and lead to more economical and scientific agriculture.—*Field.*

DR. TRIMEN'S REPORT for 1885 on the various botanic gardens in Ceylon, of which he is Director, is a very satisfactory document, as such reports from our colonial gardens generally are. It contains a considerable number of meteorological observations, and describes the arrangements made to carry out the scheme of a garden at Badulla, in the new province of Ceylon, for which funds have been voted. The usual report on the distribution of plants and seeds is given, and then comes a long list of additions to the collections of plants at the various gardens, which is followed by some interesting notes on economic plants and products. Under this head he makes various recommendations and suggestions which will no doubt be of the utmost value to perplexed planters who are assailed on all sides by dangers which are only too apparent, but which it requires scientific training and investigation to combat. Thus he advises that tea and cinchona should not be grown together, as it is only in such cases that the planter's scourge, *helopeltis*, does any appreciable damage to tea. On the other hand, he thinks that the diminution in the cultivation of cacao, through dread of *helopeltis*, is unreasonable, for the insect only attacks cacao grown in the open, and not that grown under the shade of trees, for example. The Ceylon Herbarium has been arranged during the year in accordance with Dr. Trimen's "Systematic Catalogue of Ceylon Plants," and in the work of rearranging he was able to put together a series of notes describing about 250 additions to the flora of Ceylon, and 40 new species or varities. That much yet remains to be done is obvious from the fact that during 1885 fifteen additional have been discovered in the island, many of which are striking plants. The Government has approved the formation of an exhibition containing specimens of the plants, grains, &c., of the island. Like many other colonial officials, Dr. Trimen has been busy during the past year preparing for the Colonial and Indian Exhibition, where the series of woods in the Ceylon section was prepared by him.—*Nature.*

COFFEE IN CEYLON has come to a low pitch, but scarcely so low as the Editor of the "Journal of Horticulture" would make it out to be, when in writing on the "Colindies," he speaks of an average of 500,000 lb. of coffee berries being received in London from Ceylon. "Cwt" was probably meant, though of late years 200,000 cwt. would be nearer the average; but in "lb." this would be well on for 25 millions.

THE *T. A.*—A Fiji planter who has never been in Ceylon, writing by last mail, says:—"I feel I must express my acknowledgements and thanks that I have continued to receive your most valuable and practical paper most regularly. We have been for some time passing through a most trying time of depression in this colony, and it still seems very doubtful when and how any change for the better is likely to arise. Hoping however for better times yet."

ROYAL BOTANIC GARDENS, CEYLON.—Dr. Trimen's report indicates continued progress and usefulness in the gardens under his charge. A Thwaites Memorial, in the shape of an octagonal building in the ordinary Kandyan style, and modelled after a Sinhalese temple, has been erected in the garden. No rain fell in January at Peradenyia, but the total for the year was 92 inches, distributed over 146 days. At Hakgalla the rainfall was 83 inches, over 215 days. The maximum air temperature at this station was 79°, on August 31; the minimum 43°.5, on February 3. Coffee planting is steadily diminishing, but Tea has been exported very largely, and Cinchona bark also. In spite of an estimate of 70,000,000 of trees, and an acreage of 48,246 under Cinchona, Dr. Trimen counsels the further extension of planting. Caoutchouc and Gutta-percha trees of various kinds are mostly doing well; Sechium edule is mentioned as a promising vegetable, while the beautiful Carica cundinamarcensis is spoken of as "a very valuable introduction. Stewed, or cooked in tarts and puddings, it has very much the flavour of apples, and for mincemeat it is quite equal to them. It is also very good, when fully ripe, eaten raw with a little sugar." The Kumara, Ipomœa chrysorhiza has turned out very suitable for culture in Ceylon as a substitute for the Potato. A second edition of Dr. Trimen's useful Hand-guide has also been issued, with maps.—*Gardeners' Chronicle.*

THE PRODUCTS OF BORNEO.—In a report from Buinei, Borneo, it is stated that amongst the staple articles of produce, sago and gutta-pereha hold a prominent place; the planting of new lands with Sago Palm is making steady progress to meet the demand. During the year 1884 the supply of gutta-percha fell off, "but this was owing, to some extent, to the increasing scarcity of the gutta-yielding trees, which are destroyed for the sake of the immediate larger yield, and no system of planting being introduced to make up for the continual drain, the work of collection is gradually becoming more burdensome and less and less profitable. For a like reason the collection of gutta susiu, or India-rubber, shows a falling off, though in this case a rise in the market value would with less difficulty be met by an increased production. The cultivation of Gambier (Uncaria gambier) and Pepper, now amongst the settled industries of the country, do not make such progress as the resources of the jungle lands could well stand, nor do the liberal terms on which the Government are willing to make grants of land for agricultural purposes appear to attract the attention from outside which they deserve; still the production of Gambier last year was larger than in any previous year." "Rattans form another important item in the export from Sarawak, with the prospect of the trade increasing as the Baram district gets more thoroughly opened to collectors."—*Gardeners' Chronicle.*

COLOUR OF COFFEE.—There has been considerable discussion among the various Planters' Associations during the past year on this subject, but we none of us have apparently arrived any nearer the solving of this difficult problem. Shade drying was thought to be able to set the colour better: but from all accounts this is not the case, and coffee cured in this way has realized considerably lower prices than that dried in the open. It is probable that the seasons have more to do with colour than anything else.—*From Report Coorg Planters' Association.*

COFFEE.—At the late meeting of the Acclimatisation Society, the Governor, Sir Anthony Musgrave insisted very strongly on the value of coffee as an industry for Queensland. "The coffee grown here" he said "would not probably be so good in quality as Jamaica coffee, but it would make up in quantity for quality. It was a most important subject for the Government of this colony to consider." Interviewed subsequently he said that "the expenses attendant upon the construction and maintenance of proper mills was prohibitive upon small holders of land, costing as they did from £4,000 to £5,000 in initial outlay alone, but by the establishment of a large Central Mill, encouragement could be given to cultivators large and small, who could dispose of their produce much more profitably, than could be the case with sugar growers." Sir Anthony Musgrave is the owner of coffee plantations, and deserves to be listened to with attention on this subject.—*Mackay Mercury.*—[While Brazil swamps the world with coffee as it now does, the Queenslanders had better content themselves with going merely for local requirements, although we doubt if even that will pay.—ED.]

THE YIELD AND COST OF COCAINE.—Dr Squibb (*Ephemeris*, July, 1885) says the arrivals of coca leaves have been abundant, and the quality generally good. Assays of various samples gave proportions of alkaloid varying from ·38 to ·55 per cent., equal to 26·6 to 38·5 grains per lb. The latter should theoretically yield 43·36 grains of hydrochlorate, "but, although such coca has been worked, no such yield has been realised by the writer, and it is rather discreditable to have to say that not over 33 grains to the lb. has yet been reached, and this not as a general average." The price of coca leaves has been very uncertain for some time past, but it may be assumed "that good coca, giving an available yield of 33 grains to the lb., can now (June 29) be had at 50c. per lb." Dr. Squibb's calculation is, therefore, in English money:—

1 lb. coca leaves	...	...	...	2*s.* 1*d.*
Cost of extraction	...	...	...	5*s.* 0*d.*

for 33 grains, or say 2½*d.* per grain. Vial, label, and overweight in putting up brings this to 3*d.* per grain, to which he adds 2*d.* per grain for manufacturer's profit, as "such articles are not worth making unless the profit upon them be liberal, especially until the losses in acquiring a good process be fully compensated."—*Chemist and Druggist.*

LEMONS PRESERVED EIGHT MONTHS.—The following from the Sanford, Fla, *Journal* touches upon a matter of importance to fruit-growers and shippers, and should lead to experiments and tests in the direction named:—We have in our office a lemon, of common variety, that was clipped from the tree that bore it, with a number of others, in July last. It was grown by J. F. Prince on Dr. Gordon's place on Silver Lake, and, with a quantity of others—perhaps a half-bushel—was buried in the grove when clipped, as an experiment. Mr. Prince had forgotten the circumstance until a few days ago, when, while ploughing the grove, several of the lemons were upturned by the plough. Recalling the fact that he had placed them there, his surprise and gratification upon finding all of them in a state of perfect preservation can well be imagined. These lemons were buried in ordinary soil, and not under cover, and therefore have been subjected to the vicissitudes of weather, heat, cold and moisture. Query: If lemons will keep under such circumstances, why should not oranges? And if oranges can be kept thus, is not the question of the protraction of our marketing period settled? To us the lesson taught by Mr. Prince's experiment is a valuable one, if a lesson at all. It is at least a suggestion which producers should regard of sufficient significance to prompt further experiment.—*American Grocer.*—[The inference seems to be that oranges and lemons could be sent long distances packed in earth.—ED.]

HOW FOREST TREES SPREAD.—It is a wise provision, which insures the multiplication of our most valuable forest trees, that their seeds are winged, and so blown about or enclosed in nuts which are relished by squirrels and birds, and thus carried to new places. That a grove of beeches will almost always be succeeded by maples is an old saying.—*Southern Planter.*

TOBACCO IN DEVON.—It may be of interest to our readers, especially those residing in or near the county of Devon, to learn that Mr. Samuel Eliott (Lucombe, Pince & Co.) has been granted permission by the Board of Inland Revenue to make experiments in the growth and curing of Tobacco in that county.—*Gardeners' Chronicle.*

VALUE OF THE OLIVE TREE.—A gentleman, says the *San Francisco Herald*, has recently collected 12,000 cuttings of the olive tree for planting. The olive is most successfully grown from cuttings, and the 12,000 will make a fine grove. When set in an orchard in the usual form, they will cover 100 acres. An olive tree when ten years old is estimated to be worth ten dollars, and a grove of 100 acres, or 12,000 trees, will aggregate a value of 120,000 dollars. These are estimates made upon the value and profits made upon Mr. Cooper's olive trees, in Santa Barbara, and single trees elsewhere. The olive grows well throughout this region, and the demand for its fruit and oil is good and increasing.—*Burgoyne's, &c., Monthly Export Price Current.*

WARTS ON HORSES.—These excrescences are often very annoying to horses, and very unsightly, especially when occurring about the eyes. *Treatment*:—A wart having a broad base should be thus treated. Take a common suture needle and arm it with a double ligature, each ligature to be composed of three threads of saddler's twine, well waxed; pass the needle right through the centre of the wart close down to the base; tie each half separately with a surgeon's knot as tight as possible, cut the ends off pretty close to the knot, and in the course of a short time the whole will drop off. A wart having a small circumscribed pedicle may be removed by strangulation by tying a single ligature round its base. If the exposed surfaces should not heal readily moisten them occasionally with Friar's balsam, and if they show a disposition to ulcerate, sprinkle them with powdered charcoal and bloodroot, equal parts mixed.—*Ibid.*

CHINA-GRASS (BŒHMERIA NIVEA).—The frequent recurrence or re-introduction of China-grass or Rhea fibre to the notice of commercial men is a fact well known, and each time the plant is brought to notice some novel mode of preparing the fibre is announced, or some new machinery is invented. The latest of these is a patent of Messrs. Raabe, Zimmermann & Houchet, which cleans the fibre in a purely mechanical manner without any assistance whatever from chemicals. A handful of the stems of the Rhea is put into the machine at one time; they are carried rapidly through and delivered on the other side, when it is seen that the whole of the woody portion of the stems is broken and loosened, so that it is easily shaken out by again passing the partially cleaned fibre through a similar machine a second and third time; the fibre comes out quite cleaned of woody particles, and after it has been hackled it is as fine as flax, and, like flax, is of a greenish colour; the fibre, however, is in a perfectly natural state, being simply removed from its position in the stem, and after being woven it can of course be bleached like an ordinary flax fabric, or dyed if required. The inventors of this machine claim for its advantages over other machines for cleaning Rhea fibre because of its simplicity in preparing the fibre for spinning purposes by simply removing it from its position in the stem without weakening it by the action chemicals or bleaching compounds, besides which the fibre is removed from the stem in its entire lenght, which is, of course, great advantage in spinning.—*Gardeners' Chronicle.*

THE TROPICAL AGRICULTURIST, Vol. V.—Subscribers to our monthly periodical have now, we trust, received their June number, the twelfth and last of the fifth volume, with the title, preface and index. The compilation and printing of the latter necessarily delayed this month's issue, the delivery of which commenced last week. However, the first or July number of the sixth volume, will, we are glad to say, be published on its due date, and we think we may take credit—considering the drawbacks in a busy daily newspaper office—for the punctuality with which the ordinary issues of the "T. A." are supplied month by month. We can also testify to the continued appreciation of our labours both among European planters and native agriculturists: all speak of the usefulness of the "T. A." for its information and the ready reference it affords to any question arising in connection with their daily work, with the sales of produce (now stitched in separate sheets), &c. Nevertheless, our expectation that the "T. A." would come to be regarded as an indispensable part of the office furnishing on each plantation of any consequence, has scarcely yet been fully realized. The loss must be that of the estate or proprietor, more than of the printers, and in order to call the attention of agents and proprietors to the subject, we have prepared a 'circular' to be addressed to them which we reproduce here, as follows:—

We venture to call your attention to our monthly publication, the *Tropical Agriculturist*, now beginning its sixth year, and acknowledged on all sides to be the most useful and complete repertory of information for the tropical planter in the world.

It has been our aim from the beginning to put into its pages everything bearing on the practical work of the cultivators of Tea, Cinchona, Cacao, Coffee, Rubber, Palms, Fruits, Fibres, or any other of the many new and old products planted within the tropics, not only quoting discussions in our own and other Ceylon and Indian papers, but from our agricultural, scientific and general exchanges from all quarters; and by supplying a very carefully prepared index with each annual volume, to enable the planter to lay his finger on information bearing upon any plant or fruit tree, under his notice at the time.

We expected in commencing this undertaking that on every plantation of any importance, at least in Ceylon and Southern India, a copy would be filed for the use of the Manager, by order of the Proprietor or Agents. But although that has been done in a good many cases, there are a great many blanks, and now that through Tea, Bark, and other products some degree of prosperity is returning, we think it well to call the attention of proprietors to the great advantage of their Superintendents having the periodical filed and bound up in volumes on their estates. We may say that we pass over nothing we see bearing on tea planting or preparation, on improved means of dealing with Cinchona, Cacao, Rubber, &c., without placing it in the *Tropical Agriculturist*, and several experienced planters, both in India and Ceylon, have said no estate worthy of the name should be without this work of reference and information.

Mr. Thiselton Dyer (C.M.G.) of Kew, Dr. Trimen of our Ceylon Gardens, Dr. King of Calcutta, Dr. Bidie of Madras, Mr. D. Morris of Jamaica, and other similar authorities have spoken in the highest terms of its value to all cultivators: the first named stating:—

"Sir Joseph Hooker and myself always look out for the successive numbers of the *T. A.* with eagerness, and I keep a file in my office for reference. It is impossible to speak too highly of the utility of such a publication and of the way it is managed."

"It is an astonishing repertory of everything relating to the economic botany of the East."

Market reports of the sales of all produce are included in the local issues, so that tea-makers, cardamom and cacao planters and others can see what their own and their neighbours' produce has realized from month to month and year to year, as a guide and means of comparison.

We trust therefore that you will see your way to giving us an order for the *Tropical Agriculturist* to be sent and filed on each of the plantations in which you are interested, and it will be our endeavour to increase the usefulness of this Planter's *Vade Mecum* by every means in our power.

With our issue today, the Title, Preface and Index to Vol. V. of the *Tropical Agriculturist* is issued as a *Supplement*.

TEA IN AMOY, 22nd May.—Our tea manufactory has, with the commencement of the warm weather, started its operations afresh, and the former charge of 5 cents per lb. has been reduced to 3½ cents. Tea from Tamsui arrives freely, the steamers "Fokien" and "Formosa" bringing full cargoes.—*Daily Press.* [3½ cents of silver dollar equal to 7 cents of rupee?—ED. C. O.]

TRINIDAD.—The cultivation of tea, ground nuts and onions is spoken of by the Trindad *New Era* among the future minor industries of that island, That white elephant of the Trinidadians, the Government railway, is likely to be taken off the hands of the unfortunate taxpayers by a private company. This on the authority of the *New Era*, which also chronicles an accident on the line by which a guard lost his life.—*Dominica Dial.*

NATAL TEA.—I have had an opportunity of examining the samples of Natal tea that were sold this week, and give you the result of the broker's report on the parcel:—There is evidently the making of a fairly good marketable tea in the leaf, but, probably from inexperience of the maker, there was evidently a defect in the withering, and imperfect fermentation. In liquor, it came out fairly dark, but the leaf shewed up mixed brown and brown-green with but little of the fine bright coppery color of well-made tea. I hear that a Natal Tea Company is about to be floated, a small affair, but shewing how public attention and public capital is being directed towards this leaf. Next week's sales are not likely to be much above the average, though later in time there will be a fair quantity on the market.—Local "Times."

SILK.—Mr. T. Wardle, of Leck, has just returned to England from India after examining the cultivation of the silkworm and the methods in use of reeling the silk. He is satisfied that the fibre of the Indian silk was quite equal to that of Italian, and that improvement in the machinery and method of reeling was all that was required. The Indian worm, however, only spins 150 metres of silk, on one cocoon, while the more highly-tended and selected Italian worm produces 650 metres. He suggests that the Government should rear a limited quantity of cocoons, from which a careful selection of "seed" only shall be made.—*M. Mail.*

THE DEVASTATING AND PROLIFIC SPARROW.—That sentiment is not always to be trusted is seen in the ravages which rabbits have created among the crops in Australia. It was sentiment that induced their introduction, and it was sentiment that led an old Highlander to introduce the thistle, which it has cost more than one Colony thousands of pounds to extirpate, since it grew so rapidly and injured the wool with its burrs to such an extent that it had to be stamped out at any cost. Similarly, Australians complain of the humble and insignificant sparrow as a "nuisance." It was introduced in an evil hour to accentuate home influences, but has increased to such an extent that the Colonists have long been offering a reward for its head. Complaints are heard every now and then of he impossibility of keeping this pest down, and lately one man has told how in ten days they cleared his vineyard of a ton and a half of grapes, and stripped five fig-trees which had been loaded with fruit. Another has lost 30*l.* worth of fruit from a comparatively small garden. A third has had 15 acres of lucern grass destroyed, while a fourth says he had to sow his peas three times, and each time the sparrows devoured them. —*Colonies and India.* [Beyond all else the cherry crops suffer from the depredations of sparrows.—ED. C. O.]

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, June 3rd, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White ...	Slightly softish to good hard bright ...	£6 10s a £7 10s
Yellow ...	Do. drossy & dark ditto...	£5 a £6
CINCHONA BARK—Crown	Renewed	1s a 3s
	Medium to fine Quill ...	1s 1d a 2s 6d
	Spoke shavings	9d a 1s 6d
	Branch	2d a 8d
,, Red	Renewed	3d a 2s 6d
	Medium to good Quill ...	6d a 2s 6d
	Spoke shavings	5d a 10½
	Branch	2d a 6d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s 3d a 3s
and Ceylon	Middling, stalky & lean	8d a 2s 2d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine ...	1s 6d a 2s 4d
	Brownish ...	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 6d a 3s 3d
Long Ceylon	Middling to good... ...	8d a 1s 4d
CINNAMON 1sts	Ord. to fine pale quill ...	8d a 1s 11d
2nds	,, ,, ,, ,, ...	7½d a 1s 6d
3rds	,, ,, ,, ,, ...	6d a 1s 2d
4ths	Woody and hard	5d a 11d
Chips ...	Fair to fine plant... ...	1½d a 7d
COCOA, Ceylon ...	Bold to good bold ...	80s a 90s
...	Medium ...	72s a 78s
	Triage to ordinary ...	55s a 68s
COFFEE Ceylon Plantation	Bold to fine bold colory...	82s a 101s
	Middling to fine mid. ...	61s a 78s
	Low middling	55s a 60s
	Smalls	48s a 57s 6d
,, Native	Good ordinary	42s a 44s
Liberian ...	Small to bold	35s a 52s 6d
East Indian ...	Bold to fine bold... ...	80s a 110s
	Medium to fine	60s a 80s
	Small	50s a 56s
Native	Good to fine ordinary ...	44s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£7 a £17 10s
FIBRE, Brush ...	Ord. to fine long straight	£12 a £32
Stuffing ...	Coarse to fine	£7 a £19
YARN, Ceylon ...	Ordinary to superior ...	£11 a £30
Cochin ...	Ordinary to fine	£10 a £35
Do ...	Roping fair to good ...	£8 a £12
COLOMBO ROOT, sifted ...	Middling wormy to fine...	16s a 35s
CROTON SEEDS, sifted ...	Fair to fine fresh... ...	30s a 55s
GINGER, Cochin, Cut	Good to fine bold... ...	75s a 106s
,,	Small and medium ...	53s a 72s
Rough	Fair to good bold... ...	36s a 50s
,, ...	Small	29s a 35s
NUX VOMICA ...	Fair to fine bold fresh ...	8s a 12s
	Small ordinary and fair...	5s a 7s
MYRABOLANES, pale ...	Good to fine picked ...	6s a 8s
	Common to middling ...	5s a 6s 6d
	Fair Coast...	6s a 6d 6s
Pickings	Burnt and defective ...	4s a 5s
OIL, CINNAMON ...	Good to fine heavy ...	1s a 3s
CITRONELLE ...	Bright & good flavour ...	1d a 1 1-16d
LEMON GRASS ...	,, ,, ,, ,, ...	1½d a 1¾d
ORCHELLA WEED ...	Mid. to fine, not woody...	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7¼d a 7½d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White ...	,, ,, ,, ...	10d a 2s 6d
PLUMBAGO, Lump ...	Fair to fine bright bold...	12s a 15s
	Middling to good small...	8s a 11s
Chips ...	Slight foul to fine bright	7s a 11s
Dust ...	Ordinary to fine bright ...	3s a 10s
RED WOOD ...	Fair and fine bold ...	£4 15s a £5
SAPAN WOOD ...	Middling coated to good	£6 a £7
SANDAL WOOD, logs ...	Fair to good flavor ...	£20 a £44
Do. chips ...	... ...	£10 a £16
SENNA, Tinnevelli ...	Good to fine bold green...	9d a 1s 5d
	Fair middling bold ...	4½d a 8d
	Common dark and small	1½d a 3½d
TURMERIC, Madras ...	Finger fair to fine bold	14s 6d a 15s 6d
Do. ...	Mixed middling [bright	12s a 14s
Do. ...	Bulbs whole	12s a 13s
Cochin ...	Do split	8s 6d a 9s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 24s
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches ...	5s a 9s
4th	Low, foxy, inferior and [pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.		
ALOES, Soccotrine and Hepatic...	Good and fine dry ...	£7 a £10
	Common and good ...	£4 a £8
CHILLIES, Zanzibar ...	Good to fine bright ...	36s a 38s
	Ordinary and middling...	32s a 35s
CLOVES, Zanzibar and Pemba	Good and fine bright ...	8¾d a 8¾d
	Ordinary dull to fair ...	8d a 8½d

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTATIONS
CLOVES, Mother ...	Fair, usual dry ...	None
,, Stems...	,, fresh ...	1½d a 1¾d
COCULUS INDICUS ...	Fair ...	8s 6d a 9s
GALLS, Bussorah & Turkey blue	Fair to fine dark ...	52s a 62s
	Good white and green...	47s a 55s
GUM AMMONIACUM—	Blocky to fine clean ...	30s a 60s
drop ...	Picked fine pale in sorts,	£11 a £17
ANIMI, washed ...	part yellow and mixed	£11 a £13
	Bean & Pea size ditto ...	£5 10s a £8
	amber and dark bold ...	£8 a £12
scraped...	Medium & bold sorts ...	£5 a £8
ARABIC, E.I. & Aden ..	Sorts	65s a 100s
Ghatti ...	Fair to good pale ...	32s a 65s
Amrad cha	Good and fine pale ...	70s a 100s
	Reddish clean ...	32s a 55s
ASSAFŒTIDA ...	Clean fair to fine ...	35s a 40s
	Slightly stony and foul ...	28s a 32s
KINO ...	Fair to fine bright ...	38s a 40s
MYRRH, picked ...	Fair to fine pale ...	£6 a £7 10s
Aden sorts	Middling to good ...	80s a 100s
OLIBANUM, drop	Fair to fine white ...	45s a 55s
,,	Reddish to middling ...	32s a 44s
pickings...	Middling to good pale ...	9s a 11s
siftings ...	Slightly foul to fine ...	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage		2s a 2s 3d½
,, ,, Ball		
	unripe root ...	9d a 1s
	liver ...	1s 6d a 1s 10d
SAFFLOWER, Persian ...	Ordinary to good ...	5s a 15s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts ...	Nearly water white ...	3¾d a 4¼d
2nds ...	Fair and good pale ...	2 15-16d a 3d
3rds ...	Brown and brownish ...	2¾d a 2¾d
INDIARUBBER Assam ...	Good to fine ...	1s 9d a 2s 3d
	Common foul and mixed	6d a 1s 8d
Rangoon ...	Fair to good clean ...	1s 10d a 2s 3d
Madagascar	Good to fine pinky & white	2s 1d a 2s 4d
	Fair to good black ...	1s 8d a 1s 10d
SAFFLOWER ...	Good to fine pinky ...	£4 10s a £5 10s
	Middling to fair ...	£3 5s a £4 2s 6d
	Inferior and pickings ...	£1 a £1 10s
TAMARINDS ...	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior ...	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape ...	Fair dry to fine bright ...	30s a 34s
,, ...	Common & middling soft	20s a 29s
Natal ...	Fair to fine ..	15s a 40s
ARROWROOT Natal ...	Middling to fine ...	3½d a 6d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China ...	Good, pure, & dry white	60s a 65s
Japan ...	,, ,, pink	
GAMBIER, Cubes ...	Ordinary to fine free ...	28s a 29s
	Pressed ...	23s a 24s
Block ...	Good ...	21s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra...	Barky to fair [sar	6d a 2s 3d
Reboiled...	Common to fine clean ...	1d a 1s 4d
White Borneo ...	Good to fine clean ...	11d a 1s 3d
	Inferior and barky ...	1d a 8d
NUTMEGS, large ...	61's a 80's, garbled ...	2s 2d a 3s 5d
Medium ...	82's a 95's ...	1s 10d a 2s 1d
Small ...	100's a 160's ...	1s 3d a 1s 9d
MACE ...	Pale reddish to pale ...	1s 6d a 2s 6d
	Ordinary to red ...	1s 4d a 1s 5d
	Chips ...	1s a 1s 2d
RHUBARB, Sun dried ...	Good to fine sound ...	1s 9d a 2s 9d
	Dark ordinary & middling	8d a 1s 6d
High dried ...	Good to fine ...	1s 2d a 1s 5d
	Dark, rough & middling	7d a 1s
SAGO, Pearl, large ...	Fair to fine ...	12s 6d a 17s
medium ...	,, ,, ,, ...	12s a 13s 6d
small ...	,, ,, ,, ...	9s 3d a 11s 6d
Flour ...	Good pinky to white ...	8s 6d a 10s
TAPIOCA, Penang Flake...	Fair to fine ...	1½d a 2¾d
Singapore ...	,, ,, ...	1½d a 2¼d
Flour ...	,, ,, ...	1¼d a 1½d
Pearl ...	Bullets ...	13s a 14s
	Medium ...	13s a 16s 6d
	Seed ...	15s a 15s 6d

A CEYLON TEA SYNDICATE: TO PROMOTE THE SALE IN NEW FIELDS.

We have much pleasure in calling attention to Mr. Rutherford's letter and draft proposal: there is nothing like "striking while the iron is hot" in order to get those interested to subscribe, and we certainly agree with the promoter that it is not a day too soon to prepare for "the 20 to 30 millions" lb. of exports which Ceylon is to show in a very few years hence. As for India, the estimate for the current season is 76 millions lb., of which at least 70 millions will be sent to Britain. When sufficient support is secured a careful revision of the draft proposal will no doubt take place and a committee and Office bearers be appointed:—

Heatherton, Ambegamuwa, Ceylon, 29th May, 1886.

The Secretary, Ceylon Planters' Association, Kandy.

Dear Sir,—To bring the suggestions which have been made in the local papers, as to the advisability of extending our markets for the sale of Ceylon teas to a practical issue, I have the pleasure to forward you the draft of a proposal I have drawn up for forming a Syndicate, under the auspices of the Association.

It has been urged by some that such a scheme is premature, as Great Britain can easily take and consume the few million pounds we send into the London market. This is undoubtedly true at the present moment, but, as this island in a few years will produce five or six times its present outturn, and there will be an increased export from India from the large areas put under tea in 1882-83, I consider that we cannot begin too soon to make the American and Canadian peoples acquainted with our teas.

If the scheme proves successful in creating a demand for our teas, and that demand be carefully fostered, a trade may spring up which will relieve us of a large proportion of our outturn, and consequently assist in maintaining a steadier price for our teas in the London market. This trade will take a few years to develop, but, should a developement take place, the demand for the tea will come to us when we shall most require it, viz., when our shipments are too heavy to be worked off in the Home market.

I place my views on the subject before you, so that you may put them in the hands of members of Committee in order that they may consider the subject before our next meeting.

To initiate the scheme a few estate names have been put down in a list herewith sent you, and these estates are prepared to give it support. I may add that the list has not been circulated in any district.—Yours truly. H. K. Rutherford.

Ceylon Tea Syndicate.

Proposal as drafted by Mr. Rutherford.

1. That a Ceylon Tea Planters' Syndicate be formed under the auspices of the Planters' Association for the purpose of pushing the sale of our teas in markets other than that of Great Britain.

2. That, as it is to the interest of growers (however small their out-turn may be) to extend the field for the sales of Ceylon teas, it is hoped that every grower of the product will join this Syndicate.

3. That members supply the Syndicate with such quantities of tea as they deem fit to foster the scheme of introduction into other countries.

4. That the Secretary of the Planters' Association be asked to become the Secretary of the Syndicate and for which work he be paid 1¼ cent per lb. of tea, which sum must cover shipping charges exclusive of Freight and Insurance. This method is suggested, so that the burden of the cost of the scheme may be evenly distributed among members.

5. That Agents be appointed in New York, Montreal, Quebec, Melbourne, Sydney and Dunedin, who have no interest in the sale of Japan or China teas. These Chief Agents to appoint Sub-Agents in the principal towns of America, Canada, Australia and New Zealand, whose business it will be to distribute the teas in small parcels and lots to grocers and private individuals.

Agents to be paid by commission on sales.

6. Teas supplied by the Syndicate to be consigned to the Chief Agents and when proceeds have been realized they are to be remitted to the Secretary who shall remit to members of Syndicate.

7. The names of likely persons or firms in America or the Colonies known to planters or Colombo merchants, who would be likely to take an interest in the sale of these teas, are requested.

8. Private parcels of tea to American or Colonial relations or friends to be sent through the Syndicate.

9. Great care should be taken by all members of the Syndicate to ship nothing but really good teas.

10. That before any shipments are made, full particulars be received from the appointed Agents of the Syndicate giving full instructions as to the class of tea required and size of packages most suitable, the quantity required to open up connections, the likelihood of success and all information which may be useful to the Syndicate.

11. Each member in forwarding tea to state to which country he wishes his teas consigned.

12. All teas before shipment to be examined, tasted, and reported on by an expert whose fees will be paid by the member shipping the tea.

List of Estates prepared to join in a Syndicate under the auspices of the Planters' Association for the introduction of Ceylon teas into America and the Colonies, should a scheme for such be sanctioned by the Planters' Association on the lines roughly sketched out by Mr. Rutherford in annexed Draft proposal;—

[Signatures to this list do not bind any one to become a member of the Syndicate should the scheme afterwards be altered and not then meet with their approval.]

		lb.	
Dunedin...	Avisawella...	5,000	Remarks.
Maria-watte ...	Gampola ...	5,000	
Semba-watte ...	Nawala-pitiya ...	5,000	
Dewala-kande ...	Avisawella...	5,000	Will supply in two instalments from each estate.
Torwood...	Kalutara ...	1,000	
Tillyrie ...	Bogawan-talawa ...	1,000	
Scrubs ...	Nuwara Eliya ...	1,000	
Wallaha ...	Lindula ...	1,000	
Rogart ...	Kalutara ...	1,000	

Approved for the Ceylon Company's Estates, though I am not at present in a position to promise definite quantities.—(Signed) John H. Starey.

I approve of the scheme, but at present cannot say more than Mr. Starey.—(Signed) Jas. Hill, Messrs. Carson & Co.

THE COCONUT PALM AND LIGHTNING.

Sir Emerson Tennent, when noticing the various uses of the coconut palm, as enumerated by the natives, stated:—"One pre-eminent use of the coconut palm is omitted in all these popular enumerations: it acts as a *conductor in protecting their houses from lightning*. As many as 500 of these trees were struck in a single *pattoo* near Puttalam during a succession of thunderstorms

in April 1859.—*Colombo Observer.*"

Those connected with coconut estates are aware that besides the destruction of young trees by the grubs or beetles, they must lay their account to a varying but appreciable percentage of loss of trees at all stages of growth from the effects of lightning. For, these natural lightning conductors, with their tall stems covered with a generally smooth coating of siliceous matter (to the prevalence of which near human abodes, there can be little doubt, the inhabitants of Ceylon owe much of their immunity from lightning strokes), are themselves no more exempt from occasional destruction by "the electric fluid" than are artificial conductors formed of copper or other metal. Electricity seems sometimes to be generated and to be present in such abundance and such form, as not to allow of its being carried off insensibly, even by such a series of conductors as a grove of coconut palms; and then the palms, sometimes in large groups, are struck with fatal effect. On one occasion when a crash gave rise to the impression that "the sky had fallen," we felt certain that something had been struck and on going to the seashore we found seven coconut trees affected, some killed outright and others with only the edges of their branches singed. But ultimately every tree, however faintly affected, died. During the late monsoon storms, twelve fine palms, a little south of the Kollupitiya station, were struck. Five of these were practically decapitated and others were badly burnt. But some were only affected so that a slight brown colour showed on a few of the branches. Amongst these latter is a tree with a magnificent head of fruit, and this morning we expressed our fears, based on our experience, to a good native authority that this valuable tree was as much doomed as those whose vitality had been at once destroyed. He fully confirmed our opinion: the tree *must* die. Electricity is essentially mysterious in its origin, substance and action, but perhaps some reader who has studied the subject can help us to the philosophy of the curious fact we have noted. Human beings have been "struck" by lightning and suffered more or less severe injury, but have survived. Why should coconut palms, which have merely had their external parts, their foliage, almost imperceptibly singed, be as much doomed to death as those whose vital parts the fluid has permeated, the fatal result being only protracted in the one case, while it is instantaneous in the other?

PLANTING IN NETHERLANDS INDIA.

(*Translated for the "Straits Times."*)

In Banda, the freight charges to Holland weighing upon nutmeg planters shipping that spice thither have so made away with the profit, that the cultivation of that article no longer pays. Growers lose heart and from want of labour the fruit often rots on the trees.

At Surabaya, so says the local *Courant*, Chinese traders were by last advices failing continually, and business was slack. On the sugar estates crushing had begun, notwithstanding rainy weather, from further delay being costly and hazardous. The canes were looking well, and even unusually so in some localities. The price of sugar showed no encouraging sign of improvement in face of the increased quantity of beet raised in Europe.

Private advices from the Netherlands in the *Java Bode* state that the cinchona market was in a depressed condition. Business in quinine was slack as was the case also with so many other produce articles, that it is hard to say what product can be looked upon as yielding handsome profits with one exception. The lucky holders of shares in tobacco companies there get all the sunshines available to colonial planters. The same journal says that in these days of shaken confidence in business circles, there is one Java cinchona planter who in spite of the hard times, is able to report favourably on the outlook before him, though capitalists have been kept from embarking money in this line of enterprize by the recent rapid fall in the price of bark. Quinine, however, may fall lower still in value without impairing the paying character of estates with superior kinds of cinchona trees. A temporary fall in value, would indeed benefit Java growers by making the inferior Ceylon barks almost worthless. When thereby that island, now the greatest producer in the market, is driven from the field, a rise in price may reasonably be looked out for, or at least a steadiness of the market sufficient to ensure Java planters adequate profit keeping pace with continuous improvements in cultivation.

DELI NEWS.

Heavy rains have fallen throughout Deli swelling the rivers large and small, thereby bringing about more or less destructive floods, which also prevented the Races from being held at Medan on the 23rd and 24th May. The managing committee has determined upon putting them off still July, when there is greater likelihood of dry weather, Sunday the 11th July being the date provisionally fixed upon for holding them.

NEW MARKETS FOR TEA.

The question of opening up new markets for the extra outturn that in a few short years may be expected from the large area put out under tea is likely to become of sufficient importance to warrant deliberation and action on the Indian Tea Association. Hitherto the efforts made in this direction have resulted in very little that is practicable. A large quantity of tea was poured into Australia and forced on to the market by the extremely cheap rates at which it was sold. In consequence of this we are now getting three or four millions placed annually there,* but this represents but a fraction of the actual consumption of tea in the colonies, probably about one-seventh and yet we are content to court the market's favours, not by regular shipments, but by spasmodic consignments, when Calcutta prices are a little dull. Every garden now in existence should ship a small quantity regularly. It would not really matter if it showed a loss, as the quantity even if thrown away, would make no material difference in the dividend. A taste for Indian teas must be cultivated, for there is no doubt that Indian tea is not appriciated in the colonies to any great extent. Unless new markets are opened and that in a year or two, a heavy fall in prices is like to follow and it may become a panic, such as we had a few years ago. Should this take place, offers of tea to force new markets will not only be numerous, but generous in the extreme. This, however, will not be so effective as a little liberality now would be. In addition to what could be done by regular shipments to Australia, the question of opening up the markets of America is one of great importance. The effort previously made to put Indian teas on these markets was but a feeble one. Last year the annual subscription to the Association was reduced from one to half-an-anna, because there was no apparent use for a large cash balance. The amount was so equally distributed over all, that there was no hardship experienced: it might have been much better had the one anna contribution been continued, and the money employed to advertise Indian teas in America. A great deal of the success which

* Not quite two millions in 1885, so that if three millions are sent and sold in 1886, it will be well and the progress made since the fierce battle of 1880-81, may be reckoned good in the face of the powerful vested interest connected with the cheap and nasty but large profit yielding stuff from Foochow.—Ed.

Ceylon tea is achieving is due to the way their produce is brought to the notice of the public. The Ceylon people have, for instance, sent home a Commissioner to see that their teas receive their full share of attention at the coming Exhibiton.

In addition to the Colonial and American markets an endeavour should be made to push Indian teas in other directions, and none is more likely to carry off our low class teas than the native bazaars. This is a market that has never yet been practically tapped. Were the Indian Government, too, to do away with the amount of Red Tapeism with regard to Commissariat teas, they would not only receive many more tenders, but also a better article at half the money, or. at any rate, rather more than half.

It is practicallyimpossible on a tea garden to get boxes exactly the same size and sameweight,and this is required by Commissariat contracts. Why should the Government not accept the same amount of *actual tea* packed in any shaped case? instead of laying down a regulation as to the size, shape and form of the box.—*Indian Planters' Gazette.*

COFFEE, CINCHONA AND TEA IN JAMAICA.

We have been permitted to take the following very interesting extracts from the letter of an ex-Ceylon planter now in Jamaica, addressed to a friend in Ceylon. We hope to have the same privilege again or to hear direct, for it would be very interesting to learn how the "tea clearing" comes on and bears, as well as thews perience of coffee and bark. We quote as folloma:—

Jalica, 19th April.

I think at the time I wrote ast, I had not long been living on ——. Previous to that I had been living part of each week at an old coffee property. The walking and riding backwards and forwards and the moving of bedding, &c., was too much trouble and expense, and so I prepared to live a life in the bush entirely. Fortunately, I was never without an assistant and so could not be very lonely. At one time I had ——, an Oxford man, but he returned to England very soon. Then I had ——, a cousin of the two that used to be in Ceylon and at the same time ——. After the latter, ——, who is now planting tea in Ceylon. In fact, all my assistants have left Jamaica. Two hadn't enough capital to invest comfortably and the other two disbelieved in the stability of cinchona. As soon as —— left, I took sole charge of a cinchona clearing which gives me £60 a year. In July last —— came out and lived with me for three months. He was delighted with the climate of the hills and appeared sorry to have to return. As our Company were not advancing money for extension in cinchona or coffee, I applied for charge of another cinchona clearing. This place was to give me £5 per month, six months in the year. The other six months it was to be managed by one of the shareholders. As the Company had a large furnished house, in every way superior to our own, I decided to go and live there for a time, taking —— with me. So for some time my hands were full with plenty of work in supervising the three properties. This was in October and then —— said that sugar prospects being so bad and unsettled he thought if he could lease a coffee property with a good house, he ought to bring wife and children out. We had a try for Farm Hill but the proprietor would only sell and —— was not prepared to lay out any large sum. After a bit I thought of this place. I knew it had a fine house and a healthy climate and had just been put up to auction and withdrawn for want of a decent bid. We came and looked over the place and decided to make an offer to rent the house, works and coffee for £50 a year with (at first) the option of purchase at £1,000. This sounds ridiculously small (does it not ?) but then the coffee barely repays our outlay on it, of the most economical kind at present. The houseworks and barbacues must have cost £7,000 even in slavery times and they could not be erected for that now. The garden, house and barbacues cover three acres, the barbacues alone nearly an acre. The estate consists of 1,171 acres from 2,800 ft. to 5,600 ft. elevation. It has about 400 acres fine forest, 150 acres ruinate, 550 grass, scrub, &c., and 56 acres coffee, and even in this 50 odd acres are so scattered and thin that the average bearing is only 1¼ cwt. Our total crop in bushels of cherry will be under 400. I can't help smiling when I think of this *for a crop*, when I have picked more in *a day* in Ceylon. But this estate nevertheless has been a very fine one in days gone by; and I have been told on good authority that it has given its £7,000 clear profit in a year. This property was settled in the middle of last century. First as an indigo plantation and then as a coffee estate. There are trees still growing in the place nearly a hundred years old.

Want of regularly pruning and handling, constant heavy hoe weeding and general mismanagement have done their work and reduced these places to what they are now. As far as I can see from old trees growing on different plantations, the first planting resulted in as fine coffee fields as one could wish, quite as fine as the *best Haputale* coffee. But the most extraordinary thing is that this want of good cultivation does not appear to affect prices in the slightest. Last year, for instance, 138s per cwt. was touched in the Liverpool market by this property. So you see it is only quantity we want to make coffee planting in Jamaica an unqualified success and not quality. As I have shown, we have any quantity of land for coffee or indeed anything else but we want money. I confidently believe that if —— could afford to put a few hundreds into this place I could turn the money so invested to good account very soon. He is willing to do so and no doubt, will, if he can make anything out of his sugar crop. No doubt, you all work very economically now in Ceylon in these hard times, but I fancy even now, we in Jamaica, could give you a lesson or two in taking care of the pence, &c. Take this place for instance, the gross value of the crop will not exceed £335. Out of this we have to work the estate and pay every expense, you can think of, including broker's charges. Of course, salary I draw none, but work for my own interest. A Jamaica planter is contented with very small profits and how he lives, and lives comfortably too, is a wonder. I believe that tea would grow well here. We have good land with hundreds of acres of forest well situated for firewood, extensive buildings and a plentiful supply of water. The only difficult question is the labour. We have lots of people living all round us, but the men are accustomed to get 1s a day, the women 9d and the children from 4½d to 7d. Then again, we are only 20 miles from a shipping port and that as you know is not far from London. We are only five or six days from New York, three from Panama and five from Honduras. I intend planting five acres of tea for island consumption. We are protected by a very high duty 1s per lb., and no good tea can be bought here under 4s a lb. At the Government Cinchona plantation where there are some 1,000 trees or so a very good sample has been made by hand. It grieves me to learn that so many of my old Ceylon friends have been so completely ruined. The most of them I suppose ruined beyond all chance of making another start in life. The *Observer* containing that most interesting story the "Fifties and Sixties" I enjoyed

reading immensely; knowing as I did nearly all the movers in it—I often think of poor Mr. Wood and try to find out what estates he was in charge of. But even the oldest residents cannot remember. Our cinchona on —— is doing well. It is now two years and four months old. I barked one of the hybrids the other day and got 16 ounces of wet "stem" alone. But the soil in most places is very porous and soft. We had some 30 inches of rain in less than a month, 20 of it in two days and this caused slips of gigantic proportions. I measured over 50 inches of rain for the last three weeks in December 1885 at the station on the summit of the Blue Mountain Peak! Jamaica has suffered from a dry cycle for the past six years and we are now supposed to be entering the wet one. I wish the prophets may be correct, for then we shall do well with our coffee here. I have just had the pleasure of entertaining the manager of the Jamaica Railway for three days. He was very much struck with this place—think we have got it for little or nothing, and says we ought to stock it with cattle and sheep for breeding. He seems to think it would make a fine hotel for the Americans in the summer.

THE COMING PRODUCT.

King *Coffee* 's dead! We grieve for him
And mourn his short-lived reign,
For never shall we hope on earth
To see his like again.

Cinchona too once raised our hopes;
We thought we really had
A fortune, but to tell the tale
Is very, very sad,

Of how our hopes were dashed to earth,
For people will not drink
Quinine all day to make us rich,
Unreasonably we think.

And *Cardamoms* 'neath friendly shade
We tried, but oh! the price
Has fallen sadly, and we wish
We 'd never grown that spice.

And now, Queen *Tea*, our eyes are turned
With hopeful gaze to thee:
We look to thee to bring once more
Our lost prosperity.

Grow, sturdy plant! Thou carest not
For cold or cruel heat;
Soon Kaltura and Pedro's height
Will bow beneath thy feet.

Grow, sturdy plant! Our coffers fill,
Which long have empty been;
Grow on, and we will gladly own
Thee, gentle, Gracious Queen.

Grow, sturdy plant! If thou shouldst fail
To bring us timely aid,
Then must we leave fair Lanka's isle
Or droop and pine and fade.

Zulu.

"BETELNUT AS AN OBJECT OF TAXATION,"

Has been the subject of a discussion in the *Bombay Gazette* as the following letter will show:—

TO THE EDITOR OF THE "BOMBAY GAZETTE."

Sir,—It has for several years appeared to me to be extraordinary that during times when the financial prospects of the Empire are constantly in a state of crisis, it has not occurred to any of our budget-makers, financial advisers or others, to fill depleted treasuries with the produce of a just and legitimate tax on betel-nut.

It is possible that there are insuperable objections in the way of the effective working of such a tax; but I believe that these objections, if they exist, do not lie upon the surface; and I should be glad to hear them categorically stated with a view to examining their validity.

Superficially betel-nut is a legitimate object of taxation. It is a pure luxury, much more so at any rate than salt, and I consider more so than opium.

The income to be derived from a judiciously imposed tax on this article would certainly be large; and any difficulties that may be in the way of collection cannot properly be appreciated till we have heard what they are. *Prima facie* it is not easy to understand why collection should be proportionately more difficult in respect to this tax than it is found to be in other and far less remunerative departments of our scheme of Indian revenue.

As to the sentimental side of the question, the interested outcry of our native fellow-subjects would probably be as loud as it certainly would be unjust. The European official is already taxed precisely, or very nearly to the extent of the depreciation in the rupee. Since we are compelled to purchase four-fifths of the commodities and all the luxuries of our life from the English market out of a salary which bears no proportion in reality to its nominal value, nor to the value it was intended to have when salaries were fixed and covenants formed on the basis of promises having these salaries for their consideration. In addition to this we pay an income-tax which, while it produces, as far as Government servants are concerned an infinitesimal revenue, excites a wholly disproportionate feeling of hardship and discontent. As a matter of fact, I apprehend there can be no argument against the assertion that a rich native does not contribute any thing like a proportionate amount of his means in taxation to that contributed by his British fellow subject.

Touching objections theoretical or practical that may arise from the financial point of view, nothing can be said until we are in possession of more definite information. It may be that the scheme can be demonstrated on closer examination to be altogether chimerical; but it is one of such fair promise that I should at any rate be glad to see it fairly discussed.—Yours &c., C. S.

The tax would be difficult and costly to collect and would excite discontent and evasion. Betel is used by the poor to allay the cravings of appetite, and to say that it is more of a luxury than opium is sheer nonsense.

CHINA TEA AND THE CHINESE DUTIES THEREON—PRO ET CON.

It is of interest to watch the controversy in the *North China Daily News*, on this subject "K. C. Y." writes:—

It is not only the taxes levied by the Chinese in the interior, but the whole of the taxes (export duty, lekin, barrier squeezes, etc., etc.,) which I maintain will eventually cause the ruin of the China tea trade. The first principle in any trade before it can be said to be in a healthy condition is that the grower of the raw material shall get a fair remuneration for his labour. This was the motive power that caused the tea trade to assume the proportions it has already attained, and that has brought competitors into the field to share in the benefits which a generation ago were the monopoly of the Chinese. Through the short-sighted policy of China in maintaining a very high tariff, these competitors have now gained such a stronghold on many of the consuming markets that the question is at last forcing itself on the unwilling notice of the rulers of this Empire. The deterioration in average quality has not been nearly so great as the reduction in average price. The reduction in price comes out of the growers' pockets alone.

and there is consequently less and less inducement for them to give the same care and attention to the plants which they did in former years. The point has already been reached in many districts when it does not pay to plant more gardens, and if some relief does not come speedily we shall shortly hear of the tea gardens running wild, or of other crops being substituted for tea. The greater part of the money now paid as taxes would go to the grower for some time to come, and would improve his position materially. It is for this that I crave the earnest attention of all who are interested in the trade, and not with any idea that foreign buyers would reap any immediate benefit from the freedom of tea from all taxes. I want to see "a great deal more of the land and labour of China employed in growing a great deal more tea," and not that the trade should be strangled by the hands that should be the first to encourage it. In a very few years (four or five as the outside) India will be exporting its ninety or a hundred million pound, and Ceylon its fifty or sixty millions annually. With such competition we can only look for further decline in average prices, and China will not be able to adhere to the present prohibitive taxes if she wishes to hold her own in the trade. Without taxation she can produce tea quite cheap enough to meet any emergencies. One word as to possible improvement in manufacture. One of the best of the rolling machines used in Ceylon has been on exhibition for some months in Hankow, and as it meets with the approval of all who see it, we shall probably hear of others being ordered as soon as this one has been tried in one of the tea districts.

Mr. Henry Hertz of Shanghai replies :—

The theoretical view is that while the production is increasing rapidly in other countries, this is not the case in China owing to excessive duties; though I do not find it attempted to be shown even by the use of those complaisant instruments "statistics," that the trade is actually going behind. Against this I maintain, as the practical side of the matter, that we have more than a sufficiency of China tea to deal with, which I consider to be conclusively shown by the fact that it is impossible for anyone dealing largely in the article, without having resort to the ruthless process of selling by auction "without reserve," to be entirely quit of old stocks before the arrival of the new. When the day arrives that this is no longer the case, it will be time enough to think of opening the floodgates of supply by the removal of duties. In my opinion then, these act at present to some extent as a protection to the merchant, while their aforesaid removal would in a measure supply the place of a system of bounties to the producer. Not holding any brief on behalf of the latter, I prefer to advocate what I consider most beneficial to the interests of foreigners, and it was in this sense that I endeavoured to express myself at the recent meeting of the Chamber of Commerce. I was very pleased to find that my remarks on that occasion received substantial support from others well qualified to speak from experience.

"K. C. Y." in replication :—

It is not the inland taxation alone which I maintain is strangling the trade, but the whole of the taxes on tea, Export Duty, Inland Taxation, Barrier Dues, etc. It will be necessary to make tea absolutely duty free before it can be on a sound basis, and any reduction of taxation will be only a temporary relief. You state* "there is more or less loss on every pound of tea sold in London for less than nine pence." Nine pence is the equivalent of sixteen to seventeen taels duties paid, according as the estimate is made with commissions or without commissions, but everyone who has any practical knowledge of buying tea will tell you that supplies of sound common Congou continue to come forward when the price is Taels 9½ to 10, duties paid, and that they cease altogether when the price falls below Taels 9 duties paid. I therefore infer that the cost of this class of tea is between Taels 9 and 9½ duties paid. If Tea can be brought to the Shanghai market to sell at Taels 9 at 9½, fully half of which price goes in Duties and Inland Taxation, how very much better quality tea could be brought to market to sell at the same price, if free from all Taxation. Mr. Hertz and Mr. Young appear to be afraid that if taxation was removed China would swamp the consuming markets altogether, but my strong conviction is that instead of overloading the home markets with a low quality article we should be able to ship good quality tea at such a low price that it would at once command the attention of buyers and compete successfully with the produce of other countries. The export would right itself in a very short time. I should be glad if you can publish any information as to the relative cost of land in the interior of China and in India, and also give us the cost of labour in the two countries. As to comparing the consumption of 250,000,000 Chinamen with 150,000,000 Western men. I confess it is beyond my powers, but I would not mind hazarding a statement that the Western men use four or five times more Tea than the Chinamen do to make a cup and the Chinamen continue pouring hot water on the same leaves time after time whilst the Western men consider them exhausted after the first brew. Last season was a very exceptional one. The very low prices realized for first crop Teas the previous season and the unsettled state of affairs between England and Russia made Chinese middlemen very cautious. They anticipated that Russian buyers might possibly be out of the market for the season and that English houses would buy only on very low terms, but just as the season opened more peaceful news arrived and the middlemen reaped the benefit. The growers, however, suffered terribly and the first crop was some 70,000 ½-chests short of the previous season. This coming season there are unusually large preparations for making first crops, but it is yet too early to form any idea of total yield for the reason. Like Mr. Hertz I do not hold any brief on behalf of the producer, but I am desirous of seeing a fine trade put on a firm basis.

* We did not make any such statement.—Ed. *N. C. D. N.*

INDIAN TEA TRADE.

It is possible that you may have had sent to you the Report of the Collector of Customs at Calcutta on the River-borne traffic of Bengal &c. That report contains, however, remarks bearing so forcibly on the future of tea-cultivation in Ceylon, that it will scarcely be deemed to be superfluous if I give you an extract from it here. The officer named thus wrote :—

"The exports of tea have advanced, in comparison with 1883-4, by 7 per cent., with a decline in the average declared value to the lowest point yet reached, for with an increase in shipments of over four millions of pounds there is a decline in the total declared value of over four lakhs of rupees. There has been a steady extension in the production of tea, owing principally, as I mentioned in last year's report, to the opening out of new areas in Sylhet and the Dooars. These new gardens having been started as economically as possible, can produce at less cost than the older ones and make profits while the latter are losing. Prices fell heavily last year, and many of the older gardens were far from remunerative. It appears likely that proprietors will have to be satisfied in the future with lower prices than they obtained in past years, for with a large increase in production, unless the markets for it can be proportionately extended, the value of tea in the ordinary course must fall. I referred in last year's report to the growing importance of the tea industry in Ceylon, and to the competition that will ultimately be the result of the large extension of tea-growing in that island. The amount even now is insignificant compared with the exports of Indian tea, but it will increase year by year and the extension in cultivation already is said to have been from between 200 and 300 acres in 1873, to 48,000 acres in 1884. This is an enormous advance, and the production when the large available acreage, said to be from 150,000 to 160,000 acres, has been opened out and comes into full bearing will have a very sensible effect on the tea market. It has been estimated that about 70 million pounds yearly may eventually be the

outturn of Ceylon. Tea there has several advantages. First is the excellent quality of the tea produced, said to be equal to the very best Indian teas. Then an acre in Ceylon will produce half as much tea again as it will in India. The climate, too, is more to be depended on for tea growing; there is a good supply of labour, and the tea can be more cheaply shipped. Lastly, Ceylon is growing tea on our experiences and will presumably avoid our past mistakes. With all these advantages it is clear that the prospects of Ceylon tea are in the ascendent and that the expansion of tea-growing there will continue to be rapid."—*London Cor.*

ASSAM TEA COMPANY.

Capital paid up £187,160 in 9,358 shares of £20 each. Area under cultivation 7,608 acres. Directors Messrs. W. Prideaux, Chairman, Geo. Turnbull, A. B. Fisher, J. Graham, Q.C., Geo. Paton, M.D., A. Robinson, and Major-General Beadle.

The following is the directors' report to be presented to the shareholders at the annual general meeting to be held on the 7th prox., from which we gather that the cost of manufacture and bringing the tea to market in 1885 has been reduced to 9 4-5d. per lb. as compared with 10 1-5d. per lb. in 1884—a rate that still leaves room we think for further economy—while the gross sale price of the crop has increased, the average realised in 1885 having been 1s. 0⅝d. per lb. as compared with 11¾d. per lb. in 1884. The crop gathered in 1885 was 32,359 maunds or 4,030 maunds less than the Superintendents estimate, and 1,836 maunds below the outturn of 1884. The yield per acre was 340 lb —and the profit shown per acre just over £5—which as the capitalised value of the estates is but £25 per acre enables the board to declare the handsome dividend of 20 per cent. Last year's dividend was 14 per cent. It is interesting to note that 7 years ago (in 1878) the crop cost 16d per lb. and realised 21d. per lb., so that while cost has been reduced 6d. per lb. the value of crop has fallen 8d. per lb.:—To the Shareholders of the Assam Company. Gentlemen,—Your directors present to you their report of the operations of the company for the year which ended December 31st, 1885. The whole of the crop of 1885 having been sold, your directors have considered it expedient to let you know the result of the working of that year without delay, hence the earlier date at which this meeting is called. The average price obtained for the crop of 1885 is 1s. 0⅝d. per lb., being 1¾d. per lb. more than was obtained for the crop of 1884. The quantity of tea packed and dispatched from the gardens during the past season amounted to 2,588,775 lb. which is 322,425 lb. less than the Superintendent's estimate, and 146,907 less than was packed in the previous year. This short quantity was entirely caused by very unfavourable weather during the months of August and September which it is believed produced the same result in nearly all the tea plantations of Assam. The expenditure in India during the year was £99,697 12s., taking the rupee at par or £83,268 19s. 11d. after deducting the difference in the rate of exchange, being £11,803 17s. 7d. less than the expenditure of last year, and £2,119 8s. 0d. less than the Superintendent's estimate. The result for the year stands thus:—

Tea sales, gross proceeds				£138,650	16 5
Tea seed sold in India				3,480	13 10
Sundry receipts in India				1,949	3 7
Interest and Sundries				258	6 4
				£144,339	0 2
Expenditure in India in rupees at par ..	£99,697	12	0		
Less exchange.. ..	16,428	12	1		
	£83,268	19	11		
Expenditure in England	22,940	9	11		
Total Expenditure				106,209	9 10
Net profit				£ 38,129	10 4

The profit of the year therefore amounts to £38,129 10s. 4d., to which is to be added the balance carried from 1884 of £1,376 19s. 9d., making a total of £39,506 10s. 1d., out of which we propose to pay a dividend at the rate of 20 per cent, and to carry forward £2,074 10s. 1d. In January last we paid an interim dividend at the rate of 5 per cent. and the balance of 15 per cent. or £3 per share will be payable on July 1st. Mr. Phillips, our superintendent, returned to his duties in November last. He estimates the crop of manufactured tea for the current season at 2,890,200 lb., and the expenditure in India at R1,082,189. During the absence of Mr. Phillips, the superintendence of our affairs in Assam was entrusted to Mr. Newington, and Mr. Phillips has reported to us that on his return he found that Mr. Newington had performed his duties as acting superintendent to his entire satisfaction.—*H. & C. Mail.*

TROPICAL FRUITS FOR THE ENGLISH MARKET:

The West Indies at Covent-garden.

In that very useful volume entitled "Her Majesty's Colonies," issued under the authority of the Royal Commission for the Colonial and Indian Exhibition, we are told that the colony of British Guiana is suffering from the depreciation in the price of its staple product—sugar. That is only too true; but while the attention of manufacturers and other consumers in the United Kingdom is directed to its timbers, its fibres, its oils, and its gums, an enterprising shipping firm in the City has been planning and experimenting, and laying the foundation of a new export for the West Indian colonies, as well as a new trade for themselves, the development of which may, for all we know to the contrary, be the discovery of that Eldorado which the ill-fated Raleigh sought but failed to find there. In the book quoted from above, mention is made of many valuable products of the colony of British Guiana, industries which if called into existence and encouraged will largely contribute to her wealth; but no mention is made of the fruits, because when the book was written it was not considered possible to export the many fruits which flourish upon the rich alluvial deposit which forms the coast and river banks of Guiana, to the English markets, and export them, moreover, in a ripe and yet perfectly fresh condition. But steam and science have conquered the old limitations of time and space; and an old West Indian firm, Scrutton, Sons & Co., of 9, Gracechurch-street, in the City, have been the first to apply these to the development of what promises to be an important minor industry for our West Indian colonies. The competition in the sugar trade, caused by the foreign bounty system, is now running these colonies hard, and Messrs. Scrutton, Sons & Co., likewise men, have been casting about for a new trade to work with the sugar, and it is to the fruits of the colony that their attention has been directed. One of their ships was recently fitted with special chambers for the storage of the fruits, special machinery was designed and fitted up for producing the necessary temperature to preserve the cargo, and all was ready for the experiments. The "Nonpareil" "went sailing away to the West;" the "Nonpareil" has come home again, and the experiment has been successful beyond the expectations of the firm, while fruit experts who visited the steamer on its arrival expressed themselves highly pleased with the condition in which the fruit was landed. Mr. F. Scrutton came down to the *Pall Mall Gazette* office without delay, bringing with him some beautiful bananas, in fine mellow condition, and asked that a representative of the paper should be sent down to the docks to report upon the result of the ex-

periment. Next morning found a reporter going over the side of the "Nonpareil" as she lay alongside the wharf in the West India Docks at Blackwall. The steamer was discharging a cargo of sugar—the finest Demerara crystals; but it was not sugar that he had gone out into the wilderness of ships and merchandize for to see. In the captain's snug cabin, however, was Mr. Scrutton ready for an interview.

"Yes," he said, spreading out a large chart of the West Indies on the captain's locker, "I think this ought to turn out a very good thing for the colony, and a very good thing for ourselves. At any rate, our first experiment promises well, and I see no reason why we shouldn't educate English people up to a taste for bananas such as the Americans have. It is quite true, as you say, that they don't care much about them now, but that isn't their fault. They have n't had the chance of tasting real bananas yet."

"I suppose, Mr. Scrutton, the banana, like the tomato, is an acquired taste?" "Yes, that is exactly the case. Our people here have never had them long enough to get used to them. They are too poor in quality and too dear. Give them bananas both good and cheap and they will buy again, and will soon get to like them very much. Hitherto the bananas bought in England have been picked very green; they partly ripen on the voyage hitherto, but the ripening process is finished off in Covent-garden, where they are warmed up artificially in the merchants' own rooms. All this spoils the real flavour of the fruit; and what wonder, then, that the banana is not thought much of? Now the West Indian banana trade with America is assuming very large proportions. Some fifteen or twenty steamers are constantly running to the States with the fruit, and as the passage can be accomplished in six or seven days there is no need for artificial machinery. With us it is different because, with a passage of seventeen or eighteen days, the fruit, if picked when anywhere near perfection, would ripen too fast, and be useless when it arrived. The problem therefore was to devise some means of storing the fruit in a cool chamber, where all dampness in the atmosphere should be extracted, and where the ripening of the fruits should be retarded just so much as would leave it in perfect condition on arrival in the market. Our ships running to Demerara touch at Madeira on the way out, and our idea is to work a trade in vegetables—all the common greens which will not grow in the tropics—from that island to the West Indies, and then work the West Indian fruits homeward. We shall import the banana chiefly, and endeavour to popularize it, so to speak, but we hope to introduce many more of the fruits which flourish in the West Indies, but which are absolutely unknown to the untravelled Englishman. We have not brought home any large cargo of these other fruits this time; only 'sampled' them, as the Yankees say; but you shall see and taste them presently when we go below.

"There is no difficulty in getting large quantities of bananas. It is simply a question of demand, not of supply. Whereas, as in Madeira, the banana is but a season trade, in Demerara, or 'the land of mud,' as they call it, the fruit grows in profusion alongside of the sugar in the rich black mud on the coast and river banks. So if the English people want them they can have them all the year round, now that the problem of bringing them over is solved. The idea of working this trade originated, I ought to say, with our good Captain Boniface who has worked the experiment uncommonly well; but here comes the captain himself."

With this the captain walked in and joined in the conversation. A right good hearty fellow he was, a typical sea dog, with seventeen stone of geniality and salt yarns in equal proportion. Captain Boniface soon informed us that his good ship, the "Nonpareil" named, sailed out of this port about two months ago, and anchored at Madeira on the 8th of April. There the cool chambers were loaded with vegetables, cabbages, French beans, peas, artichokes, asparagus, carrots, turnips, celery, spinach, everything in the common green stuff way that you can mention, and all which fetch good prices in Demerara. Only those people who have lived for long in the tropics know what it is to hunger for a good fresh cabbage or any other green food. About ten days were spent in Demerara, and while the sugar was being taken on board our friend the captain was being towed up the creeks in a canoe by donkeys, his object being to explore the native plantations further inland. Here he selected a modest cargo of 400 banana bunches for his experiment, as nearly ripe as he thought prudent, and having selected the samples of other fruits, sailed away on April 30th, arriving in dock on Saturday last (May 29th).

"Now come below," said Mr. Scrutton, and, together with the jovial captain, we descended the hatchway into the fruit chamber. It was delightfully cool, the thermometer standing at 41 degrees. All round the chamber were racks, very much like an apple room in a country farmhouse, the greater part of the space being occupied by the bananas. A bunch of bananas in the green state in which they used to arrive was placed on the floor by the side of one of the bunches, all yellow and mellow, as they are to be imported for the future, and there could be no mistake about the improvement. In the adjoining chamber the special freezing machine fitted up by Mr. Haslam, of Derby, was at work, and here it should be stated how the temperature is managed. To put the fruit in a chamber of frozen air would quite spoil it, so the refrigerating machine is combined with a "blower," which simply drives a quantity of the outside atmosphere into a mixing chamber, tempering the frozen air to the requisite degree of coolness; then it is driven through air-holes into the fruit chamber. But inasmuch as the fruit must necessarily throw off a certain amount of moisture the air which is pumped in at one side is constantly being sucked out and re-dried at the other end, and so a continuity of coolness and dryness is preserved, and the ripening of the fruit is retarded. The captain watched the temperature very keenly every day, and regulated it according to the ripening of the fruit, and as this is the first experiment it is probable that the next supply will be if possible, in a still more perfect condition. Of the other fruits which Mr. Scrutton produced from the racks in this chamber there were several which may before long be well known in our markets, since they were all beautifully fresh and full-flavoured. There were the sapodilla, which looks like either a potato or a russet apple, and which tastes very much like a pear; the bel-apple, a nice-looking yellow pod very much like the seed of the passion flower, only larger, the pulpy seeds of which are the sweet part that is eaten; and a smaller fruit about the size of large plums, called the loquat. This fruit is very juicy and refreshing, and if imported in any quantity will certainly be in great demand. Then there were limes and pines, &c., while some strawberries were turned out fresh and cool from Madeira. Specimens of the vegetables which are taken from Madeira to the West Indies were there too, splendid cabbages of enormous weight, and tomatoes and other things. All were

in the best possible condition, and five minutes after we left the ship a Covent-garden merchant had purchased the whole of the contents of the chamber! Messrs, Scrutton & Co., now that they can bring the fruit over fresh, intend to draw the early fruits from Madeira as well, anticipating our hothouse strawberries by six weeks. Next trip they will bring 1,000 bunches of the banana, and when they have cultivated it scientifically there is reason to believe that some very fine fruit will be the result. At present, a native puts in a plant and it grows. That sums up the history of its present cultivation.

While the Messrs. Scrutton have been elaborating this idea, the Orient Company have been doing much the same thing in the way of importing fruits from Australia—there, however, they only cultivate English fruits—and so there is good reason to hope that we shall have the number of fruits in our markets largely increased and cheapened while our colonies will find a new and valuable addition to their export trade.

Indian Patents.—One of these is thus described:—Mr. George Greig, Engineer, of Harveston, in the County of Kincardine, North Britain—"A method of; desiccating air for drying purposes."—*Indian Engineer.*

Tea.—There are said to be 84 tea plantations in the Madras Presidency, covering an area of 7,553 acres, of which little more than half is under cultivation. Last year the outturn was 398,945 lb. The above are official statistics but are of doubtful accuracy.—*Nilgiri Express.*

The Old Pussellawa district is coming wonderfully to the front under tea: an experienced "V. A." in tea said not long ago that he had not seen in the island better tea of its age than a 100 acres field of about two years old on Peacock estate.

Trout in Nuwara Eliya.—We are glad to learn that the Assistant Agent of Nuwara Eliya proposes to try the experiment of introducing trout into the Nuwara Eliya lake and neighbouring streams, and subscriptions are invited to defray the expenses connected with it. The operations of reserving the young fry &c. will be conducted under the personal supervision of Mr. LeMesurier, and we are glad to learn that about R500 have already been subscribed for this purpose.

A Rack Railway, designed especially for tourist traffic, has been constructed up the sides of the granite cone of Corcovado, in the immediate vicinity of Rio de Janeiro. The mountain is 2,336 feet high; and, as it stands alone, a superb view of the grand harbour is to be had from its summit. The line starts in one of the suburbs of the city, 121 feet above sea level, and rises to the foot of the actual peak, an elevation of 2,198 feet. The total length is 4,144 yards, the width gauge 1 metre, the least gradient 1 in 25, maximum gradient 1 in 33, and maximum radius 6 chains. The steel rails are of the Vignoles pattern, 29 feet 6 inches long, and weighing 40·3 lb. per yard. The rack rail is similar to that of the Rigi Railway, and weighs 112·9 lb. per yard. The sleepers are 5·9 feet by 6·3 inches by 5·9 inches, and are of native wood. The chief works on the line are numerous retaining walls, a wooden viaduct, two plate girder bridges over deep clefts, and a wrought-iron viaduct of three spans, 426 feet long. The rolling-stock consists of two locomotives with inclined boilers, two carriages to hold 50 passengers, and two goods vans. The Tasmanian Government would do well to construct a railway of this kind to the top of Mount Wellington.—*Sydney Mail.* If the flow of tourists continues, we in Ceylon may see similar lines to the summits of Pidurutallagalla and Adam's Peak. —Ed. C. O.]

The Value of the "T. A." to Ceylon Estate Owners.—A planting correspondent wrote not long ago:—"I think proprietors should supply every tea estate with the *T. A.* The information in it with regard to everything in connection with tea &c. is invaluable: it would pay its value over and over again. Owners of estates should not leave it to hard-up superintendents to take it in."

A Hint to Planters.—Messrs. Carson & Co. are good enough to send us two samples of coffee beans packed in tin foil bags, rolled up and sealed with wax, which have been sent to them through the post from Gonamotava estate, Haputale, and they write as follows:—"The tin foil bags are very suitable for samples of coffee, &c., sent through the post; see two herewith; not the least torn. Though not so strong as parchment they are far less costly and apparently quite as safe."

Seed Oysters are being exported from Bridgeport, Conn., to England at the rate of from 150 to 200 barrels a day. The firm engaged in the business has two dredging steamers at work constantly on the beds off Southport. The seed are freed from all extraneous substances, tightly packed in barrels, and shipped via New York. By the Englishmen they are planted in the river Umber, in Brightlingsea, south of London, and at Carlingford in Ireland. The project is to cultivate the American oyster in British beds, and thus greatly increase the supply in the English markets.—*American Grocer.*

Brazil: Coffee and "Coca:" Compliment to Ceylon Tea.—We are permitted to quote as follows from a private letter of Mr. Scott-Blacklaw:—"I shall one of these days try to continue my letters on Mandioca cultivation. I have tried all I can to find some seeds of the Coca-Erythroxylon, but cannot find it in Brazil, and I know no one in Peru or Bolivia, who could send it. I shall make another effort first time I go to Rio. I have been written to from Ceylon and from India for seed. It is a pity you could not find some as it will take the place of tea and coffee, particularly of the former as a renovator of the physical energies. The leaf is shipped at Para but my friends there cannot procure me seed. It comes down the Amazon from Peru and Bolivia. I hope you are succeeding with tea. Coffee will never grow again in Ceylon. It has left it, the same as it has left the old Brazilian coffee districts. In these latter a little grows still in the shade and there are a few exceptional cases where the plantations have held out. But in the far interior where the railways have within the last few years been opened the produce is enormous and increasing in spite of shortness of labour. All our calculations as regards Brazil have come to nothing. Slaves get fewer everyday and coffee exports increase every year. Coffee has had to be abandoned in districts which combined would take in three times the area of Ceylon. It is very selfish of me to write you only when my tea is finished, the same as I accuse my boys of writing only when they want something. But really the tea was so nice. I take ill without it, now that it is done. I have kept one bottle of it in case of sickness! If the British India steamers call at Lisbon a box sent through them to be transferred to one of the Brazilian steamers would not cost so much as sending to England. I think they will book it through to Rio." What is stated about "coca" is of importance: Mr. Gordon Grinlinton at Portswood, Nuwara Eliya, has been interesting himself in this new product; we do not know if any other planters have done so?

Correspondence.

To the Editor of the "Ceylon Observer."

FIBRES AND THE FIBRE TRADE.

Paris, 14th May 1886.

Dear Sirs,—As you are so well connected with tropical agriculture, would you be in a position to get me the so-called Chinese Mulberry Bark (like post sample, I send you herewith) in large monthly quantity at fair merchantable value. If so, kindly place me into communication with some of your friends, or, if the trouble is not too great, shall be thankful to receive your personal communication on this subject. My sons, Messrs. Edgar and Gaston Heymans, established "General Merchants" at Hai-Phong (Tonkin) have not been able to procure me any from their locality. If you could find some other textile plants equally fibrous your samples and particulars shall have my very best attention and may lead to a large trade.—Yours obediently, EDWARD HEYMANS.

[Planters and others interested can see the sample sent to us at our office. The Mulberry Bark of China is of the White Mulberry (*Morus alba*), which was early introduced into Europe, and has now almost superseded *M. nigra* for the feeding of silkworms. Neither Ceylon nor India has any for export we suspect.—Ed.]

MR. JACKSON'S TEA MACHINERY.

London, 1st June 1886.

Dear Sir,—In Vol. V., page 815, a letter appears by Mr. James Irvine in which the following somewhat sweeping statement appears:—

"All our Tea Dryers in use rapidly wear and are not only costly to repair, but, as in the T Sirocco, the whole of the machine has to be taken to pieces to replace the burned plates." Will you kindly allow me to point out to your readers that there are no plates in our Victoria and Venetian Tea Dryers which come in contact with the flame, the heating surface being multitubular, and it is a well-known fact that cast-iron tubes have stood *night and day* work for five years in England, heating air to 1,000 deg. for blast furnace purposes.

Our Victoria Dryers have been at work for three years in Assam, and not a tube has burned through yet, and when last examined there was nothing to indicate the near approach of such a mishap.

Certainly none of our stoves in Ceylon or Assam have had to be replaced in any way. Our Tea Rollers in Assam are some of them *sixteen* years old and doing good work yet, and I trust I shall yet have the pleasure of saying the same of our dryers.

I should be pleased therefore if your correspondent will allow them a fair trial prior to passing judgment.—I am, dear sir, yours truly,

WILLIAM JACKSON.

THE CINCHONA BARK MARKET.

3, Crosby Square, London, E.C., 4th June 1886.

Dear Sir,—In calling your attention to the enclosed extract from the *Planters' Gazette* we would remark that if planters could be induced, for a time, to cease producing Branch Bark, which can leave little (if any) profit to them at present rates, and is to the advantage only of those who pack, carry and sell it for them, the result would be an immediate rise in the value of their better barks, a consummation which, we venture to think, would be very acceptable in these times of low prices.—We are, dear sir, yours truly,

ARMITAGE, FRY & Co.

The Market for Cinchona Bark and Quinine.

So far the hopes entertained that the present year would see an improvement in the value of quinine and cinchona bark have not been verified. Indeed the results of the last auction have revealed a level of prices previously unknown. The official quotation for bark amounts to no more than 3½d to 4½d per unit. We must go back to August and September of 1883, to find the parallel approaching such a quotation. Then however, the price of quinine was quoted at 8s to 8s 6d per oz. against 2s 6d for German tin and 3s for Howard's in oz. bottles at the present time. In both instances the primary cause can be traced to excessive supplies of bark from Ceylon, although the crisis of 1883 was intensified by the celebrated ring of quinine manufacturers, who had bound themselves under a heavy penalty not to sell the manufactured article under a certain price. The breaking up of that ring and the consequent improvement in the trade in the early part of 1884 are matters of history well known to those interested in this important branch of trade. In the present instance the low price of quinine is due to an entire absence of speculative demand in Europe and especially in America. The American demand so long looked for, showed signs of springing up in the early part of last month, but died away again immediately, some say owing to the unsettled state of the country consequent on the strikes, capitalists not caring to engage in outside speculations with an uncertain political future. In this country the iniquitous prices asked for quinine by the retail traders have quite prevented any general dissemination of the article, which people naturally supposed would be the result when a low range of prices was fully established.

Medical men can scarcely be aware of the extremely low rates ruling for quinine in the wholesale market, or they would not refrain from prescribing it on economical grounds, as too often happens. At present, as is the case with meat and bread, no one except the middle men are deriving any benefit from the unprecedented cheapness of the article. Until this matter is more fully gone into, and requisite retail competition secured, or else the preposterous charges now ruling fully exposed throughout this country, many of those in dire need of its beneficial effects are destined to be deprived of what is theirs by every right of man, through the self-seeking monopolists, who are not content with a profit of less than 150 per cent on the retail of this article alone.

The statistical position of the raw article is by no means unfavorable comparatively. January, 1886, opened with a stock of 62,217 packages of all barks, against 80,874 packages at the corresponding period of the previous year, and although the export from Ceylon shows an increase at the end of April of some three million lb. over that of the previous year at the same date, the stocks in London at that date were 63,951 packages against 78,925 in 1885, and 99,010 packages in 1884. The deliveries for the first four months of the present year amount to 21,100 packages against 18,634 packages in 1885, and 20,094 packages in 1884; the total landings for these months being 22,804 packages. It is unlikely that the present depression in quinine and bark will be of long duration. It has its origin from one or two causes, as specified above, the result of which will so re-act on both raw and manufactured articles as to curtail the supply, and so with the increased demand which time is sure to show, we may look for steady and progressive markets later on in the year. At the same time shippers should be warned of the necessity of checking their supplies as much as possible until the market has time to right itself.

INSECTS ON THE MANGO TREE.

Tattovancotty, Pallai, 14th June 1886.

Dear Sir,—I enclose in a match-box some leaves from a young mango-tree with what I believe to be the nest of some insects. I shall be obliged by your kindly ascertaining for me the cause; and, if injurious, what remedy should be used.

In a back number of the *T. A.*, a correspondent mentioned that the leaves of the kekuna, if put in a barrel and placed about a coconut plantation, would attract and kill beetles. What is the Tamil name for this plant.*—Yours faithfully,

FREDK. MORTIMER.

[Our entomological friend tells us :—" The excrescences are galls produced by the punctures made by some minute hymenopterous insect with its ovipositor in laying its eggs. The larva hatched from the eggs, reside in and feed on the galls, which increase in size with the growth of the larva—when the latter have arrived at the perfect state, they bite small circular holes through the substance of the gall, and make their escape. They do little or no harm."—Ed.]

THE "TROPICAL AGRICULTURIST" AND PLANTING IN SOUTHERN INDIA.

Naduvatum, Neilgherries, 15th June 1886.

To the Editor of the "Tropical Agriculturist."

Sir,—May I take the liberty to suggest that your valuable periodical would be still more useful to all Indian tea planters if you could see your way to add a couple of pages devoted to the account sales of *Indian* tea in London. I am sure the Indian subscribers, at least, would gladly pay an enhanced subscription for this extra. For the sake of obtaining this information I had intended subscribing to the *Indian Tea Gazette* but when I summed up the amount of information contained in a specimen copy, it seemed to me that I would be fain to comfort myself somewhat after the fashion Mr. Spurgeon recommends with regard to poor sermons when he remarked: "Though there is not much in the sermon you always have the *text*." (For "text" read "statistics"). However I thought better of *that* investment!

Perhaps you may be interested to hear of the outturn from a coffee estate in these parts which in spite of drought, leaf-disease &c., &c., gives its 20 cwt. per acre! The secret lies chiefly in *judicious* irrigation about blossom time. The cattle-manure, when applied, is not left to rot on the roots of the coffee bushes and thereby bring on a heavy dose of leaf-disease, but the "tap" is immediately turned on and very soon the manure is transmuted into a rich, but harmless, mould. The coffee bushes on this estate are never pruned, so that the bushes (or rather trees) have never been abnormally forced.

I trust to forward you copies of a rather voluminous correspondence with the Director of Agriculture at Madras, as soon as I can find the leisure.—Yours faithfully, NOVICE.

P. S.—A tremendous gale of wind here for the last forty-eight hours. Rainfall yesterday 5 inches.

June 16th.—The future lies with those planters who have had sufficient foresight to reserve a large area for grazing purposes. In many districts planters are obliged to resort to stall-feeding. On the western slopes of these hills the pasturage is unequalled in quality in the whole of India and the area is ample. A correspondent writes of miserable crops of coffee this season in Wynaad and is of opinion that cinchona will eventually be barked only once in two years in the Wynaad district.

Would it meet our correspondent's views if we gave the tea sales for Southern India, that is the Neilgherries estates, in the *T. A.*? Our South of India subscribers are numerous enough to claim this attention, but those in the North are, so far, a limited constituency.—Ed.]

* "Canarium Zeylanicum" is the botanical name but we on find no Tamil name. The Tamil name of *C. strictum* is *Kongilum marum*.—Ed.

ENEMIES OF THE COCONUT PALM:—No. I.

Pallai, 17th June 1886.

Dear Sir,—In the accompanying match-box I send you a beetle which has lately been committing a considerable amount of havoc amongst my young coconut plants, just two-and-a-half years old. Its mode of attack is to bore through the outer covering of mature leaves just below the surface of the soil, and to regale itself on the tender, undeveloped leaflets inside. The specimen sent you was extracted from a plant this morning, by means of a penknife, while it was busily engaged in its work of destruction.

Can you let me know whether it is the genuine "black-beetle" the *kuruminiya* (small specimen) of the Sinhalese or an entirely new enemy of the coconut plant? I have hitherto been under the impression that the *kuruminiya* was a much larger beetle than the one under review, and that, moreover, it was provided with a pair of formidable forceps to enable it to penetrate the tough outer coating which envelopes the heart of the coconut. The only weapon of destruction which the accompanying "varmint" appears to possess is the horn on the top of its head, which gains for him the familiar name (and the only one by which I have known him) of the "*rhinoceros* beetle."

If he really is the *kuruminiya*, could you or any of your readers kindly suggest a ready and effectual means of combating his attacks? I have been thinking of trying kerosene oil, but I see a writer in your compilation—"All about Coconuts," declares it to be quite useless in preventing the ravages of the "black-beetle." Yours faithfully,

COCONUT PLANTER.

No. II.

Pallai, 21st June 1886.

Dear Sir,—Will your entomological referee kindly oblige me with the names of the grub and beetle contained in the accompanying parcel, and also tell me whether they belong to the same, or to two distinct species? In other words; does the grub develop into the beetle? One would suppose so, as they are generally found together, nearly every decayed coconut stem containing from fifty to a hundred of the former, and one or two of the latter.

The beetle is of the same kind as the one sent you by me the other day, and which I mentioned as being so destructive to my young coconut plants. If they are allied to the grubs which are found in such large numbers, it is high time a war of extermination were carried out against the latter pest. Trusting the parcel will reach you safely, I am, yours faithfully,

COCONUT PLANTER.

[Our entomological authority states :—" The two beetles referred to in "Coconut Planter's" letters of the 17th and 21st instant are rhinoceros beetles, belonging to the family Dynastidæ, and the large white grub is the insect in its larva state. This beetle is the Kuruminiya of the Sinhalese. It does immense damage to coconut plants and trees. The natives extract them from the trees by pushing down a long wire rod barbed or hooked at the end, which transfixes the insect and admits of its being drawn out of its hole."—Ed.]

FIBRES AND THE FIBRE TRADE: THE SO-CALLED CHINESE MULBERRY BARK.

Colombo, 19th June 1886.

Dear Sir,—With reference to your note to Mr. Edward Heyman's letter yesterday, I believe that the bark referred to is not that of a real mulberry but that which is called the paper mulberry, the *Broussonetia papyrifera*, so commonly used for paper and cloth in China, Japan and the South Sea Islands. I cannot see any reference to the bark of the white mulberry having been used as a useful fibre with the exception of the one which I now send you.

Your readers will find useful articles on the paper mulberry tree in the *Tropical Agriculturist* for 1880-1 pp. 302 and 448, and I think it is to the bark of this plant only your correspondent refers. If it is now growing in Ceylon it must be as a rare plant.—Yours, W. F.

(*From Balfour's Cyclopædia.*)

"It is probable that most of the species of the genus Morus have bark of a sufficiently fibrous nature. But few, if any, seem to be turned to this useful account. Yet the bark of the White Mulberry seems from very early times to have been made into paper in China; for Marco Polo informs us that "the Grand Khan causes the bark to be stripped from those Mulberry trees, the leaves of which are used for feeding silk-worms, and takes from it that thin rind which lies between the coarse bark and the wood of the tree. This being steeped, and afterwards pounded in a mortar until reduced to a pulp, is made into paper, resembling that which is made from cotton."

NEW MARKET FOR CEYLON TEA:—THE MANUFACTURE OF GREEN TEA SUGGESTED.

Yatiyantota, 19th June 1886.

Dear Sir,—I am glad to see that the Ceylon planters have at last decided to take joint action in the endeavour to find fresh outlets for our teas, but I think the most important point is to try and stop the (now rather frequent) complaints of deterioration and falling-off in quality of our tea, as we should have little to fear from an overstocked market if we could always place teas of *uniform* good quality in the hands of our London brokers and thus secure a first place and the full confidence of the public; and the best way to effect this is to make all our new leaf (from recently-pruned bushes) *and all leaf that cannot be properly withered*) into *green tea*. The first flush from pruned bushes which is so useless for black tea makes the best green tea, usually valued at from one to two annas per lb. higher than that made from subsequent flushes, and as leaf intended for green tea is put into heated pans immediately it comes from the fields and withered in five minutes, the only two *legitimate* excuses a superintendent has to offer for making inferior teas are entirely done away with. But so long as we are compelled to manufacture *all* our leaf into black tea, we cannot hope to gain the confidence of our customers as to entirely stop the complaint. Fully one-third of our shipments are spoiled by new leaf, and who has not at times found it impossible to wither leaf well, either from the weather being too wet and cold or too hot and dry, want of sufficient space during a rush or other unavoidable causes?

It would be taking up too much of your valuable time and space were I to attempt here to prove all the arguments in favour of converting a portion of our crop into green tea, so I will content myself by merely mentioning a few of the principal points in its favour which I am prepared to discuss (either through your columns or at the meetings of the P. A.) if asked to do so, and I believe I could prove these to the entire satisfaction of all interested parties;—

1st.—That the first cost to individual proprietors in purchasing and setting up the necessary apparatus for manufacturing green teas would not exceed R50 each.

2nd.—Even should it be found necessary to abandon the enterprise through inability to find a market for green tea, the said R50 spent on the apparatus would not be entirely thrown away.

3rd.—An intelligent *black* tea maker could learn the work by two or three lessons in as many days.

4th.—The chances of finding a remunerative market for all the green tea we might have to make (in order to improve and maintain a uniform quality in our black tea, say, ⅛ our total outturn) are by no means small, and at least as good as we have of finding fresh outlets for *black* teas. All information on the above points will be supplied if asked for.—Yours truly,

OLD PLANTER.

P.S.—As another means of improving our tea (and perhaps lengthening the life of our bushes), I would strongly recommend a heavy pruning only once in 18 months instead of yearly; but more of this anon.—Yours, etc., O. P.

[America still consumes some green tea, but the great market on which the Indian planters counted in Central Asia seems now to be very limited. Pity it is that the practice of adulteration should have excited a prejudice against all green teas.—Ed.]

Java and Fiji as Sugar Producers.—Mr. Mason of Fiji in arguing for confederation and protection to colonial produce, instituted an astounding contrast, thus:—"I may tell you that at the present time labour in Fiji costs 1s 6d a day for every man, and in Java 6d. That is one of the reasons why you in London can buy sugar at the grocers cheaper than you can buy the article at the mill in Fiji."

Mr. Jackson's Tea Machinery.—The letter in another column from Mr. William Jackson the well known and very successful tea machinist, is worthy of and will doubtless receive the best attention of our planter readers. It is called forth by some remarks from Mr. James Irvine in which that gentleman failed to do justice to the solid and lasting character of Mr. Jackson's machinery, while he did not discriminate, as Mr. Jackson points out he ought to have done, between Sroccos, the plates of which are heated by the direct action of flame, and the plates of the Victoria and Venetian Driers which receive their heat from a multitubular arrangement of stout iron. Of course no material exposed to heat or friction can last forever, but Mr. Jackson is justified in dwelling on the facts that none of his stoves have as yet shown any signs of the destructive action of fire while some of his rollers are still working in Assam after a lapse of sixteen years. We are but expressing the opinion of all who have seen the Venetian Drier, when we say that it comes as near perfection, for the purposes for which it is intended, as any handiwork of man can reach. From the moment the withered, rolled and fermented leaf is put in at the top, it is not, necessarily, again touched by the human hand until it emerges below as fully roasted tea, after having fallen from one series of plates to another as the action of a handle is applied. The Victoria is a still more advanced machine and calculated to do more work in a given time, but is considerably more expensive, and a shrewd planter speaking to us on the matter of tea roasters recently, said he would rather have two Venetians than one Victoria machine; because if the one Victoria went out of order the work would come to a standstill, while even if one of the Venetians were disabled the other would be available.—We have not yet seen Mr John Brown's Tea-Dryer, which is also self-acting and highly spoken of.

"My Poultry and How I Manage Them by an Indian Henwife," * is a first-rate book of practical hints on the rearing of poultry, and being written for Indians is of more value to us in Ceylon, than English manuals on the subject. This little pamphlet of 40 pages contains eight chapters, of which subjects are: I. Houses, Sheds, &c.; II. Breeds to Keep; III. Crosses; IV. Management, Food, Cost; V. Sitting Hens, Nests; VI Hatching and Rearing of Chickens VII. Slight Ailments and some Diseases of Fowls; VIII. General Remarks and Hints.—Reading the book over carefully and weighing the directions, we note so many points of importance not generally known or understood that we feel inclined to quote largely, or better still to advise the reader to invest in a copy. In the chapter on management, the writer insists on the importance of regularity and cleanliness. We will now give a sample of the hints:—

According to season and weather the birds ought to be let out of their houses as early as possible, either into their yards or their shed; they enjoy the cool fresh morning air and almost invariably run off to drink water; therefore their trough, or tin-plate, or earthenware vessel which holds the water, having been emptied and cleaned the night before, must be filled at once with clean fresh water; do not let the fowls wait too long for their morning feed, which ought, if possible, to consist of soft food. The house or box ought then to be cleaned and scraped, perches occasionally wiped over with a rag damped with kerosine oil, grass in nests shaken up or renewed, stray feathers picked up either in yard or house, as the birds might be tempted to swallow them. If the fowls have a grass-run, so much the better; if not, grass or vegetables cut up must be freely given once a day; and, perhaps, a scanty feed of corn of some sort in the middle of the day; at that time also the water ought to be renewed, except in short cold winter days, when it might not be necessary. Shortly before the birds go to roost in the evening a good feed of sound grain ought to be given, for a long night is before these always hungry creatures. All dry grain is best given to fowls by being thrown far and wide over the ground.

Great care should be taken not to make the food too moist, only enough milk or water must be added to make it crumble: season with a little salt, and when cold or very damp with a little cayenne pepper. Potatoes or the peel only boiled soft, cabbage, turnips or any other vegetable cut up and boiled and mixed with bran, barley-meal or ground Indian-corn is excellent food; onions, chives, garlic, raw and cut up fine, then added to the above mess is most wholesome.

Where only a few fowls are kept, sufficient scraps of meat will be had from the table to supply their want for animal food; when at liberty, they forage for themselves, but in confinement it must be given, or they will fall off in condition and laying, and by-and-bye they begin the vice of feather-eating.

In summer a piece of sulphur should be put into the drinking-water; during the rains or cold weather a few drops of a solution of sulphate of iron every other day in the drinking-water is bracing and useful.

Speaking of the quantity of food required by each fowl, they say:

Four ounces, or two chittacks, of grain per diem for each grown-up bird is about a fair average of what will keep a fowl in good condition and laying order, provided animal food and green food is added on to it.

In answer to the all-important question: "can you make it pay to keep fowls"? The author gives the following calculation:—

Supposing a hen of your own rearing stands you at six months old R1-4; she begins to lay at that time, and being a fair average layer, lays in a year's time 160 eggs, value R5; you kill her and value her at the lowest at As. 8 as a table-fowl; meanwhile she has cost you a year's feeding at 1 anna per week=R3-4+R1-4 as by above=R4-8 against R5-8; you have enjoyed your eggs and the fowl on your table and you made the profit of R1 in 18 months on an outlay of R4-8, not taking house and attendance into consideration; nor, on the other hand the pleasure you derived from the bird.

But we must leave the poultry-keeper to study the book itself it he would fully understand the business of managing his birds.

The Ceylon Tea Houses at the Exhibition are thus noticed in the London letter of the *Indian Planters' Gazette*:—

I was very pleased to see at the Exhibition that the exhibits of Indian teas stand solely upon their own individual merits, and that the name of the agents appointed by the Indian Tea Districts Association to represent the Association and take charge of the Indian tea exhibits nowhere appears in connection with the display of the samples. This is in itself noteworthy, and fair-play requires that it should be known that no advantage whatever has been taken for advertizing purposes of the opportunity afforded. Whether this is due to the right feeling of the firm or to stipulations made by the Association in the contract, I know not, the fact remains, and that, so far as the industry is concerned, is the chief point. I did not enter the tea-room where Indian tea is sold in the cup, and I must therefore withhold any remarks upon that section. I did, however, avail myself of two of the Ceylon tea-houses, and this from the accident of their positions being favourable for sight-seeing, an accident which I am thereby induced to think will count for much in the patronage bestowed by the public, which will, from this happy circumstance, flow more readily towards Ceylon than towards India. This accident of situation, coupled with the excellent quality of the tea sold in the Ceylon tea-houses, is a decided advantage not to be estimated too lightly in the race for favour at the Exhibition. Ceylon has certainly luck as well as enterprise on her side. Thus, the chief attraction, so far as exhibits are concerned is decidedly the "Durbar Hall and its native artisans in the court-yard thereof." "Old London" is perhaps the next most popular detail. These two are *vis-à-vis* and at their very doors Ceylon has an attractive tea-bungalow, with tile-pictures of tea gardens set in the tile wall. Here the tea is excellent and served by Sinhalese "boys" in their native costume. An old ruddy Falstaffian John Bull hailing from northern latitudes, sitting at a neighbouring table, felt sorely taken in, when, having been supplied with his tea-pot and regulation three biscuits, light as snow-flakes, he found that "bread and butter," "buns," &c., were not to be had on any terms, biscuits being the only edible provided at these tea-houses. At these biscuits he looked askance: his massive fists had no grip sufficiently delicate to raise such trifles without pulverizing them ere raising them from the plate, and he knew it, and refrained from the attempt, looking at them from time to time between the sips and cooling puffs blown from his porcine cheeks, as though he should like to take "them things what they give him for his 'tea' and naught else" home to his family hearth and frame them as mementoes of "the ceremony at which he saw the Queen and all the Royal family, and them things too is all them there Londoners' appetites is fit for at tea-time!" Doubtless, like the rest of us, he sometimes judges by solitary experiences. He had been there a quarter of an hour when I left but he had not in that time made up his mind as to how he could get them into his hat without crushing them into dust, but he did want to take them away badly, even the elephants on Scindiah's gate-way saw that. Again, outside in the grounds, on the most frequented walk and offering the best view of the illuminated fountains, Ceylon has a row of tea-houses as last year. The Indian tea-house, though *vis-à-vis* on the opposite side of the grounds and offering perhaps almost as good a view, is not stumbled upon in the ordinary course of a visitor's walk and has to be almost searched for to be found. More Indian tea-houses are required, and perhaps may be in preparation, though not yet opened.

* Published by C. J. A. Pritchard, 19, Lal Bazar Street, Calcutta, 1886.

Coffee Crops in Coorg.—Mercara, 21st June—The prospects in Coorg for next coffee crop are poor and I doubt if it will be much over half the last. Rain in South Coorg fell early but the result have not been satisfactory. In North Coorg it fell late but after the blossom came out showers damaged it. So altogether planters have made up their minds to make the best of it by practising economy as far as consistent with fair cultivation.

The Market Value of Tea Property in India.—In the Report of the Dooars Tea Company the astonishing fact is mentioned that an estate consisting of 2,200 acres of excellent tea land, 400 acres of which were under tea of the best quality, had been offered to the Company for £6,000, or little more than £2 10s per acre! As mere forest land, the place would be cheap at this rate. The place must surely be unhealthy and the labour supply difficult to keep up.

Quinine Production.—We learn from a home contemporary that "there are now seventeen quinine factories in the world—six in Germany, four in America, three in France, two in Italy, and two in England. The annual production amounts to about 2,250,000 ounces." We believe this must be under the mark. As regards "Dutch Quinine," the *Chemist and Druggist* states:—

"The shareholders of the Amsterdam Quinine Works met on April 30th last to consider the position of the company, and to hear the annual statement referrring to the course of the business in 1885. The accounts show an absolute loss of over 40 per cent of the paid-up capital; and under these circumstances the shareholders were asked to decide as to the continuation or winding-up of the concern. No decision was arrived at, and the meeting adjourned pending the result of certain negotiations now being carried on by the board of directors."

From the *British Trade Journal* we quote:—

"Several Amsterdam firms have petitioned the Dutch Minister for the Colonies in favour of increasing the number of Government auctions of cinchona bark from two to eight per annum, in order that Amsterdam may be better able to compete with foreign markets where regular sales are held."

A Ceylonese Student at Cirencester.—It is interesting to learn of the progress of Mr. Drieberg, junior, of Colombo, at the Royal College, Cirencester. He entered there in September last, after taking his B. A. degree at Calcutta, where he was a student both at the General Assembly, and Presidencye College. Mr. Drieberg intends taking the full coursd at Cirencester of 2½ years, and also the diploma of the Royal Agricultural College, London. From the "Class and Prize list and Diplomas for the Spring Session 1886" (at Cirencester) we learn:—

The following deserve Honourable Mention:—(Qualifying marks 2,250), Dricberg, 2,279; Agriculture.—600 Marks, Class 1 B., 7 Drieberg, 498; Farm Journal, Class 1 B., Drieberg, Highly Commended; Class 1 B.—Mineral, 6 Drieberg 459; Chemical Manipulation, Drieberg, Very Highly Commended; Book-keeping 300 marks, Class 1 B., 4 Drieberg, 282; Class 1 B.—Pneumatics, 1 Drieberg, (Hon. Cert.), 291; Class 1 B., 8 Drieberg, * 237; Class 1 B.—Mensuration, 9 Drieberg, 222. Veterinary Medicine and Surgery.—300 Marks, Class 1 B., 8 Drieberg, 217; Practical work at the Veterinary Hospital and Hospital Journal. Class 1 B., Drieberg, Commended. The following have passed the Preliminary Examinations for the Diploma of Membership in their respective Classes in order of Merit:—Class 1, Drieberg.

Mr. Drieberg ought certainly to come out well-bualified for practical work in Ceylon or any other colony.

* Has still to pass in identification of Fossils.

Good for Coconut Oil.—Some comparative experiments, conducted under the superintendence of the Hydrographic department of the United States Navy, as to the efficacy of oil in calming heavy seas, are reported to have demonstrated that the use of mineral oil for the purpose is not to be recommended, but that the importance of carrying a supply of vegetable or animal oil, to be used in emergencies, cannot be over-estimated.—*Pharmaceutical Journal.*

Esparto from Almeria.—In consequence of the increased use of wood-pulp in the manufacture of paper, the export of Esparto from Almeria to Great Britain has decreased, the amount shipped last year being 12,000 tons and the average price £5 5*s.* per ton free on board. From Oran and other African ports large shipments of Esparto were, however, made. —*Gardeners' Chronicle.*

Indian Labourers in Mauritius.—*Commercial Gazette* discussing a question of the wages, writes:—By all means let men be paid the full current value for their labour—but no more; and, in the purchase of that labour, the Director of the Botanical Gardens, who is the best judge of its value, should be left to decide what it is worth. We are pleased to see that His Excellency the Governor pledged the government to adopt the course here pointed out. We cannot, however, agree with His Excellency that a coolie drawing R240, or even R192 a year, can be correctly called a *poor* labourer. Compared with an English, Scotch, or Irish labourer we should call him a rich man. By preference he elects to live upon a handful of rice; whilst his clothing consists of a pocket handkerchief and a gunny bag. Shoes and stockings he wears none, and his laundry expenses do not amount to much. He has, or might have a respectable deposit in the Savings Bank, or, if he has not, he has most likely a respectable sum buried under the mud floor of his hut. Our envy was excited only the other day by the sight of thirty good sovereigns worn as a neeklace by an Indian lady whose clothes would have borne—washing! By all means let these people be paid the full value of their labour whether that value be high or low. But let us not talk of them as "poor" people when their earnings are, relatively speaking about three times the amount which Europeans receive both for manual and brain work

Kapok.—A short notice regarding the cotton, known as "Kapok" in Java, appeared in the proceedings of the Horticultural Society of India for Nov. last, since when Dr. Baumgarten of that place was addressed on the subject as there seemed some obscurity as to the name of the tree yielding it; he writes as follows—"Enclosed, I send you seeds of the Kapok tree, and some of the Kapok itself, though the plant grows everywhere in India, especially in Bengal. The quality of the cotton is much superior here, though, and I attribute this to the greater heat of our dry season. The Latin synonyms are Gossampinus alba, *Humboldt*; Bombax petandrum, *Linnæus*; Eriodendrum anfractusum, *Decandolle*. The Kapok in only used to fill up mattresses, chicks, etc. So far as I am aware there is in the whole of Java no Kapok plantation. In each village there are some trees, the fruit of which is sold by the natives for one rupee per thousand. When cleaned the price is R30 to 50 per picul (*i.e.*, 130 English pounds) the price is now very high, but I don't doubt it will rise more when the use is more known. Several people here tried to make from the Kapok tree a culture, but all attempts failed, the cause of which must be sought in the enormous salaries." [We learn that the Ceylon trade which had grown to be of some importance to natives and others in the Colombo and adjacent districts is in danger of being superseded by the cheaper supplies which can be got from Madras, Bombay and Calcutta.—Ed.]

THE COLONIAL EXHIBITION.

British Guiana,—The collection from this colony is closely contiguous to that from the West Indies. The entrance to the court is flanked on either side by magnificient squared trunks of green-heart (Nectandra Rodiæi) and Mora (Dimorphandra Mora, better known as Mora excelsa). The first of these is one of the tallest of the forest trees of the Guiana forests, growing in clay soil near the rivers and creeks. Logs, it is said, can be obtained from 18—24 inches square and 70 feet long. Greenheart is one of the most durable woods known, and it is one of the eight first-class woods at Lloyds. It is used for ship's keels, and other timbers for house framing, mill timbers, wharves, and, indeed, for almost every purpose where great strength and durability are necessary. The bark is well known in medicine under the name of Beeberu bark, and is the source of the alkaloid Beeberine, which is used as a tonic and ferbrifuge in place of quinine. The seeds are also used medicinally by the natives in cases of diarrhœa, and when ground mixed with other meal are used as food in times of scarcity. The Mora is an extremely strong and durable wood, and is not only used extensively for outdoor work and ship-building, but also makes good durable furniture, though somewhat too heavy for ordinary kinds. Several varieties of the trees are known in different localities, each having a distinct name. The tree grows to a height of 200 feet, and logs can be squared 24 inches. The bark is used medicinally in dysentery and also for tanning, and the large seeds are ground to a meal, ond mixed with Cassava as an article of food.

Besides the two woods here mentioned, which are the principal timbers of the British Guiana forests, there are many others of very great value, the botanical source of a large number of which is unfortunately still unknown. An excellent collection of some seventy-eight samples of the woods of the colony are exhibited by Messrs. Park & Cunningham, of Georgetown, whose aim is to bring them to the notice of English cabinet-makers with a view of introducing them to the English commerce. By far the most beautiful wood for cabinet-work, however, is the Letterwood (Brosimum Aubletii), which has a reddish-brown ground and black wavy markings representing letters, or rather the marking of a leopard skin. This wood is valuable for inlaying and for making choice walking-sticks; it is hard, and takes a splendid polish. The tree is not abundant, and in the largest trees the heartwood, which is the figured part, is but small —a tree of 20 inches diameter, having only 7 inches of heart. Two telegraph poles of Wallaba (Eperua falcata), as prepared for use in Georgetown, are exhibited. These posts, it is stated, do not require treatment with tar or other preservative, and last from fifteen to twenty years, even when placed in marshy situations where they are surrounded with water for weeks together. The trees are very plentiful, and grow to an average height of 80 feet.

Besides woods themselves, wood products are also largely shown, notably the Woodskin canoes which the Indians make from a single piece of bark stripped from the trunks of Hymenæa courbaril, or the Locust Tree, and from the Purple Heart (Copaifera pubiflora), and C. bracteata. These canoes are sometimes made large enough to accommodate fifteen or sixteen persons.

Amongst food products of the colony, those of the bitter Cassava plant (Manihot utilissima) deserve a notice. Cassava meal, Cassava bread, and Cassareep are all fully illustrated. They are described as "very important articles in the cookery of the Indians, the former being the 'staff of life,' and the latter its sauce. Cassareep is the principal ingredient in the famous 'pepper pots,' and may be used as a sauce in European cookery." Cassareep does indeed come to this country, usually in ordinary black wine bottles, and forms an excellent adjunct to stews and hashes.

Some remarkably fine samples of Balata are exhibited. This substance, it will be remembered, has been recently treated of in an elaborate and exhaustive report by Mr. Jenman, the Government Botanist of British Guiana. It is intermediate in character between gutta-percha and india-rubber. It has very great strength, and as it does not stretch under tension it is unequalled for machine-bands and similar purposes. On the whole, the British Guiana collection is one of much interest.

Hong Kong.

This collection does not contain anything very striking from a botanical point of view. There is a good collection of eighty-six specimens of Chinese woods, which were collected and named by Mr. Charles Ford, of the Botanical Garden, Hong Kong. There is also a fine collection of the now well-known China matting, which Dr. Haast has shown is made of the culms of Cyperus tegetiformis, the varieties of designs and patterns of which are, for the most part, extremely good. The numerous applications of rattans and bamboos for a variety of articles of domestic use are also of considerable interest; besides which there is an extensive collection of Chinese drugs, a large number of which are of vegetable origin; they are, however, not in a very satisfactory condition, either with regard to the specimens themselves or their labels.—*Gardeners' Chronicle.*

ESPARTO AND DATE PALM IN TUNIS.

Consul-General Playfair has recently furnished to the Foreign Office a very interesting report of a consular tour along the coast of Tunis in October and November last, from which we abstract the following notes. Writing of Susa, Mr. Playfair says the principal articles of export are olive oil and Alfa or Esparto-grass. The trade in this latter, it is said, ought to be the most important on the coast, but it is being rapidly annihilated, owing to the unwise restrictions placed upon it by the Tunisian government. This valuable fibre is found in Algeria, Tunis, and Tripoli. It was first brought into use by Mr. Lloyd, owner of the *Daily Chronicle*, who had an establishment at Oran, and up to the present time the trade has remained almost entirely in the hands of the English. In Algeria it is encouraged in every way. Two lines of railway have been constructed to convey it to the coast. Nearly 100,000 tons a year are exported, and there is no duty whatever on it. In Tripoli also, which exports 60,000 tons per annum, it is free. In Tunis, on the other hand, the duty is most onerous, and, strange to say, not uniform at all the ports The most highly taxed is that shipped at Susa, as the fibre there is erroneously assumed to be of better quality than that of Sfax.

Referring to the Lotus of the ancients, Consul Playfair says:—"Much controversy has arisen regarding the plants which so enchanted strangers as to tempt them to desert their companions and their fatherland. The passage in the *Odyssey* (ix. 90) is as follows:—'On the tenth day we set foot on the land of the Lotus eaters. . . . Now when we had tasted meat and drink, I sent forth certain of my company to go and make search what manner of men they were who live here upon the earth by bread, and I chose out two of my fellows and sent a third with them as a herald. Then straightway they went and mingled with the men of the Lotus eaters, and so it was that the Lotus eaters devised not death for our fellows, but gave them of the Lotus to taste. Now whosoever of them did eat the honey-sweet fruit of the Lotus had no more wish to bring tidings nor to come back, but there he chose to abide with the Lotus-eating men, ever feeding on the Lotus and forgetful of his homeward way.'

"Most writers have been content to follow Shaw, generally the most accurate of observers, who identifies the Lotus with the *seedra* of the Arabs, the *jujube* or fruit of the Zizyphus. The wild variety is the common scrub of the country near Algiers, where Shaw resided; it becomes less common as we approach the south, and I neither saw nor could I hear of

the existence of a single plant in Djerba, which island Shaw never visited. No human being who had ever tasted its fruit once would care to do so again; it is not, in fact, possible for either man or animals to exist upon it. There is a cultivated variety somewhat more palatable, but still it is by no means a luscious fruit, or worthy of immortality. It seems to me unnecessary to go out of the way to search for the Homeric food; the island is covered with it at the present time; no greater blessing than it was ever bestowed by Providence on man, and no other fruit is so all-sufficient for human sustenance as the 'honey-sweet Lotus' of the ancients—the Date of the modern Arab.

"The Date of Djerba is excellent, though inferior to that of the Djerid, which is certainly the finest in the world. This latter, however, is always found abundantly in the Djerba market. As this is the first place where the Date forms the daily food of the inhabitants, at which coasting vessels from the east would touch, the fruit would naturally produce a deep impression on travellers. The wine made from the sap of the tree is as familiar as the fruit itself, and may have contributed to render the sailors oblivious of 'their homeward way.'"—*Gardeners' Chronicle.*

THE HIMALAYAN LARCH.

The Himalayan Larch (Larix Griffithii), was discovered in the Bhotan Himalaya by the celebrated botanist and traveller, Dr. W. Griffith, whose enormous collections of plants lay, for many years after his death, buried in the cellars of the old East India House in Leadenhall Street; nor was the tree known to botanists till it was re-discovered by myself in the East Nepaul and Sikkim Himalaya in 1848. It is the only Indian species of the genus, and it is a remarkable fact that Larix is the only genus of Conifers which is common to Europe and India, and which is not found in the Western Himalaya. The genera are Pinus, Abies, Picea, Tsuga, Cedrus, Cupressus*, Juniperus, Taxus, of which all but Tsuga, Cedrus, and Cupressus occur throughout the length of that vast range, the exceptions being that the first of these is confined to the Central and Eastern Himalaya, and the two others to the Western half, as Larix is to the eastern. Turning now to the distribution of the other Old World Larches, L. Europæa occupies a very narrow area, along the great mountain ranges of Central Europe, from Dauphiny to Styria, and is found nowhere to the north or south of these limits. The Siberian Larch, L. Ledebourii, has its western limit in North Russia and the Ural, reappearing eastward at intervals throughout Northern and Central Siberia, and southwards in the Altai Mountains. L. dahurica begins in the country from which it takes its name, and advances thence eastwards, and no doubt these or other species occur in the mountains of Western China. Thus there appears to be a great gap in the distribution of Larix, extending from Styria to the Eastern Himalaya, for no Larch has been found in Greece, Turkey, the Caucasus, Asia Minor, Syria, Persia or Afghanistan, but curiously enough, this interval is to a great extent occupied by Cedrus, which, commencing in the Western Himalaya, is continued on thence to Afghanistan, and reappears in Syria, Asia Minor and North Africa. When we become acquainted with the geological ages at which these genera first appeared on the globe this fact in their distribution will, no doubt, prove to be of great significance.

The Himalayan Larch (Larix Griffithii, Hooker fil. and Thompson) is a small tree, not exceeding 40 feet in height, with precisely the habit of L. Europæa, var. pendula, which it so closely resembles as to have deceived myself and others. It differs from that plant in the very large cones with very long points to the exserted bracts. It is called Sah or Saar by the Lepchas of Sikkim, and Boarga sella by the Nepalese, who informed me that it was found as far west as the heads of the Cosi river in Eastern Nepaul. It occurs only towards the heads of the valleys near the snows, many miles from the plains of India, at elevations of 10,000 to 12,000 feet, and where I first saw it it clothed old moriones; and though subsequently met with on grassy or bushy slopes, it was only when there was much rock and free drainage. The wood is regarded as the most durable of all the Sikkim Conifers, and is easily split into planks, but all of those that I met with were small, soft, white; I never saw any hard, close-grained red wood, like that of the Larch in Switzerland, which may be accounted for by the extreme witness of the Sikkim climate.

The cultivation of the Himalayan Larch in Europe has hitherto proved a total failure, at least as far as I have ascertained. I sent quantities of the seed to Kew in 1848, which germinated freely, and hundreds of plants were raised and widely distributed but in every case these succumbed, in a few years, to virulent attacks of Coccus Laricis. Repeated importations of the seed into Kew and elsewhere have met no better fate. I have often been shown L. Europæa for L. Griffithii, sometimes with the most positive assurance that the tree was received as such from Kew, but in no instance have these borne the unmistakeable cone of the Himalayan Larch.—F. D. HOOKER.—*Gardeners' Chronicle.*

* Cupressus funebris, though found only in the Eastern Himalaya, is undoubtedly planted there, nor did I see it anywhere but close to temples or monasteries.

FORESTRY.

CONSIDERATIONS PRELIMINARY TO PLANTING.—Draining should be well attended to, and every foot of wet surface rendered sufficiently dry for the growth of trees. This does not, as is erroneously believed, necessitate the drains being deep—18—20 inches in depth, and 2—2½ feet in width at the top, being usually sufficient for clay, and 24 inches to 3 feet often required for moss. Deep drains are very objectionable in plantations, and where choice can be made, rather keep closer together, and make more of them for the same outlay.

The ground should be very closely examined, surveyed, and laid off, so as to enable the planting to be done in groups—such as soft moss for Norway Spruce, clay for Oak or Beech, gravel for Scotch Fir, loam for Larch, Poplars and hard woods.

All rank herbage should be thoroughly subdued according to its kind. Whins, Broom, Brambles, and such-like may be kept down by close cutting, while Heather and rank grasses are most properly subdued by burning; and where Heath is the principal growth it is to the advantage of the young trees that the Heath be burnt at least three years previous to planting. Next to destruction by rabbits I believe more injury is done to young trees by planting them amongst rank Heather and other herbage than any, if not all others put together. I have repeatedly witnessed plantations linger for years between life and death amongst rank Heather, and could only satisfy myself as to the cause of such unaccountably retarded growth by taking up some of the trees and examining their roots, when I found them so badly rooted that a tree 3—4 feet high would almost have gone into a 4-inch flower-pot without confining the roots, for the simple reason that there were scarcely any to confine. It is sometimes the wisest and best thing to do with a young plantation in that condition to set fire to it and burn off every vestige and to plant it anew with small plants suited to the soil and exposure, &c.

Some years ago a landed proprietor in Aberdeenshire sought advice about a young Larch plantation which he observed was not thriving. The trees were all growing amongst luxuriant herbage, and not a few amongst ferns, or rather Brackens. We suspected at once what was the matter, and dug up a tree here and there to show what was the cause of the slow growth and stunted condition of the trees. It is from the lower branches that a young tree derives its principle nourishment, and if these are deprived of their vitality from any cause it follows as a natural and certain result that the whole economy of the tree's

growth is interrupted, and in many cases the plant is thrown into a state of ill-health or chronic disease. If trees were only grown in accordance with the laws of Nature there would be little or no room for complaints about insects destroying them. Trees like everything else, have their natural enemies, but a great many insects found on trees, especially of the beetle tribe, are there, not as enemies at all, but from beneficent motives, or at least to do benevolent rather than malevolent work, by putting out of existence trees already diseased, dying or dead. Paring of the turf is also a plan often adopted and highly commendable, and when burning the surface is impracticable this is the best alternative system to adopt.

Boring the ground by means of the forester's footpick may or may not be considered a preparatory work, but rather an actual part of the planting itself. Be this as it may, it is generally done before the plants are put into the ground, although it can be done afterwards, as it sometimes is, and with very satisfactory results.

Another, and by no means unimportant consideration, preliminary to planting has reference to ornamental effect in the flat, tame landscape. Mountainous and hilly ground so very naturally indicates how and what to plant, that less consideration is there required than when the surface is uniform and level. The plain, however, usually consists of more fertile and valuable land than the mountain, and therefore the area that can be afforded for planting is correspondingly less. There is, however, in the plain a compensation for this of no small magnitude, namely, every single tree so situated imparts to the landscape, an effect equal, and often much superior to, a large area on the hill. From this it is not to be inferred that the plantation on high ground is not a prominent and commanding object, and usually seen from a greater distance than a tree on the plain; but what is here meant is, that a row of trees stretching across a plain district of country, or even a small group or a single tree, adds much more to the clothed appearance of the landscape viewed from nearly the same level, than an infinitely greater extent of plantation would do in an undulating district; it should therefore be kept in mind in preparing for planting what the real and true effect will be on level ground when the trees are grown up, in comparison with what is produced in a mountainous district, and that an acre, or even a single tree on the plain, is equal to many on the mountain side.—C. Y. Michie, Cullen House.—*Gardeners' Chronicle.*

Note on Quinine Sulphate, by Dr. O. Hesse.—This is part of a highly technical controversy and we content ourselves with quoting the conclusion of the paper in the *Pharmaceutical Journal*, thus:—"Commercial quinine sulphate contains a sensible percentage amount of of hydroquinine, and that for every unit of hydroquinine sulphate a result would be obtained the same as if 0·42 per cent of cinchonidine sulphate were present. It is for this reason that the amount of cinchonidine sulphate is generally indicated too high by several units per cent by the optical method. Instances have indeed been met with in which the optical method has given data indicating the presence of some two per cent of cinchonidine sulphate in material that did not contain a trace of it. This elucidation of the subject may at least suffice to show what value is to be attached to the statements of Dr. de Vrij as to the amount of cinchonidine sulphate in quinine sulphate, so far as they are based upon the application of the optical method of examination."

Care of the Hands.—The *Scientific American* says, "There are not nearly as many secrets in hand treatment as people imagine. A little ammonia or borax in the water you wash your hands with, and that water just lukewarm, will keep the skin clean and soft. A little oatmeal mixed with the water will whiten the hands. Many people use glycerine on their hands when they go to bed, wearing gloves to keep the bedding clean; but glycerine does not agree with every one. It makes some skins harsh and red. These people should rub their hands with dry oatmeal and wear gloves in bed. The best preparation for the hands at night is white of egg with a grain of alum dissolved in it. Quacks have a fancy name for it; but all can make it and spread it over their hands, and the job is done. They also make the Roman toilet paste. It is merely white of egg, barley flour and honey. They say it was used by the Romans in olden time. Any way, it is a first-rate thing; but it is a sticky sort of stuff to use, and does not do the work any better than oatmeal. The roughest and hardest hands can be made soft and white in a month's time by doctoring them a little at bed time, and all the tools you need are a nail brush, a bottle of ammonia, a box of powdered borax, and a little fine white sand to rub the stains off, or a cut of lemon, which will do even better."

Olive Oil in Tuscany.—In a report on the trade and commerce of Leghorn it is stated that the Olive crop during the season 1885-86 throughout Tuscany was very short. The yield of Olive oil is consequently estimated at barely one-tenth of a full crop. The fruit while still on the trees was considerably damaged by severe frosts, hence much of the oil made was of very inferior quality. Nevertheless, in a few sheltered localities the Olives escaped injury, and yielded oil of perfect quality, but the production of such oil has been on a very limited scale. Under these circumstances the prices of the finest qualities of Tuscan oil, which are generally considered much superior to the best growth of other soil-producing districts of Italy and of France, might have been expected to rule very high, particularly as in Tuscany stocks of Olive oil of the previous season's crop were quite exhausted. But, owing partly to good Olive oil crops in the districts of Nice, the Italian Riviera and Bari, and partly to the general trade depression and fall in values of almost every commodity, new Tuscan Olive oils have fetched comparatively low prices. The Olive trees are generally in fine condition, and promise well for next season.—*Gardeners' Chronicle.*

Cultivation of Cinchona in Europe.—In a recent issue the *Athenæum* quotes from M. Vogel (*Biedermann's Central Blatt*) that is a "very remarkable fact in relation to the chemical action of the solar rays, that cinchona trees growing in hothouses in Europe develop no quinine in their bark." This is contrary to the experience of the late Mr. J. E. Howard, who took a warm interest in the propagation of cinchona, in his own hothouses. On one of these he rote as follows in a paper contributed to the BritishwPharmaceutical Conference, 1880:—"I found that canker had invaded the plant to a serious extent; and, after trying in vain some heroic remedies, I determined to root up the calisaya, and if possible gain some useful information as to the cause of its death. The age of this tree was eight years, the height between 7 and 8 feet, but would have been much more had I not been compelled to cut off the top some years before in accordance with the requirements of my conservatory. Before doing this I succeeded in taking a strip along this upper portion and renewing the bark under moss, as practised in India. The girth of the stem at the base was 9¾ inches, and about 6¼ inches at the summit (where cut off). The result of the analysis of the bark of my tree was as follows:—*Calisaya Angelica quill*: 1·25 sulphate of quinine, 0·70 cinchonine, 0·15 quinidine. *Calisaya Angelica stem bark*: 3·20 sulphate of quinine, 1·50 cinchonine, 0 32 quinidine. *Calisaya Angelica root bark*: 3·95 sulphate of quinine, 1·00 cinchonidine, 4·00 cinchonine, 0·27 quinidine. This must be considered satisfactory for a tree grown under glass in England." This is a direct contradiction to Mr. Vogel's statement. We take it that what is meant is that the solar rays have the effect of decreasing the percentage of alkaloids, and not only so, but have the power of causing degeneration of the quinine. This is not a new fact. It was first observed by Mr. MacIvor, and no further back than last year Mr. David Hooper, Government quinologist of Madras, referred to the point in his paper communicated to the Aberdeen conference.—*Chemist and Druggist.*

ORANGES.

Practical information for busy, practical men is the demand of the times. We have been constantly in receipt of letters asking for information relative to tropical fruits, especially regarding the different varities of oranges familiar to this market. Mr. J. H. Wright, the well-known fruit dealer, who has already contributed through our columns the best articles extent relative to bananas and coconuts, has kindly given us a third article of exceptional value relating to oranges. The original paper was read on April 16 before, the Bayonne (N. J.) Scientific Club, and illustrated by an exhibition of twenty-five different varieties of oranges; the orange tree in full bloom, leaves and blossoms from the Government gardens, contributed by Mr. Wm. Saunders, Superintendent; microscopical exhibit of the orange blossoms and the living mites which live beneath the scales, so frequently seen on the outside of the orange, and various products made from oranges. Mr. Wright has since revised his paper and added thereto, and now places every reader under obligations to him for specific trade information, the result of the life study of one possessed of exceptional power of observation and the faculty of gathering information and making it tell for the benefit of others.

The orange, one of the most popular members of the citrus family (or as it was called by the ancients, the "Golden apple,") is probably the oldest known fruit in existence. Zealous euthusiasts trace it back even to the garden of Eden, and insist that the grape or forbidden fruit was the original golden apple which Eve plucked from the forbidden tree and gave to Adam; hence the name "forbidden" or "grape" fruit by which this species of the orange is known to commerce. Some ignorant and superstitious people still claim that the dark spots usually found on the stem end of "grape" fruit are the imprints of Eve's fingers which have appeared upon this species of the orange ever since the fall of Adam. And from this species of the citrus family it is claimed by some, sprang what is now known to us, as the orange. This fruit is now imported under the name of "grape" or "forbidden" fruit, deriving that name from its growing in clusters similar to grapes, and the dark spots, alluded to as the imprint of sin, being occasioned by one fruit pressing tightly against the other. The orange now flourishing so extensively from the tropics to the 42nd parallel of north latitude would lead many to suppose that it was indigenous to those parts where now found growing; but ancient historians and pomologists tell us that the true and original home of the bitter orange was India, and China of the sweet orange.

Galessio, who was the first to trace the history of the orange, asserts that the Arabs penetrating farther into the interior of India than any other foreign nation had done before, discovered the orange flourishing there and held in high esteem by the natives. So, from the jungles of India the Arabs conveyed the sweet orange into Persia and Syria, and the bitter orange (now called the Seville) found its way into Arabia and Spain. And although the orange made its appearance in Europe in the fourth century, it was not until the fourteenth century that it became widely diffused, and spread through Portugal, Sicily, St. Michel, and the islands of the Mediterranean and West Indies, and not until the Spanish and Portuguese landed and penetrated into this country did the orange find a home in the semitropical portion of America. And while the orange was so highly esteemed by the ancients for its medicinal qualities, it is surprising how little attention the present generation gives to the many virtues enclosed in this little golden ball of fruit. A prominent physician once remarked that were his patients to eat an orange or two every morning they would require but little medical attention; for throughout the entire range of fruits that have attracted the attention of the medical profession as a means of alleviating many of the ills of mankind, there has been found none that has so many diversified uses as the luscious orange, particularly in cases of low fevers and malarial complaints, and it should more largely take the place of the unpleasant drugs so extensively used, to the great disgust of the patient. No fruit compares in cheapness with the beautiful and luscious orange, and particularly so now that our own country is raising the finest oranges in the world, the fruit selling at a price within the reach of the most moderate purse. At this season of the year (April) most of the oranges received in New York come from the islands in the Mediterranean, while a liberal supply is received from Jamaica, and a few from Cuba and Porto-Rico and some from Florida and California.

MEDITERRANEAN SUPPLY AND TRADE CUSTOMS.

A few words in relation to the manner in which the orange traffic is conducted in each of the above-named places may not be amiss at this time. Prior to 1830, the importation of oranges was quite limited; sailing vessels were exclusively employed in transporting the fruit to this country until 1860, when the experiment was made of substituting steamers in place of the sailing vessels. Three cargoes of about 7,000 boxes each were received direct from Sicily, but the experiment proved a failure, the importers losing heavily by the operation, the steamers not being adapted to the carrying of fruit, and the cost of transporation being too great. Sailing vessels continued to do the orange traffic until 1870, when a regular line of steamers with improved ventilation, was successfully established between New York and Palermo. With the steady increase in demand for the orange, new lines have been formed; until now there is scarcely a week during the spring months that New York does not receive from one to three cargoes of oranges and lemons from the island of Sicily and other parts of the Mediterranean, the total shipments to the United States last season (1884-85) being 97,000 cases and 1,368,000 boxes. The little island of Sicily with an area of about 11,000 square miles, has a population of over three millions, or an average of 250 souls to the square mile, a large portion of whom are engaged in orange culture. Lands from the lowest valleys to the highest mountain, even to within a few miles of the crater of Mount Etna, are covered with orange trees, bearing annually their thousands of golden balls. The average yield of an orange tree varies as to its age and location, coming into bearing when raised from seed at about the eighth year, or from graft or bud in 3 years. The first year's yield is small, varying from 25 to 200 oranges, which are apt to be coarse and large, having a heavy, rough skin, with a dry and tasteless pulp. As the tree matures, the fruit increases in quantity and improves in quality, until it becomes of a desirable medium size, with silky skin and full of juice. A tree well advanced, yields from 500 to 2,000 oranges, but there are trees, even in our own country, that have yielded 10,000 oranges annually.

While in our imagination we are visiting this wonderfully productive island of Sicily, let us follow the orange from the grove, through the packing house on board the steamer, thence to America. The gathering of the orange is done by men and boys, who are provided with light ladders, the fruit being placed in baskets lined with cloth, and held by a strap attached to and passed about their shoulders. The fruit being picked from the trees, is left with the stem on the orange, which is afterwards cut quite short with a sharp knife or shears, hence the name, "stem cut." The object in leaving a small portion of the stem on the orange is to prevent the air from reaching the nine to ten compartments that all centre at a point immediately under the stem, which forms nature's seal, excluding the air, which would cause rapid decay. From the groves the oranges are carried to

THE PACKING HOUSE OR MAGAZINE,

where they are placed in trays to cure or sweat out (as it is called) for a few days. This is found necessary to insure transportation, as an orange when removed from the tree will soon become moist, small drops of water appearing on the skin, and if wrapped in paper at once would soon decay, but if allowed

to dry off thoroughly will keep for months. The assorting and wrapping is done mostly by young girls and women, who get on an average a salary of from nine to sixteen cents per day, and on that pittance live and enjoy life better than some of our millionaires do in this country. At the packing-houses or magazines, the fruit is assorted with the greatest care by experienced Italian girls who will take two or three oranges in their left hand from a box or tray, make a rapid movement with their fingers, that will revolve the oranges in their hands with almost lightning rapidity, examining them on all sides. One or two may be thrown into the basket of a neighbour to the right, and one into the basket of one opposite. Were you to take an orange from each of those baskets, you would probably observe no difference in them, and wonder why the separation was made, but if you were to ask the bright-eyed Italian girl, she would show you a small spot on one, or the absence of a stem on another, sufficient to warrant the fruit being rejected or packed as a second grade, the imperfection in both cases causing rapid decay. The oranges are then sized, wrapped and packed in boxes to suit size of fruit. The smallest size being designated "00," meaning the smallest, usually numbering 300 or 360 to the box. The next grade being a little larger are called "0," and pack about 200 to the same size box, while the largest size is termed "imperials," and packed 160 to the box. The usual way to determine the number of oranges in a box without counting them all, is, if they are packed straight, count one layer of one end of the box; if it is packed in rows of 5 and 5 it would make 25 to a layer, and as there are 4 layers to a side, you multiply the 8 layers by 25, and you have 200 the number in the box, or if it be a box of large Imperials you will find it to count 4 and 5 making 20 to the layer, and 8 layers gives you 160 oranges to a box. This rule is a safe one to apply to all fruit packed in Palermo or Sicily; but in Catania, where little regard is paid to the sizing of the fruit, it may have the appearance of being Imperial size on top but "00," below. After years of experience, the buyer becomes familiar with the brand on the boxes of reliable packers and can feel confident of what he has in the boxes without examination. Let us return to the magazine, where the boxes are strapped, stenciled and put on board the steamer, perhaps 20,000 boxes or more ready to start for America. As soon as the vessel is loaded, a manifest is made out of the lots, their marks, and to whom consigned in New York. This manifest is at once sent by the fastest mail to New York where a catalogue is prepared by Messrs. Brown & Seccomb, fruit auctioneers, who sell at auction all the Mediterranean green fruit upon arrival. The steamer when loaded, starts for New York, and as it passes out of the Mediterranean through the strait of Gibraltar the signal station agent at the Rock notifies by cable the Maritime Exchange in New York that a fruiter has just passed, giving her name and destination. Eighteen to twenty days is the usual run for a fruit steamer from Gibralter to New York. Upon her arrival at New York Messrs. Brown & Seccomb advertise when the steamer's fruit will be sold and at what pier it may be examined. Repairing to the dock, the fruit merchant is presented with a catalogue of the cargo, showing the number of boxes in each line or lot, and a woodcut of the mark on the boxes of that line, one or two boxes each line being opened and placed on the pile that such sample is to represent. The merchant after examining the fruit as to size, quality, and soundness, puts some hieroglyphics opposite each lot on his catalogue to indicate its condition and value to him, the better to guide him in buying when the fruit is offered for sale at the auction-room. Oranges coming from Havana, Porto Rico, and Jamaica or usually disposed of by the importer or commission merchant to whom consigned. Until recently it was a rare thing to see any barrel oranges offered for sale at the fruit auction room. Each country has its peculiar style of package for shipping its fruit. From the island of Sicily we receive the oranges in boxes, made in two sizes. For the largest size oranges, called Imperials the box is of the following dimensions; $11 \times 14 \times 26$ inches, and for the regular or ordinary size, $10 \times 14 \times 27$ inches. From Joppa (in the Holy Land), we receive oranges in what are called flats or half-boxes, measuring $5 \times 14 \times 27$ inches. From Naples and Sorrento the same box is used as in Sicily. It may be of interest to know that since 1850 nearly all of the orange boxes used for the Mediterranean trade, have been made in the State of Maine, five or six cargoes of boxes in shucks being annually shipped from Bangor, and put together by the natives. Previous to 1850 the boxes came from Trieste in Austria, but their yearly advance in price drove the orange exporter to look to other fields for supplies. The Yankee box makers of Maine took advantage of the situation, and have held the bulk of the trade ever since Valencia in Spain, uses cases instead of boxes to send oranges to America; unlike the boxes the cases have three compartments. There are four sizes of cases used, medium large, extra large, and mammoth or coffin cases; the dimensions of the largest are $15 \times 18 \times 46$, and medium, $12 \times 16 \times 40$. As these packages are so much heavier than the Sicily boxes, it is necessary for them to be roped or corded, and for that purpose is used a rope made from the Espatto grass which resembles the cat tails grown in our salt meadows. This cord is largely made by the convicts in the prison; is very strong, and costs far less than machine-made manilla rope. The Valencia orange differs but little from those grown in Sicily as to sweetness and flavor, neither being a perfectly sweet orange, but what is termed by the trade a pleasant tart; those grown in Naples and Sorrento are of a pale color, and considered the sourest orange imported, which is accounted for by its coming from the most northern portion of the country where oranges grow. It is a noticable fact that the nearer the Equator the oranges are grown the sweeter the fruit, and the further north the sourer. Even the seed from the sour orange of the Mediterranean when planted further south produces a sweet orange.

WEST INDIA SUPPLY.

Leaving the Mediterranean and drifting south, the first orange district we encounter of any magnitude is Cuba, where but little attention is given to the cultivation, assorting or packing of oranges. Not the slightest care is given to the sizing of the fruit, or the selection of the package used for transportation, barrels being used exclusively, without regard to what they may have previously contained, whether potatoes, flour or cement. This orange (the Havana) is without doubt the sweetest orange grown in the world; in fact, when fully ripe, is so sweet as to be almost insipid. While it is a general favorite in its season, it is always highly prized in the sick room.

Next in order comes Porto Rico, situated two degrees south of Cuba, in latitude 18 degrees, which island produces an orange lighter in color than the Havana and about as short-lived. Their favorite and only mode of shipment is to send them to New York in bulk, as it is called; that is, to rig the hold and deck of a schooner into bins about three feet deep and fill each of these with loose oranges, thrown in without being wrapped or sized. As there are but few cargoes come from Porto Rico and they arrive during the months of February and March, when we have plenty of oranges from other ports, they are not looked upon as one of the standard oranges of commerce.

Next in order comes the wonderfully productive island of Jamaica. Like Porto Rico, it is situated in latitude 18 degrees, its shores washed by the warm waters of the Caribbean Sea. From this island, 100 miles south of Cuba and 1,450 miles from New York, comes a most excellent orange, and one that is daily increasing in public favour. The best varieties are grown on the Mandeville mountains in the Manchester, Clarendon, St. Catherine and St. Anns parishes, and are fit for a king. In fact, I have paid $12 per barrel for a certain mark of this fruit known as the K brand—the highest price ever paid in New York for a line of barreled oranges—in its original package,

as it was landed from the vessel, and I found ready sale for the same at $15 per barrel.

The shipper of this celebrated brand (Mr. S. Kennedy of Jamaica), not content with the extravagant price his oranges brought, allowed himself to be inveigled into a contract with a certain New York firm that proved disastrous to shipper and contractor alike, for instead of keeping up the standard quality, as of previous shipments, he allowed the mark to deteriorate, thus losing its prestige, and from that day to this I have never bought a single barrel of the once celebrated $\frac{K}{S}$ braud, now no better than any other brand.

I simply cite the above to show how even a brand of oranges can reach the pinnacle of popularity, and like frail humanity, by some misdeed, sink into utter oblivion. Other shippers have taken lessons from this and maintain their standard of excellence in quality and packing, so that such marks as the $\frac{N\ G}{S}\ \frac{M\ E}{M}$ and others have gained a most enviable reputation, not only for the shipper in Jamaica but for the receivers in New York, Messrs. Goodwin & Sturridge, whose reputation as reliable trustworthy dealers is certainly worthy of emulation.

The fruit just spoken of, coming, as I said, from the Mandeville district, on the south side of the island, rivals all other oranges grown in Jamaica, although some very good fruit comes from the north side. It has not the keeping or eating qualities of the oranges grown on the soth side, for this part seems to be expecially adapted to orange culture, both in soil and climate, the fruit actually growing wild in many places, without the slightest cultivation, and where the mere keeping down of the brush would convert the trees into beautiful orange groves.

Like Havana, Jamaica ships most of the oranges in barrels, but, unlike Havana, Jamaica, is more careful in the selection of the package, usiug as far as possible a new sixteen inch head barrel, with the staves broad and full of holes for ventilation. While Havana sends the fruit to New York unwrapped and unsized, Jamaica pays great attention to the grading of the oranges, carefully wrapping them in brown straw paper. Great care is bestowed in packing choice brands in regular layers from the top to bottom of the barrel, the average count being about 350 to the barrel.

Jamaica has made such rapid strides in orange culture during the last quarter of a century that had not Florida come to our relief the Jamaica orange would now be enjoying almost a monopoly in New York markets as the only genuine sweet orange to be relied upon for late winter and spring trade. The orange tree is so pliable under conditions imposed by art, that in Jamaica it can be made to produce a crop at any desired time of the year. Its blossoming may be hastened by cultivation and irrigation, and it may also be retarded by suppressing the blossoms. This retarding process, I am informed, is extensively resorted to by the Spanish colonists in Nicaragua and Honduras.

HOME PRODUCTION.

Having thus carried you through the orange fields of nearly every foreign land that sends its fruit to the United States, let us now take a look at the orange belt of our own favored country lying principally in Florida, Louisiana and Southern California. To the Spanish Catholic missionaries it is generally supposed that Florida is indebted for the introduction of the orange, they having brought the seed of the sour or Seville orange from Spain, and as the fruit multiplied the seeds were scattered by the Indians throughout the State, which probably accounts for the numerous wild orange groves found near the banks of the rivers and lakes, formerly the favorite camping grounds of the Seminole Indians. Later the sweet orange was introduced from Europe and planted in St. Augustine (the oldest city in the United States).

At the close of the civil war small plantations of sweet oranges were found throughout the State, consisting usually of a few trees growing around dwellings. At the close of the war many of the old trees were bearing liberal crops of such luscious fruit as travellers from all parts of the world had never before eaten. The excellence of the American orange set enterprising Northerners to thinking there was money in orange culture, and the general climate of the State made the enterprise doubly attractive. Capitalists seeking health in that warm climate soon invested in lands and started groves from seeds; as shipments of fruit were made North and large prices realized. Others purchased wild groves of the sour orange and grafted or budded the sour stock with the sweet, the last process securing a more vigorous tree and one that will last for centuries. The orange fever spread among the natives, who began to realize that within their very door-yards lay a fortune they had never dreamed of. So they went to work with commendable energy, until Florida is becoming a vast forest of orange groves, having at present hundreds of thousands of trees, producing last season about eighty millions of oranges, and giving rise to the question. Will not the business be overdone? To which we readily answer, No. With the small area within the United States capable of producing oranges this will be impossible.

With its present liberal supply Florida furnishes but about one-tenth of the oranges consumed in the United States. New York City alone is said to consume more fruit than any other city in the world, not excepting London or Paris. The area of the States with climate suitable for orange growing includes portions of California, a very small part of Louisiana and the whole of Florida. A trifling area as compared to the vast sections of the United States which will be well filled with inhabitants long before the orange-growing section can be brought into bearing. The present yield of fruit grown in the United States furnishes hardly an orange a year to each inhabitant. Taking our population at 60,000,000, judging from the past, it will probably in the next thirty years double; to furnish such a population with one orange a day will require no less than 43,800,000,000, so there is but little danger of the production ever meeting the demand of our country.

Of the average age of the orange tree nothing definite can be said, but it is generally supposed that with all conditions favorable, such as soil, climate and proper attention, the orange trees are good for a century or over. In fact, at Cordova, that far-famed seat of Moorish splendour, there are still remaining a number of monster orange trees known to be seven hundred years old. Their trunks are partly hollow, their bark cracked and rough, yet each year, those dingy old giants yield their seven and ten thousand of luscious oranges as if yet in the hey-day of their youth. Even in England, at Hampton Court where the tree is raised only as a curiosity and is carefully sheltered by glass, there are several trees that are known to be over three hundred years old. There is also an orange tree in the Convent of St Sabine, at Rome, which is known to be over 680 years old. So it is no rash assertion to make that no orange grower in this country will live to see his trees cease to yield him an income.

OTHER FOREIGN SORTS.

While we recognize but two varieties of oranges, the sweet and the sour, there are as many distinct varieties as there are of apples. I will speak of a few varieties that are never, and others that are hardly ever seen in this country. The Chinese have by careful study and long cultivation succeeded in dwarfing the orange-trees until they have them growing in flower-pots, bearing fruit regularly, but in size no larger than a cherry or plum. Another variety grown in China and never seen in this country is the "coolie orange." It resembles in size and appearance our tomato; this variety has a thick rind, is quite juicy, and the tree a great bearer. There is also the "sucking orange," so called because the skin is so thin and adheres so closely to the flesh that it

cannot be peeled; in flavor it resembles the mandarin orange. At Singapore is grown an orange that is of a deep green color, about the size of an apple, with thin skin, and peeling off readily. It is juicy but very sour (said to be very bad for the teeth; the rind when broken emits a strong odor, partly orange and partly citronella. I am informed there is an orange grown in Siam that is called the King orange, so named from receiving such royal recognition, that any subject finding this tree growing without the walls of the royal garden, must give immediate notice to an officer of the Government, or be decapitated. The tree is then destroyed, as none but members of the royal family are allowed to eat of that fruit. It is described as having a transparent green skin when ripe, and a pink pulp, that can be seen through the skin, and is of a most delicate flavor. In Europe, when oranges were first introduced they were looked upon as only food for kings, and were offered as rare gifts to the crowned heads.

Of the many species of oranges that find their way to this country, I have been able to gather in a few days over twenty different varieties, including the Florida, California, Havana, Porto Rico, Jamaica, Valencia, Messina, Palermo, Catania, Joppa (or Holy Land orange) Naples, Sorrento, Seville (or bitter), the tangerine, mandarin, blood, oval, navel, grape, or "forbidden fruit," Pumallos, and Shaddock and Chinese. Of these we will speak in turn as they make their

APPEARANCE IN THE NEW YORK MARKET.

First, in the fall, comes the Havana, which is now about done for this season. Next comes Jamaica and Porto Rico; then Florida and California; then from the Mediterranean we receive the Valencia, Messina, Palermo, Catania, Joppa and Naples; these Mediterranean varieties lasting through the spring and summer months, while the trees in Florida and the West Indies are recuperating and getting ready for next fall's supply.

DISTINGUISHING FEATURES.

A question is often asked, "Why should not all the oranges grown on so small an island as Sicily be called Sicily oranges instead of Palermo, Messina and Catania, and in what way do they differ?"

If you will refer to a map of the Mediterranean Sea, and look at the island of Sicily, you will see on the eastern shore the location of Catania. About forty miles further north is Messina, and about one hundred miles west of Messina is Palermo.

From these three ports come the best of the Mediterranean oranges and lemons, the choicest varieties coming from Catania and Messina. It would be hardly fair to award the "palm" for the finest fruit to either, as both of these districts raise some of the finest oranges grown in the world. Catania is situated near the foot of Mount Etna, in the eastern portion of Sicily. Hundreds of orange groves extend far up the sides of that famous and once turbulent mountain, receiving a most bountiful supply of sunlight. Its southern exposure makes it a favorable situation for producing excellent fruit. In that section are a large number of trees that bear the much-sought for and attractive looking oval or egg-shaped orange, and this has given to Catania oranges a prominent place among the choicest varieties coming from Sicily. Prior to 1852 the American market knew nothing of the Catania orange, at least by that name, as all the fruit grown there was taken in small sailing crafts to Messina, and there sold to be graded and packed in Messina boxes, and shipped to this country as Messina fruit. In 1851 an enterprising English firm built at Catania a packing house (or fruit magazine as they are called there), for the purpose of packing and shipping Catania oranges and lemons to all points. The first cargo of 5,000 boxes coming to America from Catania arrived here in the year 1852, consigned to and contracted for by our late highly esteemed and veteran merchant, G. H. Renaud, then a member of the importing firm of D. Gillmartin & Co., of New York.

While the better grades of Catania oranges usually command a high price, more value would be attached to them if greater care was given to sizing the fruit properly, as is done by reliable packers in Messina and Palermo. While the Catania orange and lemon are pleasing to the eye, they will not keep as well as the Messina and Palermo fruit, and for that reason are seldom stored or put away for summer use, as is the case with the Messina oranges and lemons, which seem to have better keeping qualities, as do all fruits grown further north. (The same is true of American fruit, apples in particular.) There is so little difference between the Palermo and Messina fruit that we will not attempt, at this time, discuss their merits or demerits, other than to say that both the last named ports are entitled to much credit for some very choice fruit. The "Sorrento" fruit comes from the port bearing that name, which is about 150 miles north of Messina, near Naples, on the main land. This fruit is apt to have a thick skin and is of a pale color. The orange is not so sweet as those grown on the island of Sicily.

Very few of the Mediterranean oranges keep as well of late as in former years, when less attention was paid to irrigation than at present. The very wet condition in which the orange groves are constantly kept has a tendency to force and soften the fruit. As regards quality, I should place the varieties in the following order: Messina, Catania, Palermo, and Naples or Sorrento.

The Orange coming to us from the greatest distance is the Joppa, or Holy Land orange, but as it has no especial attraction beyond that of coming from the Holy Land, few shipments are made to this country, owing to the great cost of transportation, the fruit having to be sent to Liverpool, then re-shipped to New York. The fruit is mostly oval, or egg-shaped, and ranks with the Sicily orange as to flavor. It finds a ready market throughout Turkey. Russia having established a regular line of steamers between that Empire and Syria, the Joppa orange is being largely introduced into Russia. The orange groves throughout Syria are very near the sea-coast, very few groves being found successfully growing more than four miles from the sea. As there is but little or no rain in Syria from the 1st of May until October, irrigation is the only means of keeping the trees alive, each one being surrounded by a little bank of earth to keep the water about it. The trees are left without irrigation until the last of June, when the leaves begin to curl a little; then they are watered by streams coming down from the mountains of Lebanon. From Naples and Sorrento, near Mt. Vesuvius, we receive an orange similar to that grown further south in Sicily, but it is pale in color and very sour. These conditions are accounted for by the fact that Naples occupies a position so far north—in the 42nd degree of latitude, the same as the New York.

Surprise is sometimes expressed that oranges can be successfully raised at Naples and Rodi. Many theories are advanced, some claiming that the icebergs and cold currents from the Arctic Ocean hug our shores closely and lower the temperature many degrees below that of Italy, which is constantly fanned by the warm winds coming across the Mediterranean from the great deserts of Africa. Among the smallest varieties of oranges that we receive are the tangerine and the mandarin, sometimes called the "kid glove" orange, from the readiness with which the skin is removed without soiling the hands or even the gloves. The tangerine and mandarin are often associated as one and the same fruit, but such is not the case. While of the same family and closely allied, they are not identical and should not be confounded. The tangerine is in color a deep dark red when fully ripe; in shape it resembles a small flat tomato. The tangerine is a thorny tree, and is supposed to be of Chinese origin, but has been largely distributed from Tangier, a spot in Western Africa, where it has flourished for fully 200 years. From Tangier the Portuguese carried it to Brazil, and from there it made its way into Florida. The mandarin resembles the tangerine in general appearance, except in color, the mandarin being a golden yellow. The tree, unlike the tangerine, is thornless, and is supposed to have come from China, deriving its name from the mandarin, a high official in China.

The mandarin and tangerine are becoming popular oranges in Florida and when sent to the northern mar-

kets about the holidays command a very high price. As the Florida mandarin and tangerine begin to disappear about the middle of March, their place is taken by the same variety from Sicily, lasting until the summer months. Jamaica also raises the tangerine to some extent, the fruit being larger than that grown in Florida or Sicily. In the early season they lack the rich, spicy flavor of those grown in Florida. Within the last few years a new variety of orange has made its appearance in our market; it is called the navel orange, deriving that name from the curious formation on the blossom end of the fruit. For many years this orange has been a great favorite in the Bahia district of Brazil, where, it is claimed, by long and careful cultivation it has become entirely seedless, thus preventing its propagation only by grafts and buds. When grown in Florida, where it was introduced from Brazil a few years ago, a few seeds sometimes appear. The orange is unusually heavy, sweet and juicy. On the Pacific slope in Southern California, the navel orange is extensively cultivated, but as the stock buds or grafts were introduced from Australia, the orange differs somewhat from the Brazil navel, as the blossom end is not so broken and the orange is more of the oval or egg shape. The other variety grown in Colifornia is the plain seedling. The best varieties are known as the Riverside. California is fast coming into prominence as a competitor for the orange trade, it supplying all the markets west of the Rocky Mountains. It bids fair to demand a good share of the trade east of the Rockies even as far as Buffalo, thus interfering quite materially with the Mediterraneau orange trade, as the supply from both points appear in our market at about the same time.

THE BLOOD ORANGE.

Another very curious and popular orange is the blood. The general appearance of the tree, leaf and flower differs only from other orange trees in its absence from thorns. Its fruit is distinguished by a color of blood which develops itself gradually as the fruit begins to ripen, little by little the blood-colored spots appearing in its pulp as it advances to maturity these enlarge, becoming a deeper blood color, finally embracing all the pulp and spreading to the skin, which becomes a brighter blood color, the longer it is allowed to hang on the tree. This variety of orange has provoked much discussion, and many theories have been advanced as to its origin, some claiming it was produced by grafting the orange into the pomegranate tree; others that it was simply a freak of nature. From conversation with Mr. Rose, manager of the New York Fruit Exchange, who spent twelve years in orange culture on the island of Sicily, and from Mr. G. Amoroso, one of the most experienced grocers in Sicily, and other orange importers and growers, I am positively assured that the blood orange is as distinct a variety as is the Baldwin apple from the Greening, and as a graft from a Baldwin apple tree upon a Greening tree, will produce a red Baldwin apple, so the product of a bud or graft from the blood-orange tree, when grafted or budded into any other variety will surely be a blood orange, thus proving beyond a doubt that the blood orange is not a freak of nature, but a distinct and separate variety, produced hybridizing the orange with the pomegranate. In the start the blood-orange is grafted from the orange to the pomegranate tree, and in two years time is again grafted from the pomegranate to the orange, so as to secure a regular supply of bloods, which otherwise would soon die out, the pomegranate being short-lived. I have given this species special attention owing to the various opinions—purely guesswork or theory—expressed both upon the street, among the fruit trade, and in the newspaper columns; for that reason I have interviewed the above-named gentleman, whose opinions I accept and present by permission as indisputable authority. Another variety of curious formation is the oval or egg-shaped orange, coming mostly from Sicily. In flavor it is no better than the round orange, but from its odd formation is eagerly sought for by the fancy fruit dealers of our large cities and commands a high price.

While we are considering the smaller varieties most familiar to us we should not omit a passing glance at the largest species of orange grown in the world. There are two varieties, the "Shaddock" and "Pumalos," which differ only in outward formation, the Shaddock being round and the Pumalos pear-shaped. Both have a skin of a golden colour, while the pulp of both is pink. They are used only for attraction or made into marmalades. The pulp is eaten by some and is said to be palatable, but care must be used in separating the flesh from the skin that separates the compartments of the Shaddock, the Pumalos and the grape, or forbidden fruit, as it is very bitter. This fruit is of Chinese origin, but was brought from Asia by a Captain Shaddock, whence its name.

SUMMER ORANGES.

The question has been frequently asked: "Why are Rodi oranges called summer oranges?" If the reader will refer to a map of Italy he will find that Rodi is situated on the Eastern shore, in the province of Foggia, about 160 miles southeast of Rome. It lies at the mouth of Gargano Bay, between the 42nd and 43rd degree of north latitude. That is a point so far north as to prevent the orange from ripening before March and April. It reaches our market in June, or the early summer months, hence the name "summer oranges."

In variety they are the same as those grown at Messina and Palermo. Owing to the heavy foliage of the trees the fruit is lighter in color than that grown in Sicily. Rodi is frequently visited with cold wind and hail storm. At the season when the orange is reaching maturity the result being the injury of the fruit to such an extent as to cause large black scars to appear on the skin of the orange when ripe, thus greatly depreciating its commercial value. Coming into this market, however, when most other varieties have disappeared, they usually command a high price.

Much might be profitably said about the different diseases that affect the oranges and tree as well as facts relating to articles manufactured from the orange, such as the oil that is made from the skin for flavoring purposes, which sells for about two dollars a pound, and the oil that is distilled from the orange blossom, which sells for fifty dollars a pound and is used for making perfumery. In foreign countries the skin of the orange is used quite extensively, being dried for fuel, as the oil it contains causes it to burn fiercely, making a very hot fire.

You have already followed me, in imagination, over 25,000 miles, through the principal orange districts of the world, and I land you safely in our own happy land, where a kind Providence has favored a portion of our country with a climate suitable for growing this golden fruit. To the orange grower in that favored portion we say: "Go on with your good work. Multiply your groves and scatter your health-giving fruit over our land until the orange shall be a familiar fruit in every home from the lakes to the gulf, and from the Atlantic to the Pacific."—*American Grocer.*

Coconut Pudding.—One large cup bread-crumbs; one coconut, pared and grated; one tablespoonful corn-starch, wet with cold water; half cup of butters one cup of sugar; two cups of milk; five eggs; nutmeg and rose-water to taste. Soak the crumb in the milk, cream, butter and sugar, and beat in the yolks, then add to the soaked crumbs. Stir in corn-starch, beaten whites and flavoring—at last, coconut. Beat hard and bake forty-five minutes in a buttered pudding-dish. Eat cold.—*American Grocer.*

The Australian Fresh Fruit is now regularly on the market here, and, I am pleased to add, is very appreciated. Tasmanian apples at 4d a pound are naturally acceptable at a time when the market is all but denuded of home prooduce. The Ceylon tea, too, meets with much approval, and sells at the Exhibition at 3d a cup. This should be a hint to some of our Queensland planters, for I have always myself been of the opinion that tea may be profitably and extensively cultivated in that Colony.—*Anglo-Australian in European Mail.*

TEA, CINCHONA BARK AND COFFEE IN THE UNITED STATES OF AMERICA.

London, 4th June 1886.

Enclosed are extracts from the annual reports of the Chamber of Commerce of the State of New York for the year 1885-86 which can hardly fail to be of interest to the growers of tea, bark and coffee in Ceylon. While these papers were being transcribed, your *Weekly* paper of 11th ult. came to hand with the report of the special general meeting of the Colombo Chamber of Commerce summoned to consider a letter from Mr. Thomas Dickson on Coffee Adulteration.

In view of the present position of the coffee enterprize in Ceylon, it is not surprising that the Chamber should be lukewarm in this matter. The chairman apparently felt that some apology was due for this, saying that the ground taken up, viz., that the question does not now materially affect Ceylon, is not a very high one. To one reading the enclosed extracts and comparing the relative positions of tea and coffee in the United States and the United Kingdom, it would seem that if the Chamber is to consider the material interests alone of Ceylon (and what other interests fall rightly within its province ?), it would be suicidal to raise a finger to help the great rival of tea to supplant the latter in the United Kingdom also.

The story of the consumption of tea "this once overshadowing industry," as it comes from the United States, has indeed "a melancholy tinge." If cheap and pure coffee has carried all before it on the other side of the Atlantic, why not on this side also ?

In the interests of temperance, by all means let all of us take the side of tea and coffee against alcoholic drinks. But the fact must be recognized that there is, beside the great temperance struggle, domestic strife in the temperance household. Tea and coffee are open rivals for the affections of drinking humanity. In this rivalry, the interests of Ceylon and those of the Colombo Chamber have passed since 1880 from coffee to tea, and there need be no coyness in avowing the fact. W. M. L.

(*Extracts referred to*)

The Coffee Trade.—With very low prices for sugar, a large consumption of coffee may always be looked for. With low prices for both, its cheapness as a good staple increases the favour in which it is regarded by the labouring man. It has already taken the place of tea, the "poor man's diet." The improved methods of roasting have greatly contributed to this result. The per capita consumption of the United States is now estimated at 9·31 pounds, against 7·61 in 1879, an increase of 22 per cent. The average price of Brazil cargoes for 1879 was 14·85 cents; that for last year 9·01, a decrease of nearly 40 per cent; the price of last year was the lowest since 1852, and the consumption greater than ever before recorded. The variations in the market have been slight. The highest point, 10¼ cents, was in January; the lowest, 8¼ in December; the average 9·01 for fair Rio, the standard for comparative quotation. Experience has shown that the Exchange which opened two or three years since with great flourish of speculation, has proved, as open markets always have and always will prove, an equalizer of prices. The electric system of communication and the cheapness of transportation are now such that the margins for profit between cost of production and price to the consumer are extremely small. The tendency is, therefore, to the concentration of the trade into few and strong hands. The total receipts of coffee at all the ports of the United States was two hundred and forty-seven thousand tons in 1885, against two hundred and thirty thousand tons in 1884; an increase of seventeen thousand tons. The total deliveries for consumption were two hundred and thirty-five thousand tons in 1885, against two hundred and twenty-four thousand tons in 1884; an increase of eleven thousand tons, or 5·3 per cent. The increase over the consumption of 1879 has been more than fifty thousand tons, or about 25 per cent.

The Tea Trade.—The reports of this once overshadowing industry have still a melancholy tinge. The causes of the continued depression are plainly stated to be that our supplies have far outrun our consumptive requirements. Unfortunately this staple does not grow in value with age, like its great rival coffee. Stocks must be marketed. To this, rather than the general stagnation in commerce, is the distrust of the future to be attributed. The Importers' and Grocers' Exchange has not as yet proved to be more than a convenient place for the acquisition and distribution of statistics, but sooner or later will play an important part in the trade. The exclusiveness which governed the China trade is already of the past.

Annual Review of the Coffee Trade of the United States.—The more prominent features of the coffee trade of the United States during 1885 have been, first, a further increase in consumption as compared with previous years; second, an extremely low range of values throughout the year; and third, the change that has become established in the methods of conducting business, more particularly with respect to the product of Brazil, which constitutes the bulk of our supply. Increased consumption has been due partly to the growth of population, but unquestionably the most important element has been the increasing popularity of coffeee as a beverage among all classes, while its relative cheapness to consumers as a food staple has not been without its influence. The extent to which roasted coffee is now prepared and distributed has had much to do with its increased popularity. So long as this preliminary preparation had to be accomplished in the kitchen, the loss and labour that was entailed deterred many from its use. A lack of care or experience in this important process was apt to cause waste, in addition to the uniform and imperfect results obtained, but this has been entirely obviated by the erection of large roasting establishments throughout the country, where, with the aid of improved machinery and by the utilization of many ingenious inventions, this labour is all performed perfectly and satisfactorily, and consumers are enabled to obtain from retailers an article that is thoroughly prepared for cooking. This fact together with the relatively low prices that have been established during the past two years, has made coffee peculiarly the poor man's diet, and greatly popularized and extended its use with all classes. The extent to which low prices have influenced consumption may be readily appreciated from the fact that the average price of fair Rio during the year under review is the lowest since 1852. The changed methods of doing business relate to the manner of importation and sale. Jobbers and roasters now supply their wants chiefly by purchases made direct in Rio; that is instead of coffee being imported here for sale, its sale has been accomplished in most instances before it is shipped, and the seacoast ports have become clearing-houses and distributing centres rather than marts where actual merchandise is bought and sold. The net results of low prices and new methods of business have been narrow profits to importers and dealers, and a year of trade that, while in no sense disastrous, has not proved one of singular prosperity to those engaged therein. These features have not been confined, however, to the coffee trade alone, but have characterized, to a greater or less extent, the operations of the year in almost every department of commercial activity, and may be readily traced to the natural development of the tendencies of the times, after experiencing a long period of trade depression and the practice of close

economy. The existing condition of affairs has resulted from keen competition, a radical improvement in the methods of transportation by water, as well as on land, increased facilities for rapid communication with all parts of the world, the abundance and cheapness of money, the closer relations existing between buyer and seller, and a consequent disposition to trade upon a narrower margin of profit. The fact that the yearly average price for fair to prime Rio is the lowest since 1852 is the best proof of its relative cheapness during the year, but the very narrow fluctuations of the market have been of still greater importance in restricting the opportunities for obtaining more than a living profit. During ten months of the year values drifted slowly backward and forward within the limited range of 1 per cent, or between 8¾ and 9¼ cents for fair Rio, the highest prices having been made during January and February. A moderate crop has been followed by a still larger one, and the prospects for the future now point to a crop of enormous proportions, and the largest ever known. Furthermore, there has been no distinct speculative movement, and buying and selling has been of the hand-to-mouth character, that has deprived trade of its most elastic qualities. During the first three months of the year the impression prevailed that the yield of the crop would fall short of the estimates, and, accordingly, that before the close of the crop year, higher prices would prevail, which, in connection with the facilities afforded small traders throughout the country for purchasing direct from Rio, stimulated buying and led to a liberal stocking up. The warehouse deliveries from the seacoast ports for January, February and March, showing a heavy increase, being 266,815 bags in excess of the corresponding period in 1884, which is about equal to the increased consumption shown for the whole year; but, instead of advancing, values continued to decline, and purchases made on the basis of January and February prices must have been disposed of at a considerable loss. The load so easily taken on certainly acted as a dead weight upon the market during the first six months of the year, and its influence was not wholly eradicated during the remaining half. At no time since then did a sharp demand prevail, and almost constantly the country was being urged to buy rather against general inclination, which necessarily dulled the edge of spirited trade and resulted in a sluggish uninteresting market. According to the tabulated statement printed on a previous page it will be observed that consumption east of the Rocky Mountains has increased in comparison with 1884, 11,855 tons, or 5·3 per cent, which, although not as great an increase as shown the year previous, nevertheless means about one-half pound more for every man, woman and child of our population, which is a very considerable expansion, considering the relative proportion of this population that are not coffee-drinkers. This brings the per capita consumption of the country up to about 9·31 pounds, against 7·61 pounds in 1879. While the United States as a whole is one of the largest consumers of coffee in the world, its population is not so universally addicted to its use as in Holland, where the per capita consumption is about 21 pounds, or in Denmark and Belgium, where it amounts to about 13½ pounds, but with these exceptions we are the largest individual consumers of the beverage. In this connection it is worthy of remark that Great Britain shows a steady decrease within the past few years, the quantity imported last year, which amounted to 41,000 tons, being less than one-half what it was four years previously.

Cinchona Bark Trade.—The one great feature of the past year has been low prices. The extreme fluctuations ranged from 4d to 7½d, or say 8c to 15c. per lb. per unit. The supply, however, of one description or another, has been, in the London market, ample. Our American market has lost nearly all its importance, and we have to rely almost entirely on London. South American Bark is imported in very small proportion, while, on the other hand, we notice an increase of Calisaya Bark, and we expect still larger arrivals of this kind in future of the cultivated qualitise, but we expect from Colombia only shipments of the quantities which are stored there, waiting better market prices. The cultivated Calisaya Bark which has appeared in market is very rich. It should be remarked that the shipments of Ceylon Bark were, for the first half of the season of last year, very heavy, and prices for Bark were very much depressed, and shippers lost money; consequently the Bark shipped for the second half of the season was less in quantity than anticipated, and the total for the year that reached market only corresponded with that of the previous season. The stock remaining in Colombo at the close of the season, on the first of October, was about 4,000,000 lb., and this quantity being shipped during the last three months of the past year, from October 1885, to January 1886, overflowed the market and caused another depression in prices which decreased shipments. All reports from Ceylon say, that the harvest of Cinchona Bark will be smaller this year than heretofore, but low prices are anticipated. The arrivals of Bark may be limited, but should much higher prices set in, shipments will increase. The imports of Java Bark in Europe have not increased in proportion as expected. Attempts have been made to import Ceylon Cinchona Bark directly to New York. We have always thought that this business should afford an advantage to both the exporter and the importer and for our home manufacturers. This is a matter of the first importance, so as to be no longer obliged to rely on London; and certainly every encouragement should be given to such an enterprise, by paying as high prices as possible, so that the net result would be improved by direct imports to New York. The fluctuations in Quinine for the past year were 30 cents per ounce, and during the last year rates were very low, falling to a point never before reached. It was noticed as a remarkable fact in reference to 1881 that foreign Quinine was sold in Europe as low as 3s 6d per ounce, with Bark ruling at 4½d per unit. In 1885 foreign Quinine was actually sold at 2s 6d per ounce, with bark at very nearly the same value per unit as in 1884.

The following table, from 30th June 1881, to 30th June 1885, has been compiled from statistics kindly furnished by the Hon. William F. Switzler, Chief of the Bureau of Statistics, and will repay a careful perusal:—

Imports of cinchona bark during the past five years.

Years.	lb.	Value in dollars.	Average value per lb.
1881	4,219,403	1,846,280	43·8
1882	5,010,547	1,846,375	36·8
1883	3,639,315	1,205,606	33·1
1884	2,588,307	718,035	27·2
1885	3,559,691	913,189	25·7

THE "TROPICAL AGRICULTURIST."

A gentleman resident in the Central Province who has as good opportunities of knowing what is of benefit to planters as any one we know, sends us the following explicit testimony to the value of the "*T. A.*":—

"Since its commencement, I have regularly seen, and perused the *Tropical Agriculturist*. There can be but one opinion that its scope and object are highly important, and that it supplies a distinct desideratum, which it is to the interest of every estate proprietor to have available in the bungalow for the use of his locum tenens, or superintendent. As a magazine it provides interesting and instructive fresh literature at intervals, deprived, as most in Ceylon are, from easy access to libraries, and as years go by it will growingly become "The Ceylon Encyclopedia" with reference to agricultural operations. Viewing estate property, as practically a permanent investment to some one the trifling charge of R12 per annum—a rupee a month—is, certainly of no account, provided the separate numbers are kept, and bound together yearly as a book of reference,

for the benefit of the manager, and his suceessors. In that light, as the property of an estate to be handed over just as much as its office furniture few proprietors would probably refuse to authorise its being taken and filed regularly (if the periodical was brought under their notice) more especially as on looking over the most recent volume one cannot fail to see how much valuable information on 'Tea'* has been collated. In the belief that 'Tea' will restore prosperity to Ceylon, and that plantation property is a good investment for capitalists, such should not omit the office and connected equipment so advisable on all 'pucka' estates, a part of which would be 'the *Tropical Agriculturist*.' I find I have gone on writing, but as I am getting the numbers, for the past year ready to be bound, the volume is before me."

LETTERS FROM JAMAICA:—NO. XI.

WEATHER AND CROPS—JAMAICA FRUIT TRADE—A SHOCK OF EARTHQUAKE—JAMAICA COURT AT THE EXHIBITION.

Blue Mountain District, Jamaica, May 1886.

This year seems so far to be making up for those that have passed since 1879 when there was a heavy flood followed on 18th August 1880 by a severe hurricane. The May "seasons" appear to have set in, in the style one hears of from old inhabitants: indeed since the beginning of the year there has been a prevalence of showery, yet not unpleasant weather, but very few days suitable for curing coffee for market as it is here styled. Crop in the Blue Mountains is now well advanced, most properties have already secured more than half their estimates, and in some cases it is hoped they will be exceeded. The quality this year is excellent, the beans specially fine and heavy, so that our planters are hoping for our customary high prices, for very little of such fine *colory* goes nowadays into the home markets. The weather has been most favorable for the black "creole" settlers, whose *grounds* have so long been suffering from drought, this will supply them plentifully with provisions and make them all the more disinclined to work. However, I will do them the justice to say that the women will turn out to pick coffee: one estate near this picked 9 tierces in one week, say 63 cwt., which is remarkably good for a Jamaica estate, as none of them exceed 200 acres of coffee, but are considerably less in extent, though spread over a large area in detached fields; this separation by bush, and growing forest, makes Jamaica less likely to suffer such a disaster as Ceylon has undergone from over cultivation of one product, massed together in its thousands of acres, utterly obliterating the indigenous jungle.

The Jamaica Fruit Trade seems to be flourishing, the winter is doubtless the best season, before the oranges and bananas, from the more northern producing countries can reach the American markets. We had a man up here a few weeks ago, coming from Morant Bay some 23 miles offering 1s 6d a bunch for bananas which price would pay handsomely. A great many coconuts are also sent to America, but in the husk; there are no mills evidently on the north side, for turning the kernel into coconut oil and poonac. The production of fibre is being urged by the local *Gleaner* on all lowcountry planters and settlers, but there seems to be a sad lack of enterprise in Jamaica, or disinclination to turn off long-trodden paths; or there is a lack of capital, which the doing away of the consignee's loan as a *primary* claim on a property, should now do away with, as in future all claims on an estate will have priority in accordance with the dates of the loans made upon them, and registered in the Registrar-General's Books.

W. S.

* "Tea" is the subject of 143 references to papers and articles in the volume for 1885-6; "Coffee" of 52 references.—Ed.

How to make Good Coffee.—The Atlanta *Constitution* has published a Georgia woman's recipe for making coffee. It's nonsense. Her coffee is "allowed to boil a while." Thus she gets rid of the fine aroma and extracts the tannin, which is not healthful. Now, let any woman who has not a reputation for fine coffee try this recipe. Buy the best coffee and grind it to the consistency of ordinary cornmeal. Into a French teapot put an ounce of coffee for every person. One pound of coffee will make sixteen cups, and no more. Have everything clean, and as soon as the water in the teakettle begins to boil moisten the coffee gently, and leave it to soak and swell for three minutes; then add a little more water; dont be in a hurry; continue to add water until you have obtained not more than a large coffee cupful of the extract. If carefully done the entire virtue of the coffee will be in the cupful of liquor at the end of five minutes. For four persons use a quart of pure milk and have it piping hot; heat the large cups by pouring into them hot water; now divide the coffee into the four cups, each of which will be one quarter full; fill with the boiling milk. This is pure breakfast coffee, the coffee of the gods, of which no man after drinking would be so base as to call for a second cup. Such coffee connot be had at any restaurant in New York. He that drinketh in this morning will be unhappy if he fails to get it tomorrow morning but these instructions must be followed to the letter

Coca Cultivation in Java.—The following short notice appears in the *Medical Journal*, No. 5 (het Tijdschrift voor geneeskunde) contributed. In the pamphlet of Dr. Nivinny, entitled "Das Cocablatt," among other assertions it is stated that Erythroxylon coca was successfully introduced into Java by Dr. J. K. Hasskarl in 1854, but that he was prohibited from extending the cultivation by express orders from the chief of the Medical Service in Netherlands India, who looked on any extension of such cultivation as dangerous to the colony. Can nothing be brought forward by any official scientific society—for instance by the Society for the Advancement of Medical knowledge in—favor of the coca cultivation in Java? or can it be that the chance of adding perhaps 3 per cent of mentally and physically demoralized "co-queros" (coca abusers) to the adult male population of Insul-India, which already numbers 5 per cent of intemperate opium smokers, outweighs the great benefits to be derived from the bringing of cocaine within the reach of the million; which benefits will be vastly increased whenever the experiments now being made of the internal use of an infusion or decoction of coca shall be found to produce favorable results—for instance in the case of parturientes—leaving out of present consideration the great financial advantages which coca cultivation promises.—Translated for the *Observer* from the *Indische Opnemer* of the 20th May. [From the spelling it is evident that Dr. Nivenny's pamphlet is a German publication. It seems strange that the *Opnemer* neither contradicts nor admits the statement regarding the intervention of the authorities in stopping the cultivation in question. From other notices of coca in the Netherlands India papers it does not appear probable that such action has been taken. —*Note by translator.*]

THE CHEMISTRY OF TEA.

Although we agree with Mr. Barber that Dr. Watt was mistaken in supposing that damage to tea-lead was due to badly prepared tea, the real cause being almost invariably badly seasoned wood acting chemically on the lead, we yet feel that the researches of the professional chemist may largely aid the operations of the professional tea-maker. For instance, in regard to the process which is generally known as "fermentation," a term for which "oxygenation" has been latterly substituted, an authority we have consulted refuses to recognize as true fermentation any process promoted by the oxygen of the air. The question, therefore, arises, is the change which rolled tea-leaves undergo, in the process of which they are as much as possible *guarded from direct contact with the outer air*, true fermentation, or merely oxygenation, whatever the latter may involve? Tea-leaves contain a normal proportion of sugar and starch, which are not in themselves ferments, but they are, of course, liable to the action of ferments and fermenting agents, whether associated with them in the crushed leaves or extraneous. But, if the generally-received doctrine be true, that fermentation depends on the presence of the spore of an organism which feeds on and so ferments the sugar, then the professional chemist, who must be a good microscopist, ought to be able to tell us, what specific organism the spore represents,—whether the yeast plant, *Torula cerevisæ*, or some other. That question decided, the chemist might be able to observe and instruct the tea-maker to observe and decide, by a careful use of the microscope, the thermometer and other appliances and tests, the signs in the life-history of the spore, temperature raised by fermentation and other indications, the period when fermentations may best be arrested by the leaf being subjected to the action of fire. Oxygenation seems a more pleasant term to use than fermentation, but, as even those planters who prefer the former term admit that oxygenation, if allowed to proceed too far, will end in putrefaction, we feel inclined to believe that the saccharine matter in tea-leaves is acted on by some vegetable germ derived from the atmosphere in the same way that the yeast spore acts on the sugar in malt used for transformation into beer. It is highly probable that the spore is that of a different organism, however, the action of which as a fermenting agent may be slower and less violent as a heat-producer? Such are some of the points on which tea-makers might benefit by the examination and advice of professional chemists. But, as we have said, every tea maker is really a chemist in degree, and what seems wanted is that chemical knowledge in the case of the tea maker should in certain directions be amplified and extended. A peripatetic chemist, therefore going the rounds of the various tea factories, pursuing researches into the chemistry of tea with the aid of practical men, and giving those practical men the benefit of theory founded on science, shewing them the reasons for processes which by rule of thumb they have perhaps long practised, and recommending improved methods as the result of research, might confer great benefit on the tea enterprise as well as on himself, for in this, as in other cases, the labourer would be deemed worthy of his hire. We may probably be revealing unjustifiable ignorance, when we ask, has the development of any spores of minute organisms ever been observed in tea leaves undergoing the process of fermentation? Messrs. Gow, Stanton & Co. do not seem to recognize fermentation due to the presence of vegetable spores. Their language indicates a belief in chemical changes effected by the air, irrespective of the germs which inhabited it. We quote from one of their circulars, as follows:—

"Without further considering the intermediate processes of rolling, &c., we come to the firing. About this operation there appears to be mistaken views. Tea must not be calcined. This is the whole secret. The leaf, when in its withered state (properly withered that is), contains most delicate chemical products, to be dealt with very differently from what on many estates it now is. The process too prevalent is, to "fire off" quickly, and such a process at the high temperatures now used really burns out its active principle. Analytical experts declare that when the leaf is properly dried, the tannin or astringent principle remains undisturbed. The aroma of the leaf is dependent on the careful application of heat at a certain maintained degree of temperature. Then, too, with a very high temperature the process of firing destroys the gum and the theine, leaving the almost charred woody product behind, which, when infused, gives such unsatisfactory results, and leads to so many complaints of quality. From our own personal knowledge of tea-planting we venture to ask planters, when dealing with 'green' leaf, to keep the following facts before them, viz:—Starch is universally diffused throughout the vegetable economy, especially in leaves, that the absorption of oxygen from the air converts starch into sugar, and that the green resinous principle of the leaf diminishes in quantity while oxygen is absorbed. The excellence of black tea depends upon the management of the leaves in such a way that the above noted chemical changes may take place."

But the question we should wish to see authoritatively decided by a well qualified chemist, is,—Can the mere oxygen of the air absorbed by starch, converting that starch into sugar and diminishing the proportion of green resinous principle, in the tea leaf, account for the changes which take place in rolled leaf during the process in which the colour passes from vivid green to bright copper? Do or do not some of the teeming life germs with which the atmosphere seems to be loaded, have as much or even more to do with the chemical change, than even the absorption of oxygen? Can oxygen indeed be absorbed by the moist, bruised mass, perfectly pure and unaccompanied by spores which when they come in contact with sugar produce "fermentation?" Will some expert kindly reply?

MR. SHAND'S LECTURE ON TEA.

Dr. Watt of India and Mr. Barber of Ceylon on the Chemistry of Tea. Mr. Barber has sent us a very interesting letter from which we quote as follows:—

On Wednesday Mr. Shand read a paper on British-grown teas and treated the subject in its many aspects, domestic, sentimental and political. After this Dr. Watt, one of the Commissioners for India, spoke of his experiences in India and on tea matters generally. At the end he wound up by referring to bad packing and faulty manufacture, rapid drying and wrong fermentation and such other "rot" that he knew nothing of, but deemed fit to speak about, in order to say that he thought chemistry and science could help the tea planter to avoid certain consequences and in order that he might in short teach his grandmother to suck eggs. Excuse this vulgarism. I can find no better words to express my disgust at treating a London audience to faults manifold and pernicious in their results, just after a paper treating on the excellence of British-grown teas as against foreign teas.* He said 1st, that we fired off too fast, that in preparing botanical specimens they dried slowly with blotting

* Dr. Watt has done good service in classifying and describing the vegetable products of India, but his contention that badly fermented tea corrodes the lead of tea chests, exposed him to deserved ridicule. —Ed.

paper, &c., forgetting that they remain in the infancy of the art just where they were before, while we advanced from sun-drying to "chboolas," and thence to siroccos and Victoria driers. Besides, there is no analogy between drying a single leaf and treating 8 or 9 thousand lb daily rolled and smashed to a pulp. The one needing a drying to *preserve the specimen*; the other to produce a distinct aroma, the result of brisk firing. The man had no authority to speak as he did on a subject foreign to him. He next thought that some tea that had been found damaged suffered in consequence of faulty fermentation and warned tea planters and again thought that science (chemistry) would soon help us out. He was wrong again, for green teas that are not fermented at all from Japan and China are found to keep well, as the most fermented teas of the early season from Ceylon. Fermentation cannot affect the question in the least; moreover, chemistry is not of the least practical use. If merchants and brokers in London thought so, they would not go to the expense of keeping tea-tasters at high salaries.* A few bottles of chemicals would be sufficient to solve all difficulties. Now I may mention to you that I read several books down to Pasteur on fermentation and had a miscroscope in use for days at Blackstone in the hope of applying chemical aid to ascertain the right fermentation, but to no purpose. It is not of practical utility. As the tea-taster's palate fixes the value, the tea-maker's eye and sense of smell should fix fermentation—and we should rise superior to the delicate tests of chemistry and the troubles of a laboratory, as we really have. Well, now, having given you an idea of the ground on which I stood you will understand that I could not allow these statements to go unchallenged. I therefore made a statement to disabuse the minds of the audience. I saw Young and the pilgrim T. Gray among the number who approved heartily of all I said and cheered lustily. I cannot produce now all that was said but I daresay Mr. D. W. Ferguson will tell you all—or the substance. However I give you the circumstances that will show how false an impression the audience would have carried away home had there not been some contradiction. Hughes, the chemist and another were present. The former came to me and had a talk with me and said he disagreed with me. I said he was not expected to agree. I had already said, however, that I was prepared to correspond with any chemist on the subject, or to discuss the matter, and I was not prepared to grant that fermentation was answerable for damaged condition on arrival. I daresay, you will have the substance of the speech. Several present obtained my address and you may be sure I shall spare no pains to let them know what Ceylon tea is. Shand is very busy. His room or office by the Ceylon Court is always full, and he is doing great service. The Ceylon Court is the best frequented, and Ceylon tea is the most in demand. There are appus serving. It was a good idea altogether. I have not the time to write more this mail. The first batch of rollers are being shipped and shipping will go on once a week now. They came from a splendid factory, where I saw about 1,400 British workmen at work.

Tea Prospects.—The weather reports from the tea districts are generally favourable. At Chittagong, however, the late very heavy rain has done some damage, and in Kangra and Kumaon several gardens have suffered severely from hailstorms.—*Pioneer.*

---

* But tea-tasters and tea-makers are really chemists.—Ed.

CEYLON UPCOUNTRY PLANTING REPORT.

THE PANIC FOR COOLIES—PUBLIC TEA SALES—THE ECONOMICAL MAN ONCE MORE—FOWLS CLEARING TEA LAND OF GRASSHOPPERS—QUALITY OF TEAS.

5th July, 1886.

The panic there was some time ago regarding coolies has pretty much subsided, not, however, without having left some evil results in the affected localities, in the shape of heavy advances and an unstable working force drenched in debt. The men who were wrought on by the idea that there would be a scramble for labour, did their very best to bring this undesirable state about, by recklessly bidding higher than their neighbours, and giving a cooly such a value in his own eyes, that it must have tickled Ramasami when in a thoughtful mood he cast up his honest deservings, and totalled his "modest work." Looking as he always does to his master for leading, it is but natural that he should appreciate himself at the extravagant though factitious value which his timid employers are too apt to set on him while in a state of panic; and when the planter goes in for a large labour force at any cost, recruited from he knows not where, Ramasami is not the one to neglect such an opportunity of dipping deep into the planter's purse, and getting himself into that state of indebtedness, which to the Tamil mind means honourable respectability, but to ours has a decided flavour of the very reverse. The amounts which have lately been given for some gangs of coolies, if my information be correct, are startling enough. But coolies from the Coast are not hard to get, neither are they unwilling to come. Besides this if the thing is gone about in the right way—on such sensible lines as Mr. William Smith indicated—ten rupees expended on the raw article, recruited on "the village green," will give a much more satisfactory result than twice or three times that money when it goes to buy up those wandering reprobates, who, ever dissatisfied are always on the move, and whose acquaintance with Chetties, Afghans, and other money-lending harpies, are about as co-extensive as their knowledge of the present race of durais, and the geography of the planting districts. Even good coolies get unsettled when there are kanganies going about offering R10 and more a head, with a background of indefinite promises. but it is the wanderers who first respond. That we will want a large increase of our Tamil labourers goes without saying, but if that were the only difficulty we had ahead of us in regard to our new enterprise, we might account ourselves happy and dismiss it from our minds.

The collapse the other day of the public Tea Sales, does not give one a very exalted opinion of the enterprise of our present race of buyers. I suppose that there were reasons for the extreme caution displayed; yet being in telegraphic communication with the London market one would have thought that a less timorous policy might have been the result. The public sales don't always do the best r the seller, as witness a lot I heard of the other day which was thrown back on the broker's hands, the buyer maintaining that he had bid one cent less than that entered in the broker's contract. This same lot was shortly afterwards sold privately at an advance of 4 cents a pound on the auction price!

I have been told that there is one, evidently the economical man once more, who is trying to cover his bungalow supply of rice out of the samples he gets from Colombo. He complains sadly, however, that the samples are very small, not enough even for one dish;

nevertheless he has hit upon a plan which he hopes will do well for him in every way. With a zeal for fair dealing, he has requested that a sample from each bag should be sent so as to put a check on anything like mixing, and if can carry that point, he will have all his anxiety altogether removed regarding his bungalow rice supply!

The ravages of the grass-hopper on tea planted at stake is often so worrying, as to make the planter almost regret at times, having gone in for tea. How to prevent the insect from carrying on its destructive work is however the difficulty, and yet when you see the tender shoot laid over, you feel savage enough and would gladly try something to save others from similar misfortune. I understand that this hard problem how to checkmate the hopper, has been solved by the simple plan of getting together a lot of village fowls and herding them over the field, in which the tea seed has been planted. The fowls take kindly to the grass-hopper, and very soon reduce their numbers.

In America it is a common enough thing for a man to go in for "a hen ranch." I knew a a Ceylon planter who tried it, and did not make a fortune by it; but then he depended on his fowls alone. A hen ranch on a tea garden would be altogether different, for besides their use in clearing the land of grass-hoppers, the birds might be supposed to fatten for the table, and thus more than cover the outlay connected with their upkeep.

In these days when the tea planter is being preached to on all hands regarding the necessity of keeping up the quality of his teas, I fancy that we will have to recognize the fact that soil, elevation, and plants are factors which the skilled manipulator has to take into account. One of the most successful tea-makers in the island, when visiting a friend lately, offered to take charge of the three days' making, and promised to turn out a sample of tea which would equal his own. He did his best to bring about this result, but failed. Although he somewhat improved the quality, still it was a long way from that which has raised his name and that of his estate into the first rank. How was this? Had the soil, elevation, or kind of plant anything to do with it? Whatever was the reason, there was the hard fact that a man who can regularly turn out teas of the first grade while on his own estate, yet failed to do it with leaf grown at a different elevation and on different soil. PEPPERCORN.

OVERPRODUCTION OF TEA.

The June number of the *Revue Coloniale Internationale* contains articles of interest in French, German and English. Amongst the latter we find an article entitled "Overproduction and Tea Culture" by R. A. K., translated from *De Indische Mercuur*. It commences as follows:—

Ask whom you will; ask the whole world round, where, at present, is there any prospect of earning something? Where does business flourish? What persons, what trading-houses can candidly declare that they are progressing in prosperity?—There are but very few and those solitary cases, that can be pointed at who can say so. If there are—as regards Netherlands and the Netherlanders—a few banks and money establishments, at Deli and Billiton, a couple of railway companies and newspaper undertakings, almost all is said.

The history of former ages shows periods of general depression and of dearth and famine; but if you investigate the causes, these will be found to be war, persecution for the faith, plague, floods or similar calamities interfering with the regular production, and thus putting a stop to all trade for want of available commercial wares, or else for lack of sufficient security to persons and goods. Whereas *now* that depression prevails everywhere, and though there is no question of a general famine as used to rage in times of yore, yet when a number of individuals and families are really starving, *now* the case is just the reverse: not the stoppage of productiveness, but over-production; not a lack of available commercial wares, but accumulation of stock and excess of supply; not the absence of security for persons and goods, but (save very local and transient exceptions) order and peace everywhere, accelerated expedition of merchandise, and rapid and convenient locomotion for the traveller.

Where then lies the fault? Have fields, gardens, pastures and woods become less productive? Does the miner dig less treasure from the ground? Do the fishermen's nets and hooks capture less prey? Have the means of communication by land or water become more imperfect or expensive? Is there any lack of intelligence to render the work efficient and economical, in short, to make it productive? Is there a paucity of labouring hands? By no means. Science has extended her benign power over all human transactions. Botany, Zoology, Chemistry and Mechanics have exerted their beneficial influence on agriculture and cattle-breeding; gardening and forestry are attended to with greater care and consideration than formerly; mineralogy and metallurgy instruct the miner; chemistry, electro-magnetism and all kinds of scientifically improved instruments and appliances everywhere facilitate the labours of the manufacturer, the mariner, the fisherman, the architect; and now, where force falls short—where the human hand, the ox and the horse, the windmill and the water-wheel, which formerly were all in all, prove insufficient, steam steps forth in a thousand ways, and furnishes force to any amount.

Then to what or to whom is the fault to be attributed? Man alone is in fault himself. His extravagant desires and his want of sense are the fault of all this. We are—and with cause—proud of the scientific attainments of the 19th century, but, alas! we overlook the fact, that commonsense is often lamentably in the rear. Merchants, ship-owners, railway-kings and statesmen, who have mayhap often chuckled at the story of the six gates of Abdera as a skit on the silly application of the rule of three, apply that very rule to enterprises, to which the six gates of Abdera might be rightly termed mere child's play. The greatest, and in its consequences the most ruinous, affair of this kind, of which recent times have offered us the painful and striking spectacle, were the railway speculations in America.

Details of railway speculation in the United Sates are then given. The conclusion is:—

The cupidity of the would-be millionaires has levelled a severe blow to the prosperity both of America and Europe; and nobody is able for the present to compute how much time it will take ere commerce, agriculture and trade will emerge from this pool of overproduction, in which they are all in danger of being submerged. This one example of *Abderitism* will suffice for my present purpose, though innumerable instances might be produced in other departments.

And then the writer goes on to deal with our Ceylon tea enterprise, thus:—

Let us hope that good sense has been purchased in proportion to the enormous penalty? It is not only a sad, but also a grievous spectacle, surrounded as we are by so many examples of misery resulting from over-production, still to see persons, who not only refrain from warning against it, but who do all their best to increase the evil with all their power; who summon up "all hands" to give even a greater expansion to this existing over-production. What precedes reflects near about the course of my ideas while reading a pamphlet published the other day, entitled: *The Ceylon Tea Industry, an opening for men of moderate Capital. By John Hamilton (late of Ceylon).* To those who take an interest in Colonial agriculture, the vicissitudes of culture in Ceylon are generally known, and so I need not here enlarge upon the incidents in that Island with respect to coffee and cinchona. With truly admirable energy did the capitalists and planters of Ceylon, when coffee

and cinchona threatened to collapse, seize upon a new culture — that of tea; and however alarming this new rivalry may be for existing concerns of a similar nature yet no tea-planter, whether he may have established gardens in Assam, Darjeeling, the Nilghiris, in Cachar, Bagelen, the Preanger-Regencies, in China or Japan, can take it amiss if his "fellow-planter," endeavours with courage, energy, and perseverance to keep himself standing by tea-culture, when coffee and cinchona leave him in the lurch. If, however, the new culture in Ceylon really proves such a boon to the embarrassed planter, we must question whether the clatter with which the novel industry is trumpeted forth be not a great folly.

Not only in special papers, but in almost all other newspapers and periodicals, we find articles and computations to prove that the Ceylon tea possesses qualities superior to all other existing teas: that the rapidity with which the produce extends is amazing; and that in a few years, it will amount to forty millions pounds English. The Englishman, otherwise so practical, seems for the moment to be blind to the impending danger of over-production:— "The more tea Ceylon produces, the sooner we shall have sufficient to displace the China-crop," I read lately in the Indian Planter's Gazette. I hope they may; but I am not so very sanguine about it, after the ample experience of the consequences of over-production, which the tea-planters, too, have so amply experienced these ten years. The present crop of tea out of China is really more than sufficient to render the competition with that mighty tea-growing country very keen; and it is at any rate extremely dangerous to expedite the natural course of production of any article whatever by artificial stimulants.

If Mr. Hamilton is seriously concerned for the welfare of the tea-planters in Ceylon, and the prosperity of their industry, he could pursue no more unadvised course than thus enticingly summoning all "men of moderate capital" to repair to Ceylon and thus increase the already great number of tea-planters.

Indeed, the price of tea has declined so considerably from the rates at which it stood some 10 or 12 years ago, that, for planters who have not happened to work under exceptionally favourable circumstances, it has already become a question of "to be or not to be"; and that they have only succeeded in holding their own by great exertion, judgment and parsimony, or, as the saying is to get on a little by hook or by crook. If affairs flourish in Ceylon, . . . we cannot but congratulate the good planters on their success; but in their own special interest as well as that of other tea-planters, we would hope they will have the good sense of working on quietly, without any clamour, and that they may thus be left at leisure to lay by something against a rainy day, before the tea-business becomes, like so many other businesses, a wild contention of offers at lower and still lower prices; and ere not only the present planters, but moreover the "men of moderate capital," called upon by Mr. Hamilton, pull each other to pieces, as we say, while the tea-market itself is overwhelmed with tea.

This boasting about Ceylon's tea-production has sometimes led me to suspect whether there is not a little mystification in the case. I must candidly confess that the perusal of the above-mentioned pamphlet, "endeavouring to give a short account of the rising tea-industry in Ceylon, possibly destined, erelong, to make this island the Tea-garden of the World" as the esteemed author concludes his treatise, has not cured me of my doubt. What must a tea-planter think of a communication, for instance, as that about the Mariawattie-estate, occurring in the work, which plantation is said to have produced in the last two years successively, upwards of 1,100 lb. of tea *per acre*; on which he very justly observes, that it is "a feat unequalled by any estate in the world?"

This produce would be equal to:

1,763 half kilos per Bahoe
or 2,469 „ „ per Hectare.

Another article, viz, one in the Indian Planters' Gazette of the 19th of January 1886, I found also highly remarkable. It is entitled "Notes of a Visit to the Planting Districts of Ceylon; by an Assam Planter" (signed) J. O. Logan. From this paper it appears first of all, that the writer is an Englishman, then that he is a tea planter and must therefore be considered as a competent judge; the article gives also the impression of being written without any partiality. The writer relates, that he and another tea-planter visited several tea-districts in Ceylon; and that each having done this by himself, they finally compared notes. The opinion of the two experts agreed in regarding the climate and rainfall as very favourable to the tea-culture; not so unconditionally favourable was their opinion of the soil; at least the conclusion is, that tea may succeed very well in Ceylon, if the plant be judiciously cultivated and carefully treated *at all events when manure can be applied*; "but, alas!" adds the writer, "at present neither of these conditions are being fulfilled; tea is planted *anywhere and everywhere*; almost any land is thought good enough to grow tea on, etc."

The system of plucking and pruning as practised in Ceylon is decidedly condemned by the planter from Assam. The average wages of coolies throughout Ceylon stated as being 5 1-3rd annas = 33 Rupee cents per day, or 9 Rupees per month. Women 25 Rupee cents or 4 annas per day. It is difficult to deduce hence any comparison with our wages in the Dutch Indies, on account of the uncertainty of the comparative value of the Rupee to the Dutch currency, and the wages not being invariably the same in our colonies. The 33 R. cents would make about 39 cents Dutch Currency. "A remarkable tone of sanguine boastfulness runs through all the literature," observes our Englishman, "and much of the conversation about tea in Ceylon." "There is another aspect of the enterprise" he continues, "that struck me forcibly. Everyone seems to be planting tea, with the intention of selling to some one else, and clearing out of the island as quickly as possible. This is speculation, not investment; and is wanting in the elements of stability." How far this may be true, the writer of the present lines dare not decide; but he believes that it would be acting more in the veritable interests of the Ceylon tea-planters and of all their "fellow-planters" to warn them of the dark, ominous cloud, gathering over their heads, than to write such pamphlets as the one we have just discussed, by which one may become an accomplice in the ruin of others.

The principle on which the writer would aver us act is truly Dutch: if you have a good thing keep it dark so as to secure a monopoly of its benefits. About Ceylon and its tea, as about other countries and their products what is wanted is the truth and what Mr. Hamilton quoted about Mariawatte and its yield, is true. On the other hand we have the statements of the Indian planters. We in Ceylon do not overlook the danger of over-production, but we have good reason to believe that the quality of our produce will assert itself in the sharpest competition.

TEA PROSPECTS.

The fact that tea is now, as it has always been, the most important article of a grocer's trade, is sufficient reason why those whose interests are so materially affected by it should make it their constant study, and seek to understand every aspect the subject may present. Of such vital consequence is the working up of a good tea trade to grocers that, if they desire to succeed in their calling, too much attention cannot be bestowed by them on this department. With regard to the prospects of the new tea season 1885-86, although things are still slow, there are signs of rather more trade throughout the country, and it will not be denied that the season has opened under more hopeful auspices than did the last. Stocks are down one-half, while consumption is on the increase, and probably the only cause that militates against an immediate rise in prices is the uncertainty as to future supplies. Another reason for tea remaining at present

low rates is the eagerness of the public for anything and everything that is called cheap. This rage for cheapness has been fostered by dealers and worked upon by present giving shops and the like, until at last the retail prices of tea have been forced down to a point at which it is impossible to provide a really good article. In all probablity a reaction will sooner or later set in, and the demand will be for quality; then will be the grocer's opportunity to prove to consumers that long study and experience of the trade enables him to supply the want, as no mere novice or dabbler in the trade can. Of good tea there will be no lack if only the demand is alike good and the public are able to appreciate it and willing to pay a fair price. It is unnecessary to remind our readers that the quantity of tea exported from China to all countries is only a tithe of what is actually produced in that vast country; nor that the Chinese have for centuries made the growth and preparation of tea one of their staple industries, and have succeeded in bringing it to the highest state of perfection. But, besides China, the capacities of other tea-growing countries are practically unlimited, and in this way the annexation of Upper Burma may be reasonably expected to yield great results to Anglo-Indian enterprise. Advices from Calcutta state the probable export of Indian tea to this country for the coming season as about 64,000,000 lb. which, if correct, is only a little ahead of last year, but it is acknowledged that the supply might be immensely augmented in the future, and in all probability it will be. In considering tea prospects the rapidly growing importance of Ceylon as a tea-growing country must not be overlooked. Already it occupies no mean position, since the crop of the current season is expected to reach 6,000,000 lb., or fully 10 per cent of the whole production of Indian tea; this quantity, however, the planters predict they will be easily able to double next year, and three years hence they hope to have their export up to 20,000,000 lb. Nor is it only from Ceylon that large imports of tea may be expected, but Java, Brazil, Florida, and even Natal, are all coming competitors to be taken into account; still in spite of all this promised abundance, we are prepared to maintain our conviction that tea, bearing its present duty, is destined to rise. In India we are told, with the best known appliances and the most careful management, Tea can be grown at a minimum of 10d per lb. In such a season as 1884-85 that would yield very little profit on medium crops, while on inferior sorts it might mean actual loss; and it is in the order of things for skilled labour to increase in value. There is also a homely saying about a bird in the bush, and the fact that stocks of tea in this country are now so low, is certainly some temptation to bold operators to hold lay of the market and try to twist it up. Such an incident may develop any day, while the unsettled state of political affairs and the consequent uneasiness felt in commercial quarters lead to the fear least advantage should thereby be taken to enrich the few at the expense of the many. The great desideratum for the country at this juncture is confidence at home, with the opening up of new markets for British trade. While little can be expected from our Continental neighbours, and perhaps even less from America, there is much to be done in India, and it is in that country and China with Burma, that the great field of future commerce must be looked for; and hence we judge that a great extension of the Tea trade is one of the things that may be confidently reckoned upon and should be prepared for.—*Grocers' Journal.*

PLANTING IN NETHERLANDS INDIA.

(*Translated for the Straits Times.*)

COFFEE AND SUGAR.—PLANTING DEPRESSION.

The Java *Bode* of the 18th June asserts that hard times indeed are in store for the planting and mercantile community in that island. The low rates for sugar ruling in East Java where no more than 8 guilders per picul has been offered will only allow growers just to pay expenses under favourable circumstances. The only too probable result will be the closing of most of the sugar mills and the bringing down of many mercantile houses in Java. When closing is once proceeded with there is every reason for fearing that more than nine-tenths of the mills which now further so much wellbeing among the people around, will shut up, and the natives in the neighbourhood will find themselves without money to pay up the heavy taxes now bearing them down and also without sufficient food. The outcome will most likely be a storm which, unless curbed in time, will become only too widespread. Another portion of the population, namely pretty nearly one-third of the European element, will be involved in the almost unavoidable ruin of the sugar growing industry. It is a moot point whether they will quietly bear with their becoming paupers. The times even now are distressing enough. Misery is rife among the lower classes of European society in Java who, in default of honester means of earning a livelihood, have been driven to begging, robbery, smuggling, and even worse callings. Should this disorganization bring on disturbances when even these means fail, putting them down will be hampered by the insufficient number of troops available for service. The widely prevalent depression of trade and industry in Java has made itself apparent in the yield of taxation, a marked falling off being only too evident. The outturn of every tax has fallen below the estimate, sometimes as much as one-half. The coffee yield has diminished alarming, and the land-tax does not come up at all to the mark of the assessment. Yet the expenditure shows steady growth for all that. What with failing revenue, crippled planting enterprise, a weak army and navy, and beri-beri stalking over Acheen, the outlook for Netherlands India is far from being cheerful and encouraging. There is no hope for the better from changes in the machinery of the Home Government. The Parliamentary elections in Holland has resulted in a majority for the Liberals who, when they do come to power will assuredly go on with the present colonial policy of laying on more and more taxes regardless of the consideration whether they prove burdensome to the people or not.

Ravages by Locusts in the Philippines.—On Sunday, the 23rd May, there passed over the bay at Iloilo a cloud of locusts so thick, says the *Porvenir de Bisayas*, that at times it was impossible to see the neighbouring hills of Guimaras. A part of the cloud settled on one of the vessels in the bay, completely covering it, and the crew killed an immense number of the insects in driving them off. The insects were moving in the direction of Negros Island, which we learn from a subsequent issue of the *Porvenir*, was suffering severely from their ravages, all the fields being invaded by them. The authorities had issued notifications regarding the means to be taken for their extermination, and the Governor was going out in person to see that the measures laid down were properly carried out.—*Daily Press.*

Shea Butter Tree.—M. Heckel whose researches on the alkaloids of the kola nut are so well known has recently called the attention of the Academy of Sciences of Paris to the importance of the Shea butter tree (*Butyrospermum Parkii*) as a source of gutta-percha. The milky juice of the trunk when solidified has, he states, all the appearance and properties of gutta-percha. The tree can be tapped when four years old, grows readily in argillaceo-siliceous and ferruginous soils, and is found over a large area. M. Heckel also suggests that the *Bassia* trees of India should be examined with respect to the character of the milky juice they contain.—*Madras Mail.*

Correspondence.

To the Editor of the "Ceylon Observer."

THE CEYLON FISH-CURING ENTERPRISE.

New Peacock, Gampola, 28th June 1886.

Dear Sir,—An important industry has lately been inaugurated, in the island, viz., Fish-curing. Having had several cwt. of said Hambantota fish, from Messrs. J. Auwardt & Co., Colombo, in behalf of my coolies, I am very favourably impressed with their quality. I found them a wholesome, good food, when compared with the *carawaddy*, our poor coolies usually have to put up with (simply sun-dried without salt and in a high state of *fetor* before reaching Ceylon from India). With your permission I would make a few remarks on this industry. I would first like to offer a few hints to the *promoters* of this industry which, if attended to, would improve the quality of the fish :

Firstly.—Thoroughly wash the fish and free them from all blood (sea water is sufficient for this purpose.)

Secondly.—Take the head off, and two thirds of the backbone.

Thirdly.—The *salting* of the fish, should be carried out as follows :—When the head and backbone have been removed, and the fish thoroughly washed, then carefully begin in laying the fish singly, *head* and *tail*, into neat two or three feet squares, giving each layer an *abundant* supply of salt, carefully sprinkled over every part ; over each three feet square heap, place a layer of boards, and on the top of the boards, put over each heap, five to six cwt. of stone; the pressure produced, has the effect of causing the salt to permeate throughout the fish and at same time the fish gives off the fatty or oily matter more or less in all fish, which is found to be impreservable, *even by salt.* All the fish I had contained the rancid oil in them, because no pressure was applied, or, if applied, the head and backbone being left on them prevented an even pressure on the substance of the fish, and consequently the non-expression of the oil or fatty matter. The pressure should last for five or six hours. Then turn the squares (and re-salt) for other three or four hours. Nothing more is wanted, but three or four days of Hambantota *sun*, to make a perfectly wholesome food, cheap wooden presses on the *lever* or *screw* principle would be better than heaps of stone, if to be had.

I presume the retention of the head and backbone (although unfit for food, and most detrimental to speedy and safe curing of fish in a tropical country) is on the score of economy, not to loose weight. Does it not strike the promoters of Fish-curing, were they to well salt heads, backbones and offal and allow the sun to dry the last particle of moisture from them, that they would prove a valuable fertilizer if sent to Colombo and placed under our now silent coffee peelers for trituration. I believe they would soon be in demand, at R50 to R70 per ton, when the value of such a promoter of tea leaf became known.

I most candidly believe the Fish-curing industry, if fostered and promoted all around our seaboard, would be of far greater value to the natives of the country than tanks and roads in districts where there are no population, and where sickness in the form of fever render's life a misery, while the whole seaborde of Ceylon is healthy for natives, as seen by their robust health, while 20 miles inland you come to the poor wretched fever-stricken villager, *pot-bellied by enlarged spleen*, emaciated and spindle-*shanked* from the want of nourishment.

Would it not show wisdom and humanity in our rulers, if some of the large sums of money annually squandered on irrigation works (which never have *nor ever will pay*), were used to promote Fish-curing. We never can rob the "vasty deep of its wealth, while every R10 taken out from it is real wealth without the slightest drain on the national store. I have known a small seaport town on the east coast of Scotland draw a quarter of a million of money from the sea in six weeks' time, which when divided among the 7,000 inhabitants showed itself in their wellbeing and social condition. That there are splendid fisheries all around the seaborde of Ceylon with an abundant supply of naturally formed salt for the preservation of fish, it has long been a wonder some of our wise rulers never thought of devoting the *planter-earned* sums to such a purpose.

Let the Powers-that-be think of the poor planter and cooly, who will soon again be exporting their 60,000,000 to 100,000,000 lb. of tea, and giving the C. C. S. another chance of raising their pay all round, off their hard earnings, the coolies' and planters' pay being an uncertain quantity, varying with the times, but the C. C. S. once increased (let the times be ever so hard) never alters.

Dear Editor, I could give you many more hints, how the poor native could be benefited, were the wild irrigation mania, once *cured*. Just think of Kandoila and Rugam, &c., and now Ellahara to be.

—Yours truly, W. SMITH.

TEA MACHINERY.

Lunugala, 29th June 1886.

Dear Sir,—In your Saturday's issue I note Mr. Jackson's letter dated London, 1st June 1886, also "Notes and Comments" on same. Mr. Jackson quotes from an article of mine written for the "Ceylon Advertiser," on fuel for tea estates, in which I wished particularly in the first place to show how real was the difficulty which planters would have to contend with in obtaining fuel on many estates, and in the second place recommending the uses of petroleum as the cheapest fuel, easiest of transport, and the least liable to burn out fire-bars and plates or any other iron, especially cast-iron, brought into immediate contact with a dead white heat such as is produced by coke or anthracite coal. I have in no way criticised Mr. Jackson's machinery, but if Mr. Jackson has succeeded in getting cast-iron tubes which will for any lengthened time stand the direct action of a fire at white-heat in contact with the iron, he has achieved a great success. I have had heavy iron tubes or pipes in a Clerihew house burned through very quickly, and I have had the heavy fire-bars of an engine burned in one day by bad stoking. Of course there is a great deal in stoking as everyone knows.

I have not in any way criticised Mr. Jackson's machinery, but it is by no means perfect yet: in fact the last roller which I have not had an opportunity of seeing, I am told, is a departure altogether from the double action of two planes working at right angles, and the box or chamber for the tea in the new machine is rotary whilst the table is stationary. As I told Mr. Jackson the last time I had the pleasure of seeing him and talking with him on these matters, my objections to his machines were first the excessive cost which placed them beyond reach of the great body of tea planters, and second the power required to drive them. JAMES IRVINE.

THE PROPOSED CEYLON TEA SYNDICATE.

Louisa, 30th June 1886.

Sir,—I presume it is generally understood by the Committee who have the above scheme under consideration that, to introduce Ceylon teas into foreign countries, each agent must have recourse to his own method of action.

In this connection I am very much interested to know how the American general agent, stationed, say, in New York City, is to push a tea of which he has, say, one hundred samples, and but a meagre supply of any one of them. "Why, he must advertize!" says one.

Now, I wish to know how he intends advertizing? Through the medium of newspapers and printed circulars I presume. Such a plan of advertisemet would, no doubt, suit a nice homely little town like Adelaide; it *might* do for a city like Melbourne; but in New York city this method of advertizing is not likely to attract much custom. The most successful system of advertizing in America that I know of is that of free distribution of samples among the better classes of citizens, each sample being left at the house, and with it a blank order already addressed to the appointed agents who must, of course, be in a position to supply according to sample sent.

I may mention that the matter of delivery of goods is much simplified in America by the establishment of the National Express Co. Suppose A. B. receives a sample of tea, and with it a short account of the scheme in question, as also some interesting matter regarding the "far-off island of Ceylon" so well-known as the place where "every prospect pleases," &c. He either tries the tea (probably will) or he gives it to his servants to try, which, after all, is perhaps the best way to find out the intrinsic value of the article. He also finds an envelope addressed to the agent of the "Ceylon Tea Syndicate" enclosing a blank C. O. D. order, which he fills out and mails. The agent, on receipt of order, sends the parcel required with invoice to the nearest Express Co.'s Office, who pay the amount due at once to the said agent, and deliver the goods "straight away" to the consignee, who is charged a small commission over and above the cost of tea as per invoice, to pay the Express Co. for their trouble.

This system known as C. O. D. (collect on delivery) is perfect in so far as it makes bad debts impossible and insures speedy delivery. The one thing necessary in carrying out this line of business is *power to supply* any demand made upon any article so introduced, and to be able to supply it *according to sample*.

To give an agent this power, he must be allowed to bulk all teas *of a kind* together, or what is better have them bulked for him, before dispatch, in Ceylon. To avoid any question as to the unfairness of bulking "my good tea with thine which is (of course) inferior" an expert would have to be appointed, having full powers to judge and if necessary condemn any tea which he considered not up to a *certain standard*, which of course would have to be fixed and clearly stated by members of the Syndicate.

This standard (which must be high) might be fixed by defining clearly what sieves are to be used by all members sending in their teas through the Syndicate to the several countries, each respective agent having it in his power to suggest any change which he deemed advisable in advancing our interests in his own special market. I am told Ceylon teas "won't *mix*." This may be so although I have never seen it tried to any great extent, that is, Ceylon tea with Ceylon tea.

That Ceylon teas cannot compete with Indian teas, so far as mixing with China teas is concerned, we all know, but would the bulking of say 50 Ceylon teas from different estates turn out a bad sample, provided that these teas are well cured, equally sized, and individually tasted and passed by an expert?

Then as to an equal distribution of all necessary costs, which would of course be heavier at first than afterwards. I would suggest that individual consignments be sent to the bulking centre (wherever it may be) in lots of 1,000 lb., each lot to constitute one share, each shareholder to be responsible for his own interests according to the number of shares he holds.

I consider my suggestion wise for the following reasons:—First it will insure quantity and equality in what is put before the American public as "Ceylon tea." Secondly, every member will have his fair share of the proceeds, inasmuch as all teas will have to be passed by an expert before bulking.

On the other hand, all will share alike in the first expenses of advertizing and all other necessary expenses in connection with the furtherance of the scheme.

In conclusion let me add that I put this letter before the public as a suggestion and nothing more. If it can do no good, I sincerely trust it will do no harm to a scheme which must in one way or another be carried out if our Tea Enterprise is to end in success. That foreign markets *must* be opened for our tea is the unanimous opinion of those interested, and our thanks are due to Mr. Rutherford for taking the initiative in the matter.—Yours faithfully, J. McCOMBIE MURRAY.

LOSS IN WEIGHT ON TEAS.

1st July 1886.

Dear Sir,—Can you or any of your readers inform me *why* it is that an allowance is made to purchasers of Indian and Ceylon teas of 1 lb. in every package weighing over 28 lb. gross? Thus the unfortunate planter who lives so far from the cart-road as to render packing in chests out of the question is mulcted in close on 2 per cent in London, while his more fortunate neighbour who being close to a cart-road ships in chests loses only 1 per cent or under. Should a planter ship in boxes and the gross weight be over 28 lb. his loss in weight would be 4 per cent—of course this all in addition to any actual loss of tea there may be in bulking &c. in London. I am not yet quite sure whether the *Purchaser* or the *Broker* or *Merchant* benefit by the 1 lb. allowance. I only know that someone gets the allowance—and presumably the Purchaser, or failing him the Broker—for samples?

I never could understand how the loss in weight of from 1·90 to 3½ per cent arose until I hinted at theft in the docks as the cause, remarking that I had put half lb. extra into last shipment of half-chests and half lb. extra into previous shipment of full chests, each shipment containing close on the same amount of tea. To my astonishment the loss in weight on the half-chest shipment was nearly double that on the full-chest one and my enquiries elicited from my Broker the custom of allowances as mentioned above—presumably to the purchaser. This no doubt may suit Indian Tea Companies who possibly may get a sort of return commission out of it, but in the interest of individuals an effort should be made to stop the custom while our industry is in its infancy.—Yours truly, dear sir,

ECONOMY.

P. S.—Is this return of from 1 to 4 per cent given to purchasers of China teas as well as to those of Indians and Ceylons?

[We are assured that the custom of allowing 1 lb. on every package at home applies to all teas and that it is for shrinkage (in the timber of the chests) for leakage, &c. But the several questions raised by our correspondent well deserve to be enquired into by the Planters' Association. —Ed.]

MANURES FOR COCONUTS.

1st July 1886.

Sir,—Can any of your readers tell me how to apply burnt coral (unslaked) to coconut plants 2 to 5 years old: how much might safely be put to a plant, how applied, and how far from the trunk of a tree might it safely be spread, rather how near it? I am not asking for suggestions from any theorist, but a practical coconut planter who has either used lime, or has seen it used for coconut plants, and can therefore at least speak from practical observation. The information now asked for will be thankfully received by several coconut estate proprietors and especially by, yours faithfully, AGRICULTURIST.

P. S.—Salt too is, I believe, used by many as a stimulant: the same information regarding it will be welcome.

[We have no doubt that our Hapitigam Korale correspondent will be able to answer these queries. —Ed.]

Tea.—The report of the directors of the Kangra Valley Tea Company shows that the outturn was 88,102 lb. which is considerably in excess of the three previous years. The average price obtained was annas 10-0¼. The expenditure averaged annas 9-0¾ per lb. The Retail Depôt at Prince's Hall, Piccadilly, has paid expenses, and the quantity of tea sold there considerably increased. The estimate for 1886 provides for an outturn of 85,000 lb. fine tea at an expenditure of R33,067. The gross receipts for the year were R55,485, and the expenditure R49,842, leaving a profit of R5,643 which has been carried forward.—*Pioneer.*

Tea Factories.—Mr. J. Capper in a few remarks made after the reading of Mr. Shand's paper estimated that during the next six years, for Tea Factories in India and Ceylon, as much as one million sterling of home manufactures (iron, glass, machinery, &c.,) would be required. This is certainly a moderate estimate; for in Ceylon alone before six years are over, there will probably be 1,000 Tea Factories, big and little, and considering that some of the Factories already completed have run away with two or three thousand pounds and mainly for imported material, the million sterling, if prosperity favours the tea enterprise, will be a good deal exceeded, if India is counted as well.

Centigrade and Fahrenheit.—The Centigrade thermometrical scale is now becoming so frequently used in English books that a short method of turning incomprehensible Centigrade into intelligible Fahrenheit will be a desideratum. The rule is simple, and the operation, after a little practice, may be performed mentally. All one has to do is to double the Centigrade number, take a tenth away from it, and add 32 to the number obtained. Let us take 60 deg. Centigrade. Twice 60 is 120, take one-tenth away, *i. e.* 12, and 108 remains, which, added to 32, makes 140, which is the answer. Taking a more difficult number, 32 Centigrade, we double and obtain 64, from which we take 6·4, leaving 57·6, to which we add 32, the total being 89·6.—*Indian Gardener.*

Island Industries.—I stated in my first article that for the present I should defer alluding to the pearl shell and beche-de-mer industries beyond the remark that they are a well-established, profitable business. If, however, they are to continue so permanently, some legislative enactments will be necessary; some precautions will have to be taken to prevent these valuable marine productions of Queensland from being utterly swept off the coast. At present everyone appears to take everything he can get for fear of leaving it for somebody else, and however prolific these marine creatures may be, such inroads must bring them to an end at last. The pearl shell oyster must at any rate be amenable to scientific cultivation, and undoubtedly some measures should be taken to assist them in the propagation of their species, and to protect them from the ravages of both their natural and unnatural enemies.—*Townsville (Queensland) Herald.*

Tea Drying.—Mr. Gibbs sums up the philosophy of tea drying in these three sentences:—

1. That the tea should be kept in gentle but effectual movement, so as to separate every leaf from every other leaf, and allow the dry air to get at both sides.
2. The application of as much air as can be introduced without blowing the charge out of the machine.
3. The skilful adjustment of the temperature of that air so as to obtain the highest drying power without injure to the product.—*Nilgiri Express.*

The Yield and Condition of Mariawatte.—The following facts concerning this well-known estate, which have been forwarded us, are well worth reproduction:—The original 100 acres of the estate has given 420 lb. for the half-year just ended, 30 acres having been pruned last October, and 70 acres in April-May of this year. It is estimated that the estate will repeat its previous record, if not exceed it, which certainly shows that it has in no way suffered by reason of the heavy and abundant yields of former years. The 70 acres pruned this year were plucked continuously for 18 months, and the April-May pruning has so far proved successful, as the bushes are full of vigor, and look fit for big flushes. Mariawatte, much lauded as it has undoubtedly been, is probably acre for acre the most valuable and prolific estate of any in the world. —Local "Times."

Coral Leaf.—Among the curiosities now shown at the Colonial Exhibition is one specially interesting to ladies in search of novelties. This is the coral leaf which has been recommended to attention by the English Consul at the Bahamas as a valuable discovery for millinery purposes. It is lighter than jet in weight —a great desideratum in head-gear—it can be dyed any shade or bleached the purest white, and, being of a very pliable nature, is said to twist into the most perfect and artistic specimens of hats and bonnets. Ingenuity has been sorely taxed to provide a headdress that shall not outrage artistic feelings, and at last there seems a hope that in the coral leaf has been found a hygienic and tasteful solution of this difficult problem.—*Home News.*

Trade in Dried Fruits and Vegetables in Austria.—The immense importance of the trade done in the above useful articles of food by the Americans especially, and in a less degree by the Germans, French and Swedes, has at last appealed to the minds of the more apathetic Austrians. An experimental station fer research into the best methods of producing first-class marketable commodities has been established by Graf H. Attem's at St. Peter's near Gratz, and the results obtained are so encouraging that it may soon be looked upon as a certainty that the home-manufactured articles will take the place of the imported ones, and that considerable impetus will be given in that country to the cultivation of the various vegetables and fruits that can be dried with the best results. The *K. K. Oesterreichischen Pomologen Verein* has sent out a pamphlet recently, in which the various important uses to which the dried goods can be put are succinctly pointed out, especial emphasis being laid, owing to their extreme portability, on their use by the army and navy, hotel keepers, and dwellers in towns, who, by being far removed from sources of supply, or by reason of their comparative dearness, are debarred from the enjoyment of these health-giving articles of consumption.—*Gardeners' Chronicle.*

NATAL TEA.

TO THE EDITOR OF THE "COLONIES AND INDIA."

Sir,—You have from time to time kindly published my communications relative to tea culture in Natal, in order that people in this country interested in one of the burning questions of the day (*i.e.*, what to do with our boys) might be informed of the opening for capital and labour existing in the Colony to which I belong.

In the issue of your journal last week you furnished particulars of the public sale of a small consignment of tea from Natal, averaging 1*s.* 7*d.* per lb. in bond, and this price was realized in the teeth of the broker's report that the tea was over-fired or burnt, and irregularly fermented, being details of faulty manufacture which experience will remedy.

The tea itself contains the elements of good quality, only needing the guidance of an expert or experience in the manipulation to do it full justice.

From Messrs. Gow, Wilson & Stanton's Indian and Java tea report of the 11th inst, I quote the following as an idea of the current price of Indian teas in London:—Fanning, red to brown, strong rough liquor, 7¾*d.*; Broken Tea, fair brownish to blackish, strong liquor, 8½*d.*; Pekoe Souchong, fair blackish greyish, useful liquor, 10¾*d.*; Pekoe, fair greyish to blackish, some tip, useful liquor, 11¼*d.*

It is evident from the foregoing that Natal planters have a cheering prospect to stimulate them to use every exertion to produce quality rather than quantity, for the deduction is that good tea will return a good price, as the great bulk of the tea which reaches this market is of very inferior quality or strength.

There was opened yesterday at the Colonial and Indian Exhibition a new tea pavilion for the sale of Natal tea by the cup, which was largely patronised, and the quality of tea supplied afforded great satisfaction, freely expressed by the public.

In the Natal Court tea from various estates is shown (a parcel of a ton from one); photographs of plantations are on view, and every information can be afforded.—I am, &c., Morton Green, Brixton Hill, June 15, 1886.

HYDROQUININE.

Some years since (*Pharm. Journ.*, [3], xii., 905) in a paper describing several alkaloids found in the mother-liquors obtained in the manufacture of quinine, Dr. Hesse gave some account of one containing two atoms of hydrogen more than quinine, to which he gave the name "hydroquinine." In many respects it resembles quinine, dissolving readily in alcohol and ether and forming a crystalline hydrate when precipitated from the solution of its salts by ammonia. Its rotatory power is less than that of quinine. The solution in excess of sulphuric acid has a blue fluorescence, and with chlorine and ammonia the alkaloid gives the same reaction as quinine. The therapeutic action of this alkaloid has recently been studied by Seifert, who finds that it is an antipyretic superior to salicylic acid and kairine, reducing the pulse and the temperature with abundant transpiration. The dose is about the same as that of quinine and its continued use is not attended with disagreeable effects. There is reason to believe that the presence of this alkaloid in commercial quinine sulphate may have been the cause of the exaggerated estimates of the amount of cinchonidine in that article, as will appear from a paper on this subject by Dr. O. Hesse that will be published in this Journal next week. Meanwhile it may be mentioned that M. Armet de Lisle has addressed to the Académie de Medicine a formal protest against the statement made by Dr. de Vrij that the quinine sulphate of his manufacture contains 12·448 per cent. of cinchonidine sulphate. Another circumstance which appears to throw considerable doubt on Dr. de Vrij's results is the amount of water of crystallization which he gives for quinine sulphate of English manufactures viz., 10·85 and 5·72 per cent. In any case it seems very remarkable that he should regard such a small amount of water of crystallization as being the reason why a particular make of quinine sulphate commands a higher price than others. The *Pharmaceutische Zeitung* also calls attention to the fact that according to Dr. de Vrij's statements the quinine sulphate made in Germany would not hold the first rank as to quality, and it is suggested that German manufacturer of this article should take steps to furnish such an explanation as is desirable in regard to this subject. —*Pharmaceutical Journal.*

THE CINCHONA MARKET AND PRODUCTION IN CEYLON.

Our readers will without doubt have taken due note of the last local sale, on Thursday, of 72,829 lbs. of cinchona bark with the analysis and the prices realized. We cannot but regard the continued fall in bark, both locally and in the London market, as eminently unsatisfactory, not only so at the moment as it affects producers who are forced to realize their crops, but more particularly as being entirely without the slightest gleam of hope for a better condition of the market in the immediate future. Some of the bark at the sale to which we refer, analyzing 2 per cent of quinine, appears to have realized about 21 cents per unit, a figure to which we think we are justified in applying the word miserable. Shortly after the great rush for cinchona planting had fairly begun, there were many who were unable to see where a market could be found for the enormous production of quinine which seemed to be quite possible in the future, and who confidently foretold the consequences which would follow in its train. But the opinions of many eminent specialists were put forward in contradistinction to this, and planters were told that quinine could be used for brewing beer, for fixing dyes, for tanning; and for a variety of purposes from which at that time its excessive cost debarred its general use. It was boldly asserted that a reduction in price by 50 per cent would leave an ample margin for immense profits to growers, and that such a reduction would induce the use of quinine as a medicine to an extent far beyond the imagination of the men of that day. The Chinese, for instance, were to cease the use of opium, and exist on quinine as a preventive to the ague-fevers so common along the principal rivers of China, and which had mainly induced the habit of opium-smoking. We were told on one occasion by an eminent medical authority that, as there was only a certian portion of the world's surface that would grow cinchona, were every acre of that portion planted up with trees, it would not supply all the quinine for which a market could be found when the drug fell in price, something to about half the extent it has done since. How far such dreams have been realized it is not necessary for us to point out. The hope and fears of many years' experience of the cultivation, the loss of millions of trees by canker and wet, the devastation of plantations consequent on the necessities of impecunious producers, and the thousand and one causes which have resulted in the paralysis of the cinchona industry—overweighted as it has been by super-abundant supplies—the old fields of supply in South America being all but abandoned, in consequence of the reduction in value of bark causing collection to be unremunerative—in spite of all these things, the prospects of cinchona growers in Ceylon and the East Indies exhibit no sign of being bettered. It is at any moment sufficient to overwhelm the existing markets of Europe and America. Over and over again have we been told that the supply from Ceylon must shortly be reduced; it was impossible that any year in the future could show such an output of bark as we had seen in the past. It has been asserted that a variety of causes had reduced the acreage of trees in Ceylon so seriously that a very important reduction must of necessity be shown in the export of the present season, and as a consequence we might look with certainty for a rise in the value, which would altogether alter the appearance of the market. With such prospects as these the hopes of producers have

been buoyed up for months, nay for years, past. Even local experts, as well as such authorities as Mr. Moens, seemed really to imagine a radical change was imminent, and that it was quite impossible Ceylon could this year export anything approaching to the total during the year ending 31st October 1885. And, what so far as we have gone, is the actually reality? The export to date, is no less than lb. 11,608,621 against a total for the same period of last year of lb. 8,020,117. Turning to the railway returns, we find that for the week ending 23rd May, cinchona bark was carried at the rate of 158 tons, against 98 tons in the corresponding week of last year, and again on the 31st May, 128 tons against 113 last year. It must not be forgotten that though the cinchona harvest may be well considered as closed for the season in the districts which are affected by the South-west monsoon, the bark from Uva and Udapussellawa will only now begin to be taken in. The coffee crops of the spring season having been secured, attention will be paid to cinchona harvesting, which will be none the less on account of a falling off in the produce of coffee as regards the estimated outturns. The railway return does not of course include all the bark that comes down from Haputale and other districts which are served by the Ratnapura road. As far as we can learn at present our estimate for the current season made at the end of last year will have to be raised in accordance with facts, to no less than 15,000,000 lb. This enormous mass of cinchona bark cannot fail to disorganize to a large extent the markets of Europe and America, and it is impossible to foretell to what extent prices may eventually fall in the immediate future. It is equally impossible to say when any improvement may be looked for in this respect, as the necessities of producers may compel them to harvest their crops as heretofore. It may be well to allow our imagination to pourtray what might have been the present state of the market had the efforts of cinchona planters been crowned with the success that they had anticipated. Let us suppose for a moment that the millions and millions of plants which were put out had arrived at maturity, and that the older coffee districts were a forest of huge cinchona trees, stretching for miles along the slopes of the hills in every direction. It may bring but little consolation to think of it, but, had this been reality, the bark of the cinchona tree would not command sufficient value to pay for its harvesting, and the planter, with apparently countless wealth at his very door, would have been as completely a ruined man as if his coffee had been abandoned and nothing planted as a substitute. The product which is now renovating his fortunes would have found no place under the shade of the branching cinchona trees, and Ceylon would have been the scene of disasters even more complete than those that have already befallen her.—Local "Times."

JAVA: TRADE AND COMMERCE FOR 1885.

Report of Consul McNeill on the trade, commerce, and general matters relating to the Island of Java for the year 1885:—The year 1885 has been an unfavourable one for the trade in Java, and though no actual financial crisis occurred as in the year previous, a general feeling of depression has been felt throughout the year.

Sugar.—The crop has again been a good one, though not so abundant as in 1884, the outturn being about 15 per cent. less, say a little over 5,000,000 piculs, or about 300,000 tons. Prices varied considerably in sympathy with European advices, the market opening at fl.9 c.50 to fl.9 c.75, and rising steadily from fl.12 to fl.12 c.50 per picul, but declining at the close of the season from fl.11 to fl. 10 c.50 per picul. Had rates remained at the level at which first sales were made, the result would have been, as a rule, very unsatisfactory to planters; and it is a matter of congratulation that the markets in the consuming quarters advanced in the manner they did. A large proportion of the crop was again shipped to Europe on planters' account. An area under cultivation is reported to be well up to last year's and a good crop—unforeseen circumstances excepted—may be looked for in 1886. The disease in the canes, alluded to in my last two reports, has increased in some districts, but diminished in others. The damage done by it has not, on the whole, been great; and it is generally considered that by careful planting and manuring it can be easily grappled with.

Coffee.—The crop has been an exceedingly poor one, the production of the Government gardens having declined to 499,909 piculs, against 1,011,787 piculs in 1884 and 1,072,492 piculs in 1883. They yield from private plantations has also proved much under the average outturn, though the decrease is not so marked as in the case of the Government coffee. The quality of the crop has been poorer, also, owing to long-continued drought, and the presence of the leaf-disease in many gardens. Prospects for the coming crop are, however, fortunately brighter, leaf-disease not having yet shown itself to any great extent.

Rice.—The crop has been an enormous one, and consequently prices have fallen to an unprecedentedly low level. The quantity exported was more than double that of the previous year, viz., 27,939 tons, against 10,360 tons.

Tea.—The number of plantations under cultivation have remained almost stationary, but owing to unfavourable weather the yield of 1885 shows a slight decrease, the exports having been 2,568,675 kilos., against 2,904,567 kilos. in 1884. Exports to London amounted to 1,705,850 kilos., and to Holland 750,446 kilos. The preparation has been paid more attention to with favourable results. A considerable quantity of seeds from Assam has been imported.

Imports.—Our markets have been in a more depressed and unsatisfactory condition than has been experienced for many years past, owing principally to the decreased buying power of the native population, and the more than adequate supplies which have continued to come forward during the year. The market was already overstocked with goods of all descriptions at the end of 1884, and the heavy arrivals thrown during the twelvemonth on a falling market served to depress prices still, further. During the last three months of the year business almost came to a standstill, as dealers at last lost confidence, owing to the progressive decrease in prices, and were frightened to operate with the possibility of having their purchases left on their hands in consequence of a further decline. The poverty of the natives is attributed to the very considerable depreciation which has occured in the value of rice, combined with the increased pressure used by Government in the collection of the land tax.

Cattle Disease.—In the beginning of the year cattle plague broke out in the eastern part of the island, in the Passaroean Residency, and as there had been no transit of cattle from or to this district, which had remained free from the disease up to this period, the origin of the outbreak appears to have been spontaneous. In May the plague appeared in the western part of the island, in the Bekassi district, near Batavia, where it prevailed with considerable severity, but owing to the strenuous exertions taken by the Government, it disappeared almost entirely after the lapse of two or three months. In August there were some few cases of cattle plague and foot-and-mouth disease in the neighbourhood of Batavia, but in the following month the disease was officially reported to have disappeared. In December there were a few cases of cattle plague among the buffaloes in the Krawang Residency. The staff of veterinary surgeons, appointed by the Government for the inspection of cattle and suppression of diseases numbered at the end of 1884 seven Europeans, assisted by 13 certificated natives, while several Javanese were also in receipt of medical instruction to qualify them for future service.

Customs Receipts.—The following have been the customs receipts in Java and Madura during the years 1884 and 1885:—1884, fl8,968,825 c67; 1885, fl8,251,193 c33. The returns therefore of last year show a decrease on that of the preceding year of fl717,632 c34.

Government Railways.—No new lines have been completed during the past year. Progress has, however, been made with the lines between Djokjakarta and Tjilatjap, and with the small line connecting Sourabaya

with the mouth of the Kaliemaas River, whilst the survey and the provisional plan of the line between Tjilatjap and Tjitjalengka, and the surveys of the lines from Djokjakarta to Willem I. *via* Magelang, and from Magelang to Poerworedjo, have all been finished.

Private Railways.—The line between Batavia and Bekassie, mentioned in my last report as having been commenced, has been steadily progressing during the past year, although considerable difficulty has been experienced in purchasing the land through which the line passes. A line connecting Tagal and Balapoelang *viâ* Bandjaran, with a branch line from the latter place to Pangka, has also been commenced.

A concession has been granted by Government for a line from Cheribon to Samarang *via* Tagal and Pekalongan, whilst another has been asked for a line starting from one of the stations on the Djokjakarta-Tjilatjap Railway to Bandjarnegara *via* Poerwokerto, Soekaradja, and Poerworedjo.

A steam tramway has been opened during the year, connecting Poerwodadi and Goendih (Central Java).

Several concessions have been asked and granted for tramways throughout the island, but none of them have up to the present been commenced.

		Population.		
		1882.	1883.	1884.
Europeans *	A	35,535	36,764	37,608
„	B	8,222	8,664	9,157
Natives	A	19,994,999	20,367,944	20,665,510
„	B	6,334,330	6,295,544	6,199,946
Chinese	A	211,207	211,775	214,470
„	B	140,571	139,152	149,558
Arabs	A	10,817	10,987	11,229
„	B	5,108	5,067	4,965
Other foreign Orientals	A	2,603	2,632	2,755
„ „	B	20,760	20,676	21,659
Total		26,764,152	27,099,205	27,316,867

The above is exclusive of the army and navy, the former of which consisted of 14,982 Europeans and 15,254 natives, and the latter of 2,762 Europeans and 1,021 natives on December 31, 1884.†

The number of British subjects resident in Batavia, Samarang, and Sourabaya, the three principal ports of Java, at the end of 1885 were respectively 68, 21 and 56.

Steam Communication.—The British India Steam Navigation Company, Limited, commenced in October last a monthly service between Calcutta and Adelaide and back *via* Singapore, this port, Brisbane, Sydney, and Melbourne, and the steamers of the Eastern and Australian Steamship Company, which run between China and Australian ports, have again commenced, touching here at irregular intervals. As regards communication with Europe and Netherlands-India no alteration has taken place. The competition between the various lines of steamers, both Dutch and English, running between this island and European ports, is becoming very keen, and the supply of steam tonnage, except at the height of the shipping season, has been in excess of requirements. The contract with the Netherlands-India Company for the conveyance of Government goods and passengers will expire at the close of 1890, and next year tenders will be invited by Government for a new contract.

Batavia Harbour Works.—The buildings in connection with the harbour are being steadily carried on. The Custom-house, railway station, telegraph office, harbour-master's office, &c., mentioned in my last report as being in course of erection, have now been completed. The service of trains between Tandjong-Priok, where the harbour is situated, and Batavia, a distance of about six miles, has lately been greatly improved, there being now sixteen trains each way daily, with the exception of Sundays, on which day there are only five trains each way. There is and assistant harbour-master in attendance at Tandjong-Priok every day, so that ships can now be cleared in and out there a change of considerable importance to shipmasters.

* A. Java and Madura; B. other possessions in Netherlands India.

† The total European population of Netherlands India in 1884, therefore was 64,509.—Ed.

Native Labour.—Native labour is in request here for the tobacco estates of Sumatra, and a large number of natives have been engaged to work there under two year contracts, whilst a trial lot of about 100 have been drafted during the past year to work on sugar estates in Queensland.

Eruption of the Volcano Smeroe.—On the night of April 18 an eruption of the volcano Smeroe, situated in the eastern part of the Island, occurred, and immense volumes of lava poured forth from it, which almost entirely devastated the neighbouring coffee estate of Kalibening. The manager, some overseers, and natives belonging to the estate lost their lives during the eruption.

Import and Export Duties.—A strong movement has of late been made by the commercial and planting communities to have the export duties on sugar, coffee, and tea abolished, and it is expected that they will be, or at least reduced, during the coming season, increased duties being levied on some articles of import to compensate for the loss of revenue.

Hypothecation of Standing Crops.—In order to assist planters who have lately had to contend against low prices for almost all kind of produce, the Governor-General, at the close of 1884, made certain provisional regulations, sanctioning the hypothecation of standing crops. These regulations were only valid for twelve months, but in January of this year (1886) they have been rendered permanent by the granting of the Royal sanction.—*London and China Express.*

YERBA:—ILEX PARAGUAYENSIS.

BY HENRY DAUBER, JUNIOR.

In Paraguay the *Ilex Paraguayensis* grows uncultured in very extensive forests called "Yerbales." It is also common to some provinces in Brazil, to the territory of Misiones, and to Corrientes, one of the northern provinces of the Argentine Republic. This plant, which belongs to the order *Aquifoliaceæ*, is often called also Brazilian holly, on account of its resemblance to the holly shrub and its being an evergreen; it seldom attains a height exceeding ten feet. The leaves, which when dried almost exclusively constitute the yerba, or tea—sometimes known in commerce as "Yerba-Mate"—vary from two to five inches in length, and from three-quarters of an inch to one inch and three-quarters in breadth. They are simple, shiny, very short stalked and of a dark green colour, which assumes a lighter hue beneath. The fruit is red and somewhat smaller than a wild-berry, containing four seeds, all of which are seldom in full development. Yerba has been known to the Guarani Indians (once a large and powerful tribe, but now almost exterminated) from time immemorial; to trace back the period when the leaves of the *Ilex* were first used for infusion is impracticable.

The *Ilex Paraguayensis* has been exported, and planted in two or three countries in the South of Europe, where it appears to have acclimatized itself, naturally not developing as perfectly as in its own natural regions. If cultivated (as it was to some extent some years ago, before the expulsion of the Jesuits from Paraguay), its leaves yield a far more agreeable beverage than if uncultivated.

On receipt of a substantial sum of money the Paraguayan Government grants concessions to companies to gather the leaves during the season, February to July. These companies fit out expeditions, consisting of natives with their families. A suitable spot is selected in the midst of the yerbales, and here the expedition camps. The first operation is to construct a number of ranches, roofed with palm leaves or thatched with straw; these being the abode of the men and their families as long as the leaf-gathering period lasts. Next a space of ground is cleared from all incumbrance and rendered as smooth as its physical condition will permit, being then beaten hard with wooden mallets. The leaves of the ilex are gathered but very often branches, or perhaps almost whole trees are chopped down, placed on the space of ground previously alluded to and left there a few days, the

sun partially drying them. An arch called an "emramada," by some "barbagua," is then made, upon which the sun-dried branches with the leaves attached to them are placed. A fire is lit under this arch and is constantly kept brisk till the leaves are completely dried. Great precaution is always taken to prevent the leaves from roasting or igniting. This operation terminated, the branches with the leaves still adhering are placed on the mallet-beaten space of ground and beaten with sticks, the leaves of course falling off partly in powder. Portions of the stalks get detached also, this being the reason that they generally constitute a portion of the yerba. Care must be taken not to deprive the young trees entirely of their leaves, as otherwise they will not grow, but remain mere bushes. Other more advanced methods for the preparation of yerba have lately been in use in some parts of South America; in one locality large ovens are used to dry the leaves, which are afterwards reduced to power by stone mills. Large iron dishes are also employed occasionally for the purpose of drying the leaves. These advanced processes yield a yerba that unquestionably is contaminated with less mineral matter than the yerba prepared by the primitive process.

The final operation is the packing. The mode almost exclusively in use is: bullock hides are steeped in water and sewn at the sides and bottom, the upper part remaining open for the introduction of the yerba. This package, which resembles a bag, is called a "tercio" or "seron," the latter being the name used by the Spanish. Yerba is rammed into one of these packages; when full the aperture is sewn up. The "tercio" is then pounded with mallets till it acquires an oval shape, and left to dry in the sun, becoming in a few hours as hard as stone. In this quaint enclosure, in which it is very well preserved, yerba is exported to the different South American markets. From Brazil, and occasionally from Paraguay, it is packed in barrels. A "tercio" full of yerba generally weighs 200 to 300 pounds.

The expeditions are fatal to many. The heat in the "yerbales" is extremely excessive, causing death from sun-stroke very frequently.

Three sorts of yerba are prepared, namely, caa-cuy, caa-mirim and caa-guaza; the prefix "caa" denoting leaf in the Guarani language. Caa-cuy.—The new leaves from the small branches, dried in the sun. It is consumed on a very small scale, is of a yellowish-green colour, and is rarely exported, as it invariably loses its aroma very rapidly, consequently being of little value on reaching its destination. This variety contains no stalks. Caa-mirim.—The leaf carefully separated from the stalks and dried. It preserves its aromatic properties longer than caa-cuy, but the demand for it is as limited in one case as in the other. Caa-guaza, or "Yerba de Palos" (yerba of stalks, Spanish), is the third and last sort, and is composed of leaves and stalks, which have passed through the drying processes. Is the variety known all over South America on account of preserving its aroma for a considerable length of time.

In Brazil a tea resembling yerba, called congonha, is prepared from the *Ilex congonha* in a similar manner to yerba; but its use has not become very general yet. Other teas from different species of *Ilex* are prepared in South America, but their use is limited to the inhabitants of the localities in which they are prepared.

Paraguay tea is often called "mate." This, however, is not correct. Yerba, the Spanish word for herb, is the only name the tea has, whilst mate is the name of the vessel in which the infusion is made; this probably accounting for the tea being erroneously called mate. This receptacle is like a pumpkin, though smaller, and is the fruit of a creeper common to Brazil, Uruguay, Argentine Republic and several other countries in South America. A hole is bored on top of the mate, which has been dried in the sun, and the seeds extracted. It is used as a cup for the tea. The infusion is called mate, deriving its name from the cup. Porcelain mates, wooden mates inlaid with silver, and polished coconut shells are also used as receptacles for the tea, in several cities.

Mode of Infusion.—Three or four tea-spoonfuls of yerba are put into the mate, and boiling water poured up to the brim of the cup. A tube, made of silver or electroplate, having one end widened out and perforated with small holes, is placed in the mate. Through this tube, called "bombilla," the infusion is taken, or rather imbibed as hot as possible. Most South Americans use no sugar, perferring the characteristic bitter taste; some, on the contrary, like it sweetened, while a third lot make the infusion with boiling milk, sugar being used in this instance.

Yerba has a very sustaining effect on persons who constantly drink its infusion. Conflicting opinions however, respecting its effects on the constitution are held by eminent men. M. Sellieu recommends Paraguay tea as being pleasanter to the taste and less injurious to health than China tea, whilst Professor Bentley affirms it to be more exciting, and when taken to excess to produce a kind of intoxication. It may nevertheless be said, that the sober portion of the inhabitants of South American Republics cherishes yerba as the great natural beverage, deriving nutriment and the greatest comfort from its use. It has been attempted to introduce yerba into this country, but, probably owing to the want of knowledged as to its preparation, the attempt has, so far, not been successful. I think it can be safely predicted, that were it brought systematically before the British public, it would soon become a favourite beverage, and prove a valuable rival to other imported teas.

I will now endeavour to give an approximate idea of the quantity of yerba which is annually consumed in some South American countries, with which I am more or less intimately acquainted. The figures I give are gathered from official sources, and therefore, should be considered reliable. The total imports of yerba to the Argentine Republic in 1880 (notwithstanding its own production) were about 14,000,000 kilos. Towards this Brazil contributed 9,000,000 and Paraguay 5,000,000. One thousand kilos, within a small fraction being equal to an English ton, the preceding figures represent as near as possible 14,000 tons. If now we consider that only 280,000 kilos of China and Indian tea were imported during the same period, it will be evident that for every pound of tea fifty pounds of yerba are consumed in the Argentine Republic. The consumption of yerba is larger in the country than in the towns. European habits of different sorts, owing to the mixed population of the large towns, have gradually made even the natives acquainted with not very wholesome beverages, at any rate far less so than yerba.

The Argentine Republic produces yerba only in its most northern latitude, comprising the province of Corrientes and the territory of Misiones; the former province even importing 500 tons annually from Paraguay. Entre Rios, not self-producing, imports nearly 1,000 tons per annum from Paraguay. Santa Fé, the great agricultural centre of the Republic, consumes over 4,000 tons yearly. The provinces towards the west, separated from the Republic of Chili by the Andes chain of mountains, are the smallest consumers of yerba, owing especially to their distance from the producing districts. The Republic of Uruguay, with a population of about six hundred thousand, imports annually an average of 6,000 tons, against only 80 to 100 tons of China and Indian tea; *ergo*, for every pound of tea over sixty pounds of yerba are consumed. This shows that the average annual consumption is 23 pounds per head, most of which is of Brazilian growth; 5 to 1 as compared with Paraguay yerba.

Although the consumption of yerba in the Argentine Republic (population three million) is apparently less than in the Republic of Uruguay, it should be borne in mind I have not taken into consideration its own production, which though inferior in quality to the Paraguayan or Brazilian, is largely used by the inhabitants of the northern provinces.

Like tea in England, yerba is almost exclusively the hot beverage at a family table in the countries mentioned: only it is taken in larger quantities. A visitor

to Montevideo or Buenos Ayres would not get the infusion at the cafés (as I have said, European habits prevail in the large towns), but he would hardly get anything else in the country. The camp people often remain without anything but yerba for considerable intervals. Wherever visitors put in an appearance they are certain to obtain yerba, and though it may seem strange to European notions they are not required to pay for it. In short, throughout the country both friends and strangers find yerba to be an important element in social intercourse.

Below I produce an analysis which I have conducted upon a bulk sample of the caa-guaza species from Paraguay.

Mechanical Analysis

Leaves	64
Stalks	36
	100

Preliminary Analysis.

	Per cent.
Moisture (at 100° C.)	9·407
Matters extracted by ether	8·920
Soluble vegetable matter	51·667
Woody fibre (cellulose)	18·406
Ash (mineral matter)	11·600
	100·000

Organic Analysis.

Moisture	9·407
Yerbeine*	3·355
Tannic acid	5·220
Oil (volatile	0·064
Fat	1·711
Chlorophyll	2·064
Wax	0·420
Resin	3·800
Sugar	4·031
Dextrin	1·160
Albumen	4·510
Carbohydrates (soluble)	34·252
Woody fibre (cellulose)	18·406
Ash† (mineral matter)	11·600
	100·000

Calculated upon 100 parts of ash:—

Carbonic oxide	11·724
Sand (insoluble in HCl)	1·224
Silica	10·413
Phosphoric oxide, P_2O_5	10·421
Sulphuric oxide, SO_3	1·413
Ferrous oxide	0·250
Alumina	1·310
Lime	28·163
Magnesia	12·304
Potassa	8·672
Soda	12·122
Chlorine	1·984
	100·000

* This is the active principal or alkaloid of yerba hitherto called by others caffeine (the active principle of coffee). Dr. Peckolt found in air-dried leaves from Parana 1·6 per cent. and Professor Hoffman 0·3 per cent.

† *Inorganic (mineral) Analysis.*—In 100 parts of yerba:—

Carbonic oxide, CO_2	1·360
Sand (insoluble in HCl)	1·142
Silica	1·208
Phosphoric oxide, P_2O_5	1·209
Sulphuric oxide, SO_3	0·164
Ferrous oxide	0·029
Alumina	0·152
Lime	3·267
Magnesia	1·427
Potassa	1·006
Soda	1·406
Chlorine	0·230
	11·600

After infusion yerba has the following composition, the moisture being taken at 9·40 per cent.—

	Per cent.
Moisture	9·400
Vegetable matter	87·060
Ash	3·540
	100·000

Yerba yields 28 per cent. soluble matter in boiling water, of which about 8 per cent. is of the ash constituents.

The lare quantity of albumen contained proves yerba to be a nutritious diet.

The volatile oil, belonging to the phenol group, I obtained by distillation from the matters extracted by ether.

The estimation of tannic acid I conducted throughout according to Mr. Procter's method, which gives very satisfactory results.

I have lately seen an analysis of yerba, showing no ash whatever; this to me is totally inexplicable. Compared with Chinese teas, the ash in yerba is greater. It has been observed by different chemists that the more costly teas contain less ash than cheaper qualities. In all the samples of Chinese teas, analysed by a Russian chemist, the quantity of ash was found to be in inverse relation to the quality, as indicated by the price; the ash being especially high in teas adulterated by admixture with other leaves. In case of Japanese teas analyses do not all agree with this.

Dr. Peckolt is reported to have found in yerba gathered in Neufreiburg:—

	Per cent.
Oxide of manganese	8·958
Sodium	10·062
Potassium	14·615

As will be noticed the percentage of soda and potassa, which I find in the ash, bears no sort of comparison to the amount Dr. Peckolt found contained in the leaves. But even supposing that his results, in potassium were obtained from 100 parts of ash, this would amount practically to double the percentage found by myself, and would represent an extraordinary richness of that element. Further, I fail to discover the minutest trace of oxide of manganese in the sample I possess.—*Pharmaceutical Journal.*

Chena Cultivation.—In a brief editorial on the Province of Uva, the "Dinakaraprakasa" suggests that for the encouragement and assistance of the poor cultivators that they may be allowed by Government to cultivate chenas (burn forests), and grow such vegetables, as cucumbers, potatoes, &c. They should be supplied with a good kind of cotton seeds. A small amount of the proceeds sale of these vegetables, &c. should go towards the rent of the lands thus cultivated.

Darjeeling Tea Prospects.—The Darjeeling correspondent of the *Englishman* says:—"The weather in this district during the last fortnight has been all that could be desired for tea manufacture. A hot sun with an occasional heavy shower brought the leaf out in abundance, and many factories have been obliged to work night and day to keep pace with it. A change in the weather has just now taken place, amounting almost to a disastrous storm. In some parts of the district the wind blew a terrific gale, and the cold rain has sent the temperature down considerably. This will somewhat stop the growth, and give the planter time for packing and despatching. Most gardens are well ahead of last year, and although very poor prices were realized at the first Calcutta sales, the teas manufactured to date are quite equal to those of previous seasons for quality, if anything better, and it is expected that when this fact is established on the London market the prices will become better, both here and at home, for Darjeeling teas. It has been an excellent season for leaf so far. Red spider has increased rapidly with the late favourable tea weather, but this heavy rain will prevent any further spread, besides washing off a great deal of that already in existence."—*Pioneer.*

THE OUTLOOK FOR CINCHONA GROWERS.

The present critical state of the cinchona bark market is a serious matter for cultivators who contemplate harvesting this year. Last September we said that prospects were hopeful for planters, as a syndicate had been formed in the United States, to shut out English and German made quinine, its members having determined to manufacture enormously, and even to sell at a loss for a time if they could effect their purpose thereby. As a matter of fact, prices did rise much higher in October than they had done for a long time, but this was followed by a sudden fall, from which there has as yet been no recovery. In an interesting review of this branch of trade Mr. Moens, the ex-director of Government Plantations in Java, explains how this depression came about. When the increased demand for bark last autumn began to be felt on the Continent and in London, stocks being at the time rather low, brokers, thinking that consumption had overtaken production and that the "unit" would soon be at 10d. advised those who wished to be before the rush of South American bark which such a rise would let in, to hurry home their produce. The rush arrived as was expected, but it was from a different quarter. Ceylon had not been exporting as largely as usual, and it was supposed that so much cinchona had been harvested to pay for tea extensions that very little remained. But encouraged by the brilliant prospect held out to them, the Ceylon planters managed to bring their total exports for 1885 to the enormous total of 12 million lb.; and the news of these shipments, which, it was feared, would swamp the market, had by the end of December driven the "unit" down to 4d. Mr. Moens thought when he wrote that this last effort, must have exhausted supplies. "I am of opinion" he says, and am confirmed in it by statements of very reliable authorities in Ceylon, that the exports from Colombo will not in 1886 attain the high figure of the preceding year, but will gradually fall off." He has probably changed his mind by this time for, notwithstanding the falling market, over 10 million lb. have by last accounts been already sent from Colombo this year, as against 6 millions for the corresponding period in 1885. A great deal of this is rubbish that will probably be sold in London for a farthing a pound, and will hardly pay for carriage to the coast, much less for freight and charges, but the uncomfortable fact remains that the total consumption of good and bad bark last year was about 20 million lb., and that if Ceylon goes on at this rate for the remaining six months of 1886, it will supply the whole quantity required itself.

But this after all, is very improbable. In the first place the months of March and April in Ceylon are considered the best to coppice in, and a great proportion of the bark must be from trees which have been thus cut down. In the second place, the south-west monsoon, which is now on, will for some time render any further harvesting almost impossible. Nor need the fact of this large export necessarily be discouraging to Indian planters. As far as can be learned, little or no cinchona has been planted in Ceylon during the last two or three years, since the planters there became convinced of the success of the tea enterprise, and to a considerable extent the above large output is got by working trees at an absurdly early age. It may become an unpleasant necessity to shave *succirubras* 3 feet high, but it can hardly be expected to conduce to the longevity of a plantation. It would seem almost certain then that future years will show very considerably smaller bark exports from Colombo. This is admitted by every one in the island who is acquainted with the planting districts, and, indeed, the continued large yield seems to have surprised the planters themselves. But while we anticipate a large decrease we are not amongst those who imagine that the fall will be to zero. A large acreage of cinchona is still carefully cultivated in Ceylon, and even should tea continue to be a success there, it is unlikely that for as many years as we need calculate about, it will entirely supersede the earlier enterprise. Those who speak of the probable rapid extinction of the Colombo bark export perhaps hardly realise what such an event would mean. Of the total of the 20 million lb. used in manufacture last year, Asia contributed the following proportions:—Ceylon 12,000,000 lb., Java 1,300,000 lb. and India 600,000 lb. of which last no less than 100,000 lb. was from Government plantations. It is in fact hardly recognised that, largely as it is extending cinchona cultivation in India is very much a thing of the future as far as making its influence felt in the European markets is concerned. The large export from Java, was, as we pointed out some time ago, the result of the extensive coppicing and uprooting which took place last year, on its being determined to replace the inferrior varieties with *ledger*; this is an encouraging fact for Indian planters, for it will check production for some time to come. Nor can too great stress be laid on the huge increase in consumption of quinine which has followed its drop in price. Mr. Moens states, for instance, that the total imports of bark in the five years 1865-69 were a million lb. or less than Ceylon alone sent to Europe in 1885; yet at the end of last year stocks were 19,000 packages less than in the year before, and, moreover, a great deal of what did remain unsold consisted of the comparatively worthless *cuprea* bark, which is always avoided as long as possible by buyers, thus showing that manufacturers were able to absorb nearly all that came into the market. The value of the cinchona alkaloids is becoming more generally known all over the world, and in India especially, where the lower grades are largely sold in the bazaars; the opening out of Africa is also causing a constantly increasing demand; as is the employment of the bark in manufacturers not connected with medicine, especially in brewing.

To summarise the prospects of Indian growers, we think that an improvement in price may be expected at the end of the year, or early in 1887, when most of them will be offering their bark in London. For the next few months a rise cannot be expected, for even should the Ceylon export fall off, buyers will not be inclined to pay highly for a product that they cannot be sure the market will not be glutted with at the first return of prosperity. As for those whose plantations are not coming into yield for a year or two, the outlook is very hopeful, for there is very little planting going on except in India and in Java, and should Ceylon send away even a quarter less than she does at present—and this is a smaller decrease than most people acquainted with the subject anticipate—a glance at the figures given above will show what room would be left for Indian bark. The only competition planters in this country would have to fear for the present would then be South America, and as the bark from that country cannot be made to pay at present prices, a large rise in value must take place. Mr. Moens alludes, in passing, to the competition of the Madras and Bengal Governments with private enterprise. As a former head of a cultivating department in

Netherlands India, he cannot be expected to be violently opposed to the system, but he condemns the practice of local sales, and the wasteful manufacture of the Government febrifuge, "by which 40 per cent of the alkaloid is destroyed." He does not notice the liquid febrifuge with which experiments are still, we believe, being carried on. The question is one which must, sooner or later, be decided by the Government handing over their plantations to be worked as commercial undertakings by private owners; and the subject has been taken up with this view by at least two Associations in this Presidency.—*Madras Mail.*

CEYLON AT "THE COLINDIES."

The following is taken from the "*Exhibition Supplement to the Colonies and India*":—

The effect of the Ceylon Court as we look on the arches of the roof coloured in yellow, the sacred colour of the Buddhists, and red, and the many pictures—Sinhalese paintings running all round the Court in a frieze, telling the Birth Stories of Buddah—with the porch at the entrance from the Private Exhibition Gallery, resembling a giant "lych gate," is exceedingly quaint, bright, and pretty. The first impression is favourable, and this is more than confirmed on closer acquaintance. The gateway through which we enter has a solid, rich, massy air, constructed as it is of ebony, with tamarind pillars, the beautiful longitudinal grain of the coconut palm, and the high relief of the frieze and panels carved in Calamander wood. This gateway is a fac-smile of one carved in stone at the ancient Royal City of Yapahu. Above in very high relief, seemingly of stone, is the figure of Gautama Buddha, wrapped in contemplation, some ten feet high. Flanking on either side of the figures are two elephants carved in ebony, with ivory tusks.; Starting with Buddha Gautama, Prince Siddartha, son of Suddhudana, King of Kapilavastu, on the borders of Nepal, born 600 years B. C., we shall not lose sight of the Great Teacher who early taught "what light shines beyond our broken lamps," or of the elephants until we quit the Court of Ceylon.

On each side of the entrance arch two tall palmyra palms—one polished, one *au naturel*—stand as sentries, there are high dadoes of the many-grained, beautiful woods, and in each corner is raised a pyramid of woods, the effort being very happy. In the smaller trophies some 250 kinds are shown, and in the larger planks are Calamander (or Coromandel), flowered satinwood, ebony, tamarind, coconut and other exquisite specimens, the strange names of which would express no meaning to the casual visitor. Here it may be as well to call atention to the decorations on the walls—large palm flappers, arms, spears, shields and implements, both of the aboriginal inhabitants, the Veddas, and of the Sinhalese; painted masks used by the Devil Dancers and in Sinhalese comedy; skins of leopard, sambur, axis (or spotted deer), buffalo, wild boar, bear, and tiger; peacocks' tails; antlers, tusks, and tushes, and representations of mythological animals taken from sculptures on ruined monuments in Ceylon—the goose, horse, bull, lion, and, naturally, the elephant.

Facing us are cases of a series of "C's"—cinchona cinammon, cloves, coconut, cacao, cardamoms, and coffee, all well worthy of examination. The cinnamon in large bales—two and a half millions of pounds' weight are exported annually; the cinchona in an artistic trophy and in cases—Jesuits' bark *in excelsis*. and yet our troops in the Soudan were without quinine; the coconut in all its products—coir and copra, oil and fibre, ropes and nets, walking sticks and artistically-carved nuts, and arrack made from the sap, in samples of fifty-year-old spirit—a fine liqueur—and some distilled but the other day—not only "a torchlight procession going down one's throat," but an entire display of fireworks, including Catherine wheels and fiery serpents. A model of a still is shown and also of a "pot" still, to avoid what they term in Ireland and Scotland "the gauger." Mr. David Smith, M.P. for Brighton, from his estates at Kadirane, Negombo, Dimbula, and Badulla—winner of many medals, from our 1862, to Paris, 1878—and Messrs. Leechman, of Colombo, contribute two exhaustive collections. In cases here are spices and flavourings, nutmegs, both unpeeled and peeled, and mace, vanilla, and pepper. On the right hand side, against the wall, all the varieties of rice are shown, including the grain unhusked, or paddy, and the rice of commerce, as we know it. Tea, shown on the left of the Court, in singularly handsome cases, is an assortment from twenty-one districts, varying in elevation from the sea level to an altitude of 6,500 feet. In photographs, the entire story of tea-growing is given. Planting a new clearing, pruning, plucking, and weighing, withering on trays, rolling, fermenting, firing, sorting, packing, and shipping, together with views of tea fields and stores. Sugar, arrow-root, and cassava flour, are exhibited; and tobacco, both in leaf from Jaffna and Batticaloa, and in the Dumbera cigars of Mr. J. K. Ingleton. On an exquisite table of Calamander wood in the centre of the Court, is a large ivory tusk, carved into the semblance of a coconut flower resembling a number of ears of "Champion" wheat. This is a veritable Curio. And in an interesting display on the left, Messrs. A. M.—C.M.G.—& J. Ferguson, of the *Ceylon Observer*, Colombo, present a series of their publications, and their well-known "Handbook." Now, in the centre is a "Hackery"—a light cart, resembling a buggy, for trotting bulls. This should prove a new sensation for the Paris Hiopodrome or our William Holland. In case to left, on the lower shelf, a collection of Ceylon shells; above, boxes and book-shelves and other articles in porcupine-quill work, carved ebony boxes, plaited boxes from Matara, moonstone jewellery, musical instruments, coconut-shell carving and a wonderful gathering of tortoise-shell work, turned to every purpose, from chairs to cigar-cases, combs to paper-knives—a pretty show of a characteristic art of Ceylon. This tortoise work is an important industry on the southern coast at Point de Galle and Colombo. On the right, Mr. C. W. Rosset, in two cases, presents his ethnological collection from Maldive Islands, an exhaustive gathering needing a catalogue to itself. Photographs of the natives of the Maldives the Vedda Country, the ruins of Anuradhapura and Ceylon scenery, are to be seen on adjacent screens. In the centre, a finely-inlaid table of various woods in curves, on which lies a large block of water sapphire. Now, on the left, we can pass under a giant samboo arch to h Ceylon Tea House, the four Ceylon carriages built in Colombo, and Old London, and on the right to to the Imperial Gallery. Now a case of ivories, large tusks, tushes and teeth, with carvings, palm trees, a coconut flower, elephants, the stands of cut teeth, teeth cut into boxes, showing a charming wavy grain, lacquer and painted ware in boxes large and small, betel boxes, vases, cups, and "ringer" jugs. And in the corner the curious painted wood furniture, the decoration in rings of diverse colours, from Tangalle. On the left, Kandyan silver work from Ratnapura, Kegalle, and the Kandy Art Association; and in loan exhibits, Low Country silver work, brass work from Colombo, Jaffna, Negombo, and Batticaloa, and some charming specimens of bowls of copper, brass and silver—the effect of the raised decoration being delicious. Sacred books of Buddha written in Pali characters on palm leaves, robes of Buddhist priests, fans, and alms bowls—these mostly lent by the High Priest of Adam's Peak, to which the "grand old gardener" is supposed to have climbed, leaving Mrs. Eve-Adam to await his return—are here. These books lie flat and have a cover top and bottom, on the latter being two pegs, on which through holes the leaves pass. These, with arms, figures of Buddha sleeping will repay patient inspection. Behind, a series of water-colour views of the beautiful scenery, by Miss Gordon Cumming; of the island is a marvellous map by D. C. Gabriel Perera, S. Benedict's Institute, Colombo. The Benedictines of old had their *Scriptorum*, in which they produced the illuminated MSS. and "Books of Hours" so highly prized, and this would not be considered unworthy of the old skill. With a pen Mr. Perera not only gives a map of Ceylon,

fine as if engraved, showing the provinces, towns, roads, railways, heights of mountains, mean temperature, area, population, average rainfall per annum, but also, in a border most artistically designed and drawn, has placed sixty medallions of the animals and birds of Ceylon. The best of our Sixth Standard Board Schoolers, after this, may take the rearmost of back seats. In centre, model of Double Canoe, with palm-lea :covered deck house. Other models shown on cases and elsewhere are the canoes with outriggers, safe and swift, carts, bullock carts, a padda boat for cargo, and a pearl-fishing ballam (or yawl), with crews, divers, and all equipments. The two principal exhibits come next. On the one side, ebony furniture—admirably carved sofas, chairs, cabinets, and tables, with large tusks mounted on stands as sentinels, and a screen of ebony wood with exquisite embroideries of flowers on black cloth. On the other to the left, about the prettiest and most effective furniture in the Colinderies—a book case, five cabinets—three large and two small—chairs in Calamander-wood, the grain a picture in itself. These flanked by sentinel tusks. These have been lent by Mr. C. H. de Soysa, J. P., to whom the Court is much indebted for contributions, from arrack to gems, and hunting trophies to jewellery. Indeed, tusks are in evidence on every side. The method of capturing wild elephants is shown in two models of kraals, with the hunters, the tame or decoy elephants, the wild ones, the palm trees, all carved in ebony. In one is also given a Kandyan chief entertaining a party; whilst a Sinhalese Strauss and his band, discourse music, mostly on tom-toms.

An extensive display of lacc from Galle, Cotta, and Negombo, including the loan collection of Miss A. E. Ferguson, is set in large cases on each side of the Court. There are cases of arms—jewelled, gold, silver, and bronze—Sinhalese swords and daggers, daggers mounted in silver and gold, with uncut rubies and other precious stones, gold filagree work from Jaffna, gold plate set lent by Mr. C. H. de Soysa, elephant-teeth boxes set in gold, and in ebony coconut writing desk with a tree in silver, and other numerous objects of *brick-a-braccrie*. Then four Dagobas, two silver, one gilt, and a large one of brass, models of those standing, and now the only remains, save the ruins, of a Buddhist Temple (where was the collar bone of Buddha in a dish), and the Sacred Bó tree of the chosen capital of King Pandukabhaya, the capital for twelve centuries, Anuradhapura, founded 437 B.C., and said to have been 250 square miles within the walls. The group of two leopards, representing the death of Ranger, a hound —the assassin having been killed by mere pluck, with a knife, by Mr. Beauchamp Downall—surrounded and set out by Elephant Trophies, big bones, skulls, tusks, tushes, pads, tails and saw-fish swords, lent by many, including Mr. A. N. Birch, C.M.G., Messrs. C. H. de Soysa, Fanshawe and Swyney, will attract attention, artistically grouped by Mr. Rowland Ward. The case of shells of the Tamblegam Lake oyster *Placuna Placenta*, from Trincomalee, showing the almost transparent semilucid shell with prismatic colours like a bubble, and the pearl oyster in its various stages, from the baby of three, six, and nine months of age to the adult of five and a half years, and the chank shells, not unlike our whelks, used for cutting into rings, with the fine gauges for size, are both interesting. The fishing canoe has a quaint stone anchor with hole bored through it, shaped like an old-fashioned weight used by divers to lower themselves quickly. Facing this is a case of jewellery, which should prove, and is, one of the magnets of the show. Here is a moonstone belt, a girdle of light, the *facsimile* of the silver casket which holds the sacred tooth of Buddha at Kandy. The view of the Temple is on the walls of the Entrance Hall, and the porch of teak, with its carved pillars and plafond in nine panels, the stone balustrade or low wall, both within and by the Ceylon Tea House, are all faithful representations of divers portions of the Dalada Maligawa, the Temple of the Sacred Tooth. In this case, beside the moonstone belt are the gold collar, with its lion (not elephant) emblems, and gold belt with jewelled medal of office of Diwa Nilame, who may be seen outside the Court in the warriest of war paint and the most gorgeous of hats, in company with a gentleman that looks, with his blue gold-laced tunic and gold shoulder-belt and rather incongruous silk *jupon*, like an admiral in petticoats. An "ola" box of *carved* silver for the sacred writings in "Pali" on palm leaves a silver box to hold a book, rude coral necklaces with gold beads, contrasting strangely with necklaces of pearls, fitted for an Empress, a Tsarina, or our loved Princess, the Rose of Denmark. The three cases of gold and silver ware and jewellery will well repay an hour's detail. The elephant's foot pads, used as flower vases, with Latania Borbonicas, look well: but the cases of precious stones, though they will welcome the coming, will not speed the parting guest. Here will be found the marriage stone—ruby and sapphire, blue and yellow sapphire, combined in one stone; white sapphires, tourmalines, chrysoberyl, chalcedony, jargoons, spinels (these latter very effective and cheap), amethysts, cat's eyes, moonstones, star stones, topaz, hyacynths, aquamarines, rubies, zircons, dalam, a sand blended of chrysoberyls, sapphires, and rubies, alexandrite (green by day and red by night), ruby crystals and sapphire matrixes, and crystals of corundum or sapphire, are an Aladdin's Cave of jewels. But with a glance at Miss North's paintings, the model of the Breakwater at Colombo, the plumbago carvings and the use made of plumbago by Morgan Brothers in their famous crucibles, the skin of the scaly anteater, we leave, and so, as Buddha himself greeted us at the entrance, a yellow-garbed Buddhist priest bows us out of the Ceylon Court—by the Sal tree beneath which Buddha, prince, priest, and prophet, breathed his last—which owes so much to the taste and liberality of its Commissioner, Mr. A. N. Birch, C.M.G.

TEA AT 4½D PER LB.—What wiseacre was that who spoke of throwing away tea which sold at this rate in public sale? Why throw away "4½d" or bury it in the earth? Times are too hard for that; as the tea had to be made, the 4½d per lb. is so much to the good. Fine plucking—in some places very fine—and sifting, can give us 1s 3d, 1s 6d, 1s 9d and even 2s for select parcels; but it is quite possible that the estate getting 4½d for its worst may pay its proprietor better taking quantity and prices all round.—*Com.*

TEA CULTURE IN CEYLON.—The London *Field* of June 5th has the following notice of Mr. Hamilton's pamphlet—a notice which cannot fail to do good by attracting increased attention to our new and great industry:—"The Ceylon Tea Industry, an Opening for Men of Moderate Capital, by John Hamilton (late of Ceylon), London, Skipper and East. This little pamphlet, contains in a condensed form, a great deal of useful information with respect to an industry that is at the present time being successfully carried on in Ceylon, and which bids fair to restore the island to the prosperity that existed previous to the failure of coffee through disease, and the consequent depression, which culminated in the crash of the Oriental Bank. The author, in turn, deals with the most material facts connected with tea cultivation in Ceylon—such as the tenure of property, means of communication, labour supply and the suitability of the soil. He argues that the disease which has proved so destructive to the coffee-plant is never likely to injure the tea leaf, which, from the difference in its structure would be able to resist its attacks. After giving the prices per acre at which lands can be purchased at the present time, he recommends Ceylon as affording a good opening for younger sons possessed with a small capital, and concludes with some very sensible remarks on the future market for Ceylon tea."

BRITISH-GROWN TEAS.

We take the following account of the meeting where Mr. J. L. Shand read his paper, from the *Home and Colonial Mail*:—

In the Conference Room of the Colonial and Indian Exhibition, Mr. J. L. Shand, of the Ceylon Court, on Wednesday, June 9th, read a paper upon "British-grown Teas." The meeting was presided over by Mr. A N. Birch, C.M.G., Executive Commissioner for Ceylon.

The Chairman, in a brief speech, introduced Mr. Shand, whom he said would give thoroughly good and reliable information.

Mr. Shand opened his paper with a reference to the question whether the tea-plant was indigenous in China or was introduced from India, and said it had finally been decided that it was introduced at a very remote period from India. It was not known when tea first became an article of diet, but its properties quickly received recognition in China, and a thousand years ago it had become the national beverage there. Early in the seventeenth century, tea was introduced into Europe by a Dutch company. It gradually gained ground, and in the domestic history of England there was nothing more remarkable than the hold which tea had taken of the people. A hundred years ago 18,000,000 lbs. of tea came to Europe, of which two-thirds was taken by Great Britain. Every reduction of duty in this country was accompanied by a proportionate increase in the consumption, so that in 1845, when a further reduction of duty was contemplated, Parliament was informed on high official authority that, the imports of tea having reached 40,000,000 lb., it was probable that the limit of consumption had been touched, and that a fresh reduction could only be followed by a loss of revenue. That was in 1845, and, though there was now a tax of 6d per lb. on tea, equal to an *ad valorem* duty of more than 50 per cent., the consumption in 1885 was 180,000,000 lb., or within a fraction of 5 lb. per head of population. What but a few years ago was used as a luxury by a few, had become an article of daily consumption in almost every household in the kingdom. (Hear hear.) To show the importance of the subject, he might mention that the tea duty last year brought into the Exchequer £4,795,000—nearly four times as large a sum as the duty on wine produced—and that the tea industry was the agency by which countless thousands in the Mother Country and in the Colonies earned their livelihood. Enterprise had developed in India and elsewhere, food supplies hitherto undreamt of, and, as visitors to the Exhibition had an opportunity of learning, England had attained a position never touched by any nation before, for in her dominions she had the power to produce every requirement and every luxury of life, and, if it were necessary, could be independent of the markets of the world. (Applause.) The discovery that the tea plant was indigenous in the Indian forests was made sixty-five years back, and a committee was soon afterwards appointed to consider the best methods of cultivating the plant in India. Great difficulties were encountered, many of them being placed in the way by the Chinese; but gardens were formed, the enterprise grew, and British-grown teas, which in 1865 formed but 3 per cent. of the total quantity consumed in the United Kingdom, amounted to 16 per cent. in 1875, and to 33 per cent. in 1885. India had 250,000 acres under tea cultivation, and produced 70,000,000 lb. of tea; the capital invested in the industry was £16,000,000; and a quarter of a million of her Majesty's subjects who indirectly contributed to the income-tax of Great Britain, were engaged in it. (Hear, hear.) The tea plant was introduced to Ceylon from China about the year 1842, but it was not till coffee was stricken by disease that attention was generally directed to the cultivation of tea in Ceylon. In 1873 a small parcel of 23lb. of tea was exported from Ceylon. This year 9,000,000 lb. would be exported, and, estimating from the acreage now planted with tea, the export in 1890 would be 40,000,000 lb. There were 120,000 acres planted with tea, which gave employment to a considerable number of Britons and 150,000 British subjects, and the area was being rapidly increased, In the Exhibition there was also tea from the Fiji Islands, Natal, and the Straits Settlements. The cultivation of tea had been successful in Natal, and a large quantity of land was being taken up for that purpose. The teas of Natal, as well as those of Fiji, would eventually find a market in Australia, but it was to India and Ceylon that the people of England must look for a pure tea produced by their own fellow-subjects. Mr. Shand then gave some particulars about the growth and preparation of tea in India and Ceylon, and went on to say that the people of Australian colonies were the greatest consumers of tea in proportion to the population. The consumption per head of the population was as under:—Australian colonies, 7·66 lb.; New Zealand, 7·23 lb.; Great Britain, 4·90 lb.; Newfoundland, Canada, and Tasmania, followed closely; various British possessions, 1·66 lb.; the United States, 1·30 lb.; Holland, the largest European consumer next to Great Britain. 1·05 lb. In Spain which was the lowest on the list, the consumption was only ·01 lb.; in other words, the Englishman drank 490 cups of tea for every cup taken by the Spaniard. Tea was said to be a source of nervous disease and no doubt it contained properties which, if misused, might become injurious; but the table he had quoted from showed that the English people at home and abroad were by far the largest consumers of tea in the world, and probably they were the least nervous race: It was unfair that there should be such a high duty on tea. The duty on sugar had been removed, but that on tea remained, because the tea interest had not such a preponderating Parliamentary influence as the sugar interest. Tea and sugar might be said to be equally necessaries of life and yet, while the former yielded 2s 6d per head of the population, the latter was untaxed. Tea was year ily year being more largely produced by ourselves, while sugar was being more and more poured into our markets from other countries. In such light esteem was sugar held by the trade, that frequently the purchaser of a pound of tea was presented with a pound of sugar. Suppose the duty on tea were reduced to 3d per lb., and a duty of ½d per lb. were placed on sugar, there would be a considerable margin left in favour of the Exchequer. The British sugar-grower and refiner would benefit, because the cheap Continental sugars would feel the tax most; the average consumer would suffer only in an imperceptible degree, and a great stimulus would be given to the consumption of tea. Proceeding to consider why British people should drink British-grown teas, Mr. Shand said that those teas came into the London market pure. There was no recorded evidence of adulteration having ever been discovered. The adulteration of China tea, on the other hand, had been the subject of several volumes, and of special legislation. The purity of Indian and Ceylon teas made them more sensitive than the ordinary China mixtures. It was not necessary to put such large quantities into the teapot, but it was all the more necessary that the water should be boiling, and that the tea should not be allowed to stand too long. Disappointment should not be felt because the liquor was not black; that was in consequence of the tea being quite pure and unmixed with black-lead or indigo. If Indian and Ceylon tea were fairly tried and carefully treated, they would be found more economical than China teas; they placed within the reach of all a beverage economical, pleasing, and nourishing. Though the grower sent his teas to London pure, they generally had to pass through the hands of the retail dealer before they reached the public, and the temptation to use up cheap China teas by mixing them with the pure Indian and Ceylon products was so great that it had become the custom of the trade to make the mixture, and much tea was being sold labelled Indian and Ceylon which contained but a very small proportion of those teas. Another reason why British-grown teas should be consumed by

British peop'e was that they were produced by our fellow-subjects, and that the industry furnished an outlet for the congested population of these isands. In conclus'on, Mr. Shand expressed his readiuss to give further information about Ceylon tea to anybody who might ask for it. (Applause.)

Dr. Watt, in charge of the Indian exhibits, said it was not generally known that tea was really a forest tree, and not a bush. In their natural state in the Indian forests, some of the tea trees were fity feet high. He had been unable to find in the fild plant any trace of the disease from which the wultivated plant suffered. With regard to the concroversy as to whether tea was damaged by the lead in the boxes, his own opinion was that the fault was ito be found in an imperfect knowledge of the fermentation of tea befor packing. He had seen tea which was tainted though the lead was not perforated; and he had analysed tea in one instance in which the lead was perforated, and had not found any trace of lead in the tea. He was not aware of any chemist having discovered tea actually poisoned by lead, and he thought that the tea-planting industry ought to bring science to its aid in the matter of fermentation. He thought, too, that the tea industry suffered from too much selection, and he could not see why the planters should not mix their own teas, instead of leaving the retailers to do it, and get brands which should be known as theirs. If a garden sent one quality of tea, and one only, he was sure the industry would benefit. (Hear, hear.)

Dr. Robert Pringle, of H. M. Bengal Army, said he looked upon the tea trade of India as one of the greatest undeveloped industries that that country possessed. Tea was a very good saddle-horse to put indigestion on, when one liked to shift the responsibility from irregularities in diet; but he would like to treat those people who talked about tea being indigestible, not with his medicine chest, but with a muzzle. (Laughter.) After speaking of the importance of doing all we could for the natives of India, Dr. Pringle condemned the tax of 6d. per lb. remaining on tea, and with regard to fermentation, said that the Government ought to consider it their duty to settle that point. It was far more important morally to do that than it was to have a first-class analyst to see that the opium went out in good condition. (Hear, hear.) In reference to the disease, it was his opinion that it was brought about by over-cultivation, just as the disease of coffee was. Where there was not over-cultivation there was no disease.

Mr. T. J. White, who lived for many years in Ceylon, confirmed Mr. Shand's figures relating to that colony, and said he knew of no part of the world in which the climate was more healthy or more favourable to long life than the hilly country there. Some years ago a police magistrate in Calcutta told him that tea from the North-Western Provinces of India injured his nervous system and that he had since drunk Assam tea without feeling any ill effects.

Mr. F. R. Saunders, who had long been a resident in Ceylon, said the consumption of British-grown tea ought to be encouraged because the industry provided employment for people of those countries of which we had taken possession, and of whose interests, therefore we ought to take peculiar care.

Mr. Moreton Green spoke of the growth of tea in Natal, and said there was in the Exhibition more than a ton of Natal tea, which would be on sale in the course of a week.

Mr. Capper remarked that British tea-growing promised to be very useful to our home industries, for every tea estate in Ceylon was being provided with British-made machinery, and he had no doubt it was the same in India. Not less than half-a-million of money would be spent by Ceylon in the next few years on machinery.

Mr. Barber, as a tea planter of Ceylon, denied that tea-drying was a process which was hurried ove (Hear, hear)—since the tea was kept for a month ween the processes of drying and packing. (H hear.) Tea manufacture had been raised to the dignity of a fine art, and he did not believe it could be helped by chemistry. Any deterioration in the tea was due not to bad fermentation, but to bad wood or bad packing.

A gentleman in the room mentioned that several Indian planters had told him that they hoped for assistance from chemistry. (Hear, hear.)

Dr. Pringle, replying to a statement made by Mr. White, said that our soldiers in the Afghan war used tea from the North-West Provinces, and he believed they did not prove themselves to be particularly nervous. (Applause and laughter.)

The proceedings closed with votes of thanks to the Chairman and Mr. Shand

THE OUTLOOK FOR TEA.

Apart from the consensus of opinion in Mincing Lane, that, from circumstances of weather, pruning and plucking, and also perhaps, as is charged, some want of care in preparation, the Ceylon teas recently sent to market have not been up to the previously high standard of quality, there can be little doubt that the low prices and semi-panic in the London market which reacted so adversely on local sales and planters' interests, were due mainly to the overloading of the market not only with good tea but with absolute rubbish from China. In the interesting report by Mr. Consul Sinclair of Foochow, which we this day quote in our planting columns, it will be seen that he actually mentions tea being made of leaves which had been five years on the trees! It seems doubtful if leaves can cling to even an ever-green shrub (we mean, of course, the *same* leaves) for five years, and perhaps what is meant is that old and neglected and inferior bushes, which had not been touched for five years, had latterly been plucked for tea-making purposes, under the influence of speculative demand, following the cessation of war and the opening of markets wholly or partially closed during the war. The remedy suggested by the worthy Consul of uprooting the old trees and planting afresh is certainly heroic, but it is questionable if he realized what the costliness of such a process would be, even where labour is so exceptionally cheap as it is in the tea districts of China. Besides which there would be an interval of non-productive ness in the comparatively cold climate of the tea regions of China, of from four to five years. We suppose those familiar with tea culture would rather advise that the old bushes should be so pruned as to compel them to yield good flushes, while young plants to replace those of them which showed signs of decay were growing. What seems evident is that China, if money is offered, can produce large quantities of tea, the bulk of it inferior. Mr. Giles is very sanguine about Formosa as a producer of fine quality teas, but, until "the savages" are exterminated or civilized and that beautiful island is fully peopled with Chinese, it is not likely to prove a very formidable factor in the question of tea production. We are taken by surprise by what is said about brick-tea made from good tea-dust for the Russian market, because all previous accounts led to the impression that brick-tea was composed of old, coarse leaf and stems. If a good market offered for bricks made of tea-dust, we see no reason why India and Ceylon should not successfully compete with China in that direction. But we suspect the Indian and Ceylon dust and broken teas are superior to the China brick-tea, notwithstanding the Consular opinion as to supplying the army. It is quite evident that a crisis produced not only by over-supplies from China, but, as Mr. J. L. Shand points out, from disturbances in the

home political world, will pass away and better prices return. What Ceylon planters have to continue to do is to produce as cheaply as they can, but always to keep in view QUALITY which will enable them to hold their own in competition with teas which are now being grown "from China to Peru."

In this connection it is interesting to learn that Mr. Gow has consented to read a paper before the Dimbula Planters' Association for the benefit of Ceylon tea planters. Added to his prolonged experience as a planter in Assam, and his acquaintance with the London tea market as the head of a well-known broking firm, Mr. Gow has now acquired a very fair idea of the Ceylon planting districts; their capabilities and advantages as well as drawbacks. We are glad to learn from Mr. Gow that on the whole he is well satisfied with Ceylon. He has had occasion already to report favourably on the prospects of tea here from a business point of view to London firms, and Mr. Gow's report on the Degalessa lands for the Kelani Tea Company, shows that he thinks highly of Ceylon as a tea-growing country. But, as might be expected from an old Indian planter, tea-maker and tea-seller, Mr. Gow sees many things capable of improvement as he goes about the districts, more particularly in connection with "plucking" and manufacture. He has already given evidence of his ability to improve the local system of tea preparation by the admission of several planters who have had the benefit of his advice and instruction; and while we can scarcely expect Mr. Gow before the Dimbula Association to tell us all he knows about our tea and the proper system of preparation, still the presentation of his opinions and ideas, even after a general fashion, cannot fail to be interesting and instructive. Mr. Gow is particularly strong as to the proper modes of "plucking," "withering" and "fermentation" of the leaf so as to do justice to its chemical properties, and the appearance and trial in Colombo, shortly, of his own "witherer" (for which at length the local patent has been granted) will add to the interest felt in what our correspondent describes as "Mr. Gow's new system of tea manufacture."

PLANTING NOTES FROM UVA.

RAINFALL AND GOOD CROPS—COFFEE IN NATIVE GARDENS —THE RAILWAY WANTED—CATTLE MURRAIN—CRIMES— PADDY CROPS—BAD ROADS.

HAPUTALE, 10th July.

There has been more wind and rain up here during the last two months than usual at this time of the year. During May and June we had very strong gusts of wind at times, and the rain was accompanied by thunder and lightning and hail stones on one occasion. You will see by the following what the rainfall for six months has been on the Haputale Pass compared with the rainfall for the same period in 1885:—

	1886. Rainfall.	No. of days.	1885. Rainfall.	No. of days.
January ..	9·53	21	1·41	14
February..	0·84	6	0·72	5
March ..	1·29	8	4·72	10
April ..	11·84	15	5·09	16
May ..	9·43	20	12·21	20
June ..	2·40	10	4·64	17
	38·33	80	28·79	82

Nearly 10 inches more rain in almost the same number of rainy days both years. The month of July commenced very wet and monsoonish, and from 1st to 7th there were six wet days and a rainfall of 2·35 inches recorded, and for a time planters of the higher estates who depend chiefly on spring crop, and *August blossoms*, were getting very anxious about the weather changing to fine and dry, which, I am happy to say, it looks like during the last day or two. On all the higher estates, there is abundance of wood in fit condition for a grand blossom and bumper crops, if the weather will only keep fine for the next month or six weeks. The autumn crop now on the trees, especially on some estates below the Pass, are exceptionally fine, and the Laird of Kelburne particularly will reach the island in time to see one of the biggest crops picked not only from his own property but from many other estates in Haputale. The *native gardens* also show abundance of crop wherever the coffee is in condition and not neglected. All over Uva leaf-disease is gradually disappearing, and coffee regaining vigour every month. A year ago I thought, and many other experienced planters as well, that many places on the Haputale Pass would never recover and were doomed to extinction, as far as coffee was concerned; but after a visit to Haldummulla a few weeks ago I was most agreeably surprised to find the coffee everywhere—on estates and native gardens alike—looking most luxuriant, very free from leaf-disease and bearing very fine crops. Now would be the time for any sceptic and disbeliever in the future of coffee (at least on this side of the country) to come and see our estates. For my part I would just as soon plant coffee as tea on new land and virgin soil in Uva. If the crop of 1884-85 was a short one, that of 1885-86 promises so far to be one of the largest dispatched from Uva for many years back.

Cattle Murrain or hoof-and-mouth-disease has been prevailing for some weeks past amongst cart bullocks on the Ratnapura road and village cattle. Why the Government do not adopt or even attempt some remedy to try and stamp out this dreadful animal epidemic, to is a mystery, and one which "no fellah can understand." Year after year tens of thousands of cattle of all kins are carried off or die of this disease, and the wonder is that any are left in the island of the old stock of indigenous cattle. Why not legislate on the subject and have a *Medical Ordinance* for the villagers and their sick cattle? The Medical School or College in Colombo annually turns out a number of cheap doctors to practise on the public and delight the coffee planters, and the country is getting overstocked with them. Out of their superabundance a few licensed cattle or bullock doctors might be manufactured to try their skill on the quadrupeds. Besides sick cattle, in this sporting age, there are any number of mangy-hounds in towns and country that owners would gladly pay handsomely to see cured. Why not have a *veterinarian* class attached to this so-called college and make the subject of endemic cattle diseases, murrain, hoof-and-mouth-disease, a special study. Was it not by legislative act and severe penalties attached that rinderpest, was stamped out in Europe and other countries? A great deal more might be written on this subject but I am afraid it would be labour in vain. Our paternal Government might reply it was interfering with the poor natives and distressing to impose upon them the burden of looking after their sick cattle. It is only the planters who require looking after, and Ordinances for Cattle Trespass, Cattle Stealing, Medical Aid Wants, Cooly Ordinances, Register Keeping, Immigration Returns, Birth and Death Reports &c. The poor native must be left to live just as he pleases, rob, murder, ravish, commit arson, and live at his European neighbour's expense. J. A.

GEMMING.

An enterprise (writes a correspondent) in which the general public seems entirely left out in the cold is that of gemming. The most casual glance at the Ceylon Court of the Indian and Colonial Exhibition cannot fail to strike any one with the immense value of stones yet unfound even in this one productive island. A good deal of business also is carried on in this court, sapphires and rubies being bought and ordered by many ladies

attracted by lower prices than are usually asked by jewellers. Why a company has never been formed for the purchase and working of gemming land in Ceylon and India strikes me as strange. If a few ounces of gold were to be found in any new region the noise of it would be blown abroad, and the wildest hopes entertained—especially by some well-known company promoters—of fortunes to be speedily unearthed. And yet the value of the gems other than diamonds sold yearly in this country alone must be considerable. From whom do the jewellers procure these gems? We presume they have agents in the different countries who barter direct with the native dealers, or else are supplied by "middle-men" in the form of gem merchants. The native dealers again—we can answer for those in Colombo and Galle—never own any pit or plot themselves, but again deal through agents, whose time is spent purchasing stones from villagers up in the gem-producing districts. Every intermediate profit made is immense. In the districts of Saffragam and Ratnapura the wretched Sinhalese, who own small pieces of land beside the streams, where they work like slaves, often up to their waists in water, derive but a precarious income from their really valuable labours. The travelling moormen who command a little ready money frequently purchase sapphires, rubies, and cat's-eyes upon which a profit of a thousand per cent. is deemed to be erring on the side of moderation. Ready money could purchase tracts of gemming land in the most favourable localities, and a systematic plan of jewel-digging be entered on under European supervision. Many of the best rubies never reach this country, but are bartered to native chiefs in a clumsily cut state, often to be buried, lost, or hoarded away by some dying miser. Many a fine stone, worth some hundreds in London as a brilliant, has been cut into thin plates resembling glass, changing its value to almost nil.

No European mineralogist has devoted himself to finding out from where these stones spring which are washed down the streams and deposited in layers of gravel under the river bed. We cannot help indulging in fascinating dreams of some huge matrix of jewels high up among the mountains whose splendour one charge of dynamite might expose. All the gem pits are in low ground. The gems become more and more triturated during their descent down stream, until they are termed "tusi," or dust. This ruby dust can only be used for cutting and polishing. The fact that the supply of these gems is not yearly decreasing points most plainly to the conclusion that somewhere a matrix exists. Leaving, however, these Utopian ideas alone, the ordinary process of gemming in the low ground is one which should commend itself from its prospect of really handsome profits. If all these dealers, agents, and merchants, both native and European, can manage to make a living from the enterprise in addition to the heavy profits made by London jewellers on coloured stones, then it would seem rational to suppose that shareholders of a well-managed company might find they had not embarked in an unremunerative venture.

I expect at no distant date to find the chief gem enterprises worked by English companies in the East Indies, just as has been effected with the gold mines, but with perhaps more profitable results. A geologist who can discover the real matrix of the ruby and the sapphire will no longer need to write pamphlets or read lectures in order to gain an income, but will soon be heard of in financial circles as the "Jewel King".—*Pall Mall Budget.*

CEYLON TEA AT SOUTH KENSINGTON.

To the Editor of the "Home and Colonial Mail."

Sir,—Your contributor "Assam" intends to convey the impression that Mr. Shand's able paper on British grown tea was meant as an advertisement of Ceylon teas generally. This is nonsense, if he will pardon my saying so. The paper deals exhaustively with the subject, and reference was made to Fiji, the Straits Settlement, Natal and other tea growing countries. "Assam" seems to forget that as Mr. Shand pointed out, tea was introduced into Ceylon from China about 1842, so that "Assam's" sneers about the speaker's reference to "that island as *it* were the home of the industry" falls rather flat. If Ceylon planters have managed to advocate their tea successfully at home so much the better for them. Indian planters have had the same chance. There need be no jealousy or unpleasant rivalry between Ceylon and Indian tea planters. Let the best and cheapest tea, I mean that which is laid down upon the best terms, command the best market. There is plenty of room for all of us. We planters have yet much to learn and competition will keep us awake. Our planters are awake I can assure you, and the shipments of tea from Ceylon are merely a tithe of what may be expected when confidence is quite restored, and capital more easily obtainable.—Yours, &c.,

A Ceylon Planter.

INDIAN AND CEYLON TEA.

To the Editor of the "Home and Colonial Mail."

Sir,—Your correspondent 'Assam' touches lightly on a subject which some of us shareholders in Indian tea companies would like to see harped upon with a heavier hand. Since the coffee and cinchona planters of Ceylon turned their attention to tea they have had a wonderful run of luck, not only with their crops and prices, but in the manner in which their tea has been advertised at home, For many years China was the only tea producing country recognised by the British matron and her daughters. India was only known to her as the land of rupees and indigo, from whence shrivelled relatives, who had disappeared as cadets, returned as wealthy but delicate old men to finish their days at Cheltenham or Bath. The Indian tea industry, which has been steadily developing for years was scarcely known until recently outside the immediate circle of the few interested in large concerns like the Assam Company. It is only in recent times that Indian tea has been heard of by the tea consumer, for until lately it lost its identity in a judicious blend, and its value was too important as the component part of a mixture to be worth selling alone. Perhaps those who produced it were too content with the high prices then received to trouble themselves about this, and supineness was the result. Anyhow, the dealer and grocer ruled the roast and nothing was said by anyone. With the fall in prices came a change, then the planter became anxious to be brought into closer contact with the consumer. A Tea Districts' Association was formed in London, and there was something like a stir. But after all it did not amount to much. There was much cry and little wool. That which the Indian tea producer has taken years to attempt is accomplished by the Ceylon planter in a very short time. Ceylon tea, I venture to affirm, is better known to the public at home than Indian, and this is mainly because the interests of Ceylon have been well pushed, no opportunity having, on her behalf, been neglected, and her representatives and friends have been far more lively than their neighbours in India. Possibly I am utterly wrong but I have less faith in the ultimate success of tea cultivation in Ceylon than many. The estates in the island are heavily mortgaged as a rule, the land is consequently forced, and crops are gathered to the full extent of the yield. This will cause a day of reckoning, but apart from the question of how long it will last, I cannot help admiring the pluck of the planters in the island, and I am positively envious of their good fortune in having some clever heads amongst them who have pulled the

wire to some tune and raised the drooping fortunes of the planters there. If Ceylon continues increasing her outturn of tea at the present rate we shall see a tremendous glut in the market before long, and then let those engaged in the China tea trade look out. According to my view China will not be able to hold her own, and the result will be disaster. If planters in India and Ceylon can place their teas in the London market at low prices the game will be theirs, but it is quite certain some gardens will go to the bad. I advise all shareholders in tea to make careful selection before the evil day comes, and I also urge upon investors in this class of security to see that the companies they invest in are strong in the "Reserve" department, and also take a great interest in details, even to the nature of the machinery used. Trusting you and your readers will pardon this rambling letter from an old man.—Yours, &c.,

An Old Indian Fogey.

COFFEE, &c., PLANTING IN NETHERLANDS INDIA.

(*Translated for the Straits Times.*)

By last advices from Sourabaya the commercial outlook was gloomy indeed from the rapidly increasing number of Chinese insolvencies without any prospect of improvement in the near future. Some idea of the reach of the evil may be formed from statistics bearing upon the subject drawn up by the Agent of the Java Bank there, to show the extent of the losses suffered by the mercantile community in that quarter from failures and liquidations among Chinese so far as known. Many other merchants during that period had been obliged to make arrangements with creditors to which naturally as little publicity as possible was given. The statistics given, incomplete as they are, extend from the 1st April, 1885 to the corresponding date this year, and show figures of such significance that one wonders how it is possible, under these circumstances, for any mercantile firm to have courage to continue carrying on business there. The number of officially sanctioned bankruptcies in Java during 1885 amounted to 69, the lion's share, 38, falling to Sourabaya. In the statistics of the Java Bank, there are enumerated 50 failures and 22 liquidations at that city from April 1885 to April 1886 with liabilities coming to 2,459,581 guilders and assets estimated at 838,520 guilders. Bad as the present situation of affairs is, there is every likelihood of its becoming even worse.

The *Java Bode* has been informed on reliable authority that tea planters in Java will probably do good business there partly in consequence of the high prices which European dealers now give for that article, from its having so vastly improved in quality owing to better preparation for the market than formerly. Another reason for this anticipation is the greater yield available which in its turn resulted from the drought prevalent in 1885 and from the fewness of that destructive insect, the *Helopeltis Antonii*, after the rainy season had once fairly set in. This small winged insect has wrought havoc on the estates of tea and cinchona planters estimated at thousands of pounds of crop from its influencing indirectly the quantity of the outturn by destroying the young leaves on plants and trees. With regard to tea the evil consequences become immediately manifest but, as to cinchona, they are betokened by retarded growth and the consequent slight increase of the bark inweight. Hitherto no better means of checking this pest has been known than that of setting women and children early in the morning and at nightfall to catch them, owing to these insects not flying out in the day time. On cinchona estates the leaves attacked by these insects and in which they have laid their eggs are gathered together and burned.

TEA IN INDIA:—THE OPENING SEASON.

Owing to the late opening of the rains in many of the principal districts in Assam, the season will not be an early one, and, perhaps, considering that stocks are so high, it is well that it should be so. Al round the question is being asked, what sort of prices are to rule this season? When such good judges as some of our best brokers were so much out last year in their forecast, it is problematical to say how prices will go. Another question which is agitating the minds of planters just now is, what class of tea to make? It makes little difference into how many classes a tea is divided, provided the manufacture has been sound from the beginning and a sufficiently large number of chests put into each break. About 14 or 15 years ago in Calcutta, a *poojah* sale of 3,000 to 4,000 chests was looked upon as huge, and now-a-days, several brokers sell more weekly, so that some idea may be formed of the work they have to get through, to meet the requirements of the trade. Besides a very large quantity of the tea so dealt with is not bulked, and so the labour is more than doubled.

It is a difficult matter to keep even the best tea-house entirely free from damp; but a small tea bulking-house could be made not only impervious to damp, but almost air-tight. As soon as the tea was made without any assortment whatever, it might be passed into this house, and there assorted into kinds and packed into boxes. The temperature of the bulking-house could easily be regulated by pouring the heated air from the sirocco, or other dryer used, into the house, if need should arise, or else conducting it outside the building in a tube made with a closing valve. In the case of using the sirocco, we mean the new T shape, the top trays would require to be enclosed, this it seems to us, should prove no detriment. In the first instance, when assorting the teas into classes, there is no necessity to keep them long exposed and lose aroma, for they can easily be put back into original boxes leaded and merely tacked down here and there with a little solder. As soon as sufficient is assorted for an invoice, these solder tips may be opened, and the whole tea thoroughly mixed, finally fired, and packed ready for shipment. It may be objected that there is a great waste of tea lead, and also that large bins capable of containing 15 to 20 chests are far more economical, but it is contended, that they do not give the same results in retention of flavour and now every day this is becoming more essential, as tasting can scarcely keep pace with the requirements of the trade. We have it on fairly good authority, that many teas are bought entirely by the smell, and in America this is a very common way. Retention of aroma is thus a most important consideration and deserving of careful attention. In order to maintain the character of Indian tea every care must be taken with manufacture, else prices are sure to go down, and many concerns are quite unable to stand a drop in prices.—*Indian Planters' Gazette.*

HUMUS AS A CROP NUTRITIVE.

The vindication of the character of humus as an important source of crop nutrition—disparaged by Liebig, with his mineral theory—may be said to have resulted from the researches of M.M. Schlesing and Muntz, continued by Mr. Warrington, of Rothamsted. These chemists have fully demonstrated the important action known as nitrification, carried on by bacteria to which the name *micrococcus nitrificans* has been given, the result being the production of nitrates in soils rich in

organic matter, or humus. In order to test the importance of this process of soil fertilisation, or, rather, of conversion of elements of fertility from an inert state to one suitable for the nourishment of plants, Professor Laurent, of the School of Horticulture, Vilvorde, Belgium, last year carried out some careful experiments, a record of which has been sent to us. Buckwheat was grown in pots under four different conditions, namely;—1. In natural soil; 2. In earth first sterilised, but afterwards inoculated with bacteria of the soil; 3. In sterilised soil; 4. In sterilised soil with the addition of chemical manures. The conditions of the experiment were such as to exclude the inoculation of the sterilised soils in the third and fourth series. On the occasion of the first observation recorded the plants of the first series were the most robust; those of the second were healthy, but not as forward as the first; while the plants in the soil free from bacteria were comparatively puny; though those of the fourth set, having the aid of artificial manures, were superior to those of the third. The results were summarised in the following table, averages being given:—

Series	No. of Leaves, Aug. 28	No. of Leaves, Sept. 11	No. of Flowers, Sept. 13	No. of Seeds, Sept. 29
1	9	15	126·33	94·67
2	6	13·17	128	96
3	3·62	6·62	58	23·5
4	4·6	10	88·4	66·75

Thus, it will be seen, says a writer to the *Standard*, the action of bacteria in nitrifying the organic constituents of the soil had a greater fertilising effect than chemical manures consisting of nitrate of potash, undissolved phosphate, sulphate of lime, sulphate of magnesia, and sulphate of iron.—*European Mail.*

Peaches and Plums.—"New Galway" has long been famous among Ceylon planting districts for its fruit-trees, and "Warwick" estate in that district stands out very prominently. We have lately had the opportunity of appreciating delicious plums and peaches from Mr. W. I. Cotton's orchard on this property. When the railway gets to Ambewela, Mr. Cotton ought to lay himself out to find a market in Colombo for his fruit.

Tea at Hankow,—A correspondent writes from Hankow to a Shanghai paper dating his letter the 31st May, as follows:—"Some ten days ago I wrote you concerning the sad state of the tea market and on the possibility of the bankruptcy of many of the native tea merchants, consequent on the high prices paid in the interior. Little did I think then that the losses would be of so disastrous a nature as to affect the minds of those most deeply interested, but I have now to record the deaths by suicide of two men by opium poisoning at Hankow, and of one by drowning at Hankow. Rather than lose face by their liabilities, these three men have destroyed themselves, and as this is only the commencement of the season, what we may expect later on is sad to contemplate."—*Daily Press.*

Tea in Japan is thus reported on in the *Japan Weekly Mail* of June 5th.—The Tea trade has been large, nearly 20,000 piculs of leaf having changed hands, but prices have been somewhat irregular, fluctuating a dollar on most descriptions. There appear to be ample supplies to meet a large demand. Again the *Japan Weekly Mail* of June 12th reports:—The Tea trade which closed last week with a downward tendency in prices, has again been extensive, though heavy stocks of leaf and free arrivals have induced a fall of a dollar per picul on all grades. The second crop has commenced to come in, and the supply appears to be equal to the demand, and likely to continue so.

Advices from Assam (20th June) say that the coming tea crop will be very short and below the estimates. Cholera is raging on some gardens, and the coolies bolting into the jungle to die. The tea-seed crop is good, but being plucked off and thrown away, in order to increase the yield of leaf—last year's shipments of seed to Ceylon having been unsatisfactory, both to seller and buyer (consignments *said* to have left Calcutta in good order, proving to be *rotten* on arrival in Colombo), have not been encouraging.—*Cor.*

Drought and Heat in South Australia.—Dr. Schomburgk in his report for 1885 on the Adelaide Botanic Gardens, from which we shall extract copiously in the *Tropical Agriculturist*, states that the rainfall of last year was only 15·887 inches, or 5·272 below the average for 40 years. In five months, September-January, only 3 inches of rain fell. The heat was terrible: maxima being attained, of 182 in the sun and 115 in the shade! No wonder, if crops failed and general depression existed. After the heat came a temperature of 29° and 30° in May and June, with frost. Not an equable climate certainly.

Petroleum as Fuel for Tea Furnaces.—In the Western and Eastern Hemispheres petroleum, in more or less degrees of purity, is found superabundantly in North America and on the shores of the Caspian and in more moderate quantities in Burma and in portions of north-western India. It seems probable therefore that, as far as price is concerned, the substance, probably in its impure state and perhaps mixed with coal dust or other substances, can be supplied at a price which would render its use economical in tea preparation, where supplies of timber fuel have been exhausted and cannot be supplied cheaply. But the question remains can the strong and penetrating odour of naptha be so expelled that there may be no danger of its injuriously affecting the flavour of so delicate and sensitive an article as tea? We suppose modern science will prove equal to the solution of this problem.—We have since learned of a patent "hydro-carbon fuel" (petroleum and water, mingled in a fine jet), so free of smell that a chop can be cooked over the flame. We are going to make enquiries about it.

Tea in Japan.—The *Japan Gazette* thus refers to the opening of the tea season:—Our tea season 1886-87, is bidding well to be quite as sensational as that of 1882-83, and results will probably be the same in heavy and disastrous losses. Early this week circulars announcing important reductions in overland freight both by regular mail steamer as well as per sailer and rail were sent round and concurrently exchange rates declined, which seemed to embolden buyers, and in consequence an excited and somewhat indiscriminate demand was established. Grades mostly in favour were teas for price, and rates paid preposterously high considering quality obtained. Settlements for the first six days of closing week amount to the large total of 17,090 pcls, against arrivals as reported 19,080 piculs, so stocks in hand are only but very moderate and native dealers appreciating the circumstances, are more than firm in their demands. To criticise prices would be a work of pure supererogation, the same old madness seems still to afflict the buyer in Eastern Chaazse: a sort of *bete noir* seems to bestride him as pertinently and tenaciously as ever the Old Man of the Sea harrassed Sindbad, and until buyers can convince themselves that it is more or less a barren honour, that of being largely represented on the home markets with first and early shipments, so long will strained and extravagant prices prevail in the East.—*Daily Press.*

Tea at Foochoow.—The following was issued in the form of an express at Fochow on the 31st May:—"In consequence of the unnecessary quantity of dust having been packed in the 600 half chests of Congou purchased a few days ago by a certain foreign firm the purchaser has the right to refuse to take delivery of such, and on being informed of the fact, the Chinese seller indignantly resorted to the tea guild where a meeting took place yesterday at 7 o'clock p.m., and it is reported that a resolution has passed to stop transactions with this very firm, and in consequence of which every foreign merchant, who is a member, has a right to ask the Chamber of Commerce to put a stop to such unjust proceedings of the native sellers, and that the foreign merchants must be unanimous in body and mind to boycot one or two Chineese tea hongs for every act of unworthy transaction so that their haughtiness may be repressed." The signature "Disinterested" was appended.—*Daily Press.*

The Hankow Tea Trade.—From a letter in the *Hongkong Free Press* we quote as follows:—

> The hurly burly's done,
> The battle's lost and won,

and the damage has been done so far as the tea season of 1886 is concerned; for the present passivity, standing as it does in the strongest contrast with the excitement and action of the last week in May, is the sure and certain sign that "the war is o'er." Buying has proceeded since the opening of the season as if the crop were neither large nor early. Now, as regards the size of the crop. There is already a visible excess of between five and six million pounds in the first crop, made up by an increase of 80,000 half-chests Hankow, and 30,000 half-chests Kiukiang teas. Is this over-production or not? Is this the disease which a sagacious merchant at a recent meeting of the Chamber of Commerce complained that the trade was suffering from? If tea should pay after all, the retrogressive cry of over-production should be stifled for ever. In respect of the quality of the crop, it is universally admitted here that it is superior in "cup" to that of the last few seasons. In "make" it may be relegated to the "Can pass" class. The Chinese have made the successful attempt this season to place practically *the whole of the first crop* in front of buyers before the end of the month, but this has been done at the expense of the 2nd and 3rd "*packs*," whose "uncouth" appearance, despite a redeeming set-off in cup, affords sure evidence of a too hasty toilet. A judge of great experience says:—"The leaf (of 2nd and 3rd packs, of course) has come to market much in the same state as when *it fell*, or was picked off the trees. The result of all this is that there is a large supply of good and fine tea *at a much lower cost than usual*, whilst the medium and lower grades are mostly so unsightly that any cup quality they may possess, must be very heavily handicapped." The *tendency of prices* all along has been downward; partly from the intense anxiety of teamen to clear out; partly from the grue some nature of the telegrams from London. It may be desirable here to attempt to remove the impression which has obtained amongst the uninitiated that the early purchases of fine and finest teas were made at excessive rates, some 10 to 15 per cent higher than usual. This impression is altogether a wrong one; for the unexceptional practice has been so to *shorten* prices that the laying down cost has really been moderate in the extreme. The "original contract" and the "final ship off" prices have borne no relation whatever to one another. And when it is remembered that *cuts* have been inflicted varying from Tls. 3 to Tls. 15 a picul, it is not difficult to understand that the high cost was more imaginary than real. Never, perhaps, has there been a season when such *cruel cutting* has been in vogue, and the sooner this unsatisfactory state of things comes to an end, the better for everyone all round. A continuation will lead to unutterable grief somewhere. [From the above it will be seen that the making of tea from *fallen leaves* is deemed possible! Such tea must be vile rubbish.—Ed.]

Wire Fence should not be stretched too tightly. The contraction of the iron in cold weather breaks many wires.—*Nilgiri Express.*

Tea Prospects.—A planter writes:—"Who is the man who sounds the note of alarm from Udapusselawa by asking the question, 'Will 200 lb. an acre pay?' Surely a much better return than this can be confidently looked-for from so fine a district. Surely too the cultivation is not yet in a sufficiently advanced stage for any one to limit its yield to such mean figures. Methinks he serves his district but scurvily, and I hope someone will come forward with a brighter prospect for the district which has done such wonders in coffee production.—*Cor.* [The Udapusselawa man is mild compared with other critics: one of the latter, an experienced planter, the other day ventured to say that "half the area planted with tea in Ceylon would give 200 lb. per acre, and half would not"! —Ed.]

Bulking Teas on Estates.—A Ceylon proprietor writes:—"Mr. —— (a well-known London broker) advises me most strongly not to bulk my teas. He says, as a director of large Indian Tea Company he has found it a mistake. I myself bulked all my invoices for seven months; the eighth month I sent a break unbulked, and to my surprise the dock charges were the same as before in *account sales*. I wrote for full particulars of dock charges for that and previous seven breaks and found in every case my bulked tea had been rebulked in London though I had never had a complaint and was under the impression that I was saving money by bulking teas. I venture to say that many planters who are under the impression that they are saving by *bulking on estate* would find their mistake, as I did, if they insisted on getting the *items* of the heading 'dock charges' appearing in their account sale."

Petroleum as Fuel in Russia.—Crude petroleum and residuum as is wellknown are largely used for fuel on the steamboats running on the Caspian and the Black seas, and on the Volga river, and also in many Russian oil refineries. Recently Mr. Koribut-Dashkevitch patented in Russia an apparatus for heating stationery engine and locomotive boilers with petroleum. This consists of an iron cylinder, divided into two horizontal chambers, the upper for petroleum and the other for steam. At the ends of both chambers fine tubes are arranged in semi-circles, the tubes for steam extending at an angle of 45° to those of petroleum. The boiler is first heated by means of wood or coal in order to obtain steam enough to atomize the petroleum, which drips from the tubes. Then the petroleum is ignited, thus heating the boiler with liquid fuel. The chambers are connected respectively with an oil reservoir and the steam tubes of the boiler. Through the holes made in the sides of an oven comes a free current of air in quantity sufficient to make combustion complete. It is claimed in Russia that Dashkevitch's apparatus makes petroleum an easy, efficient and economic fuel.—*Bradstreet's.* [The above is interesting with reference to the possibility of crude petroleum or some preparation of the substance being used as fuel for tea curing. In such an event it seems obvious that special furnace arrangements will have to be made, or the hydro-carbon patent process introduced.—Ed.]

TROPICAL GARDENING.

Human nature, as a rule, exhibits a craving for things hard to be obtained. Setting the fashion of the period on one side, nothing shows this more plainly than the popular taste or longing for plants which are natives of a different clime to the one in which we reside. In a temperate clime tropical plants are considered essential, while if we are residing in a tropical one, then how beautiful to our ideas is the vegetation of the temperate region. Residents in Jamaica are no exception to the general rule. The native trees, the almost endless list of herbs and flowers, beautiful in their formation, their variation, their numerous hues and colours, are by the majority of residents totally disregarded, and satisfaction is sought in the introduction of the flora of other countries often no better, seldom as good, as those of native growth were their beauties fully appreciated. The attempt to cultivate these introductions often results—as might be expected—in complete failure, seeing that most of them are natives of temperate climes. The question is often asked here, "Why is it I cannot get such a plant to grow?—why do my Dahlias and Gladiolus so rapidly degenerate?" which, though apparently a very simple question in itself, involves a description of the principles of vegetable physiology, which is generally for the most part quite unintelligible jargon to the querist, and therefore if given falls flat, with the result of leaving the hearer still unconvinced, and with the determination in his mind to "have another try." Flower gardening in Jamaica, especially among the European residents, consists in the main of a series of attempts at the cultivation of that class of plants usually to be found in the well-kept gardens of residents in a temperate clime. In the mountains at high altitudes, where the climate is favourable, these trials are attended with a fair proportion of success, but on the plains the same exertions result, as a rule, in disappointment. Some may say, "But tropical plants flourish in a temperate climate." So they do, but then the means taken to enable them to do so are adequate to their requirements. There, every protection is afforded them; houses are built, a costly system of providing them with the proper temperature is followed; soil is brought (sometimes for hundreds of miles) suitable to their requirements, and the knowledge and experience brought to bear upon the cultivation of plants render is a much easier task to the cultivator there than to the cultivator in Jamaica, where the means of instruction in these matters are not so easily obtained. Who would think of building a house, to be permanently kept at a much lower temperature than the open air, in the Liguanea plains or other similarly situated place? Yet this is no more absurd than to apply heat for raising the temperature, for it would be done with the same object—viz., that of maintaining a suitable temperature. It is a well-known fact that many plants belonging to the warmer European and Asiatic countries grow well in Jamaica with a little care, and give a fair return for the labour expended upon them; but in nearly all of these the close observer will detect a degeneracy, a falling off from the original type, so gradual, yet so complete, that in course of time they become changed in such a manner as to be scarcely recognisable. An incident in the life of the great botanist, Linnæus, plainly indicates that temperature is one of the first points to be studied in connection with the cultivation of plants. A person had a favourite plant; he supplied it with heat and moisture, and, indeed, with every-thing he considered it to require; the result being that it grew "small by degrees, and beautifully less." Linnæus, then a young man, but a student, requested that he might be intrusted with its treatment. After attentively studying the plant, he withdrew it from its previous situation and pampered treatment, and placed it in a corner where the cold, the wind, the rain, and the frosts of winter, could exert their influence with impunity. He had placed it in its element, in its proper temperature, and under natural conditions, and was rewarded by seeing it grow and flourish. Such are the lessons to be learned by those who are fond of cultivation; nothing but a watchful eye on every requirement can conduce to success. If we see a plant flourishing, find out its family, and then subject its congeners to the same treatment, and in many cases success will ensue. In Jamaica there exists an enormous amount of material for experiment and improvement; pretty way-side flowers, which if developed with half the amount of skill expended upon similar things in Europe, would repay the labourer a hundredfold. It should be remembered, however, that it is no use to attempt to control Nature; that is beyond the art of man; but by a careful study of the various forms she assumes to attain her ends, he may assist her in all her efforts, and thus add much to the beauties of the vegetable kingdom. It is not to be thought for a moment that the writer deprecates the enjoyment by those who wish to do so of their taste for the growth of plants not indigenous to the country, but he wishes to indicate to them that they cannot reasonably expect "great things" from such cultivation. The writer's ideal of a tropical garden is that it should consist of a collection of the many handsome native trees, shrubs, ferns, and palms, and such other things as are indigenous to the climate, or can be obtained from countries enjoying a similar one. By grouping the most striking species in prominent localities, noting their time of flowering, and also the time when their foliage is in its fullest glory, for the sake of giving them proper arrangement; by filling secluded nooks protected from the sun's rays, and where the wind cannot ruffle their delicate textures, with the finer species of Ferns, of which no country, for its size, in the world possesses a greater variety than Jamaica, we should have something upon which the eye could rest with enjoyment at every season, and the garden would never be without some feature of interest to the true lover of nature. Have you a dry spot where nothing appears willing to grow? Then assemble together the different species of the Cactus tribe. The succulent Euphorbias, and other allied genera, and what was formerly nothing but "Macca"* will, by its various and curious habit of growth, become of interest to its possessor, and will enlighten the visitor as to the many strange forms of vegetable life to be found in the island. Old trees which cannot be conveniently removed can, by putting in a plant of Bougainvillea or other climber at their base, be formed in a year or two into an magnificent spectacle. Growing fences should be planted around the boundaries; bushy trees for wind-breaks, and small flowering plants and shrubs for foregrounds, suitable plants for which can easily be obtained at the local gardens supported by the Government. An avenue of Palms, a woody retreat surrounded by groves of the Orange, the Citron, or the Jasmine, a corner in which bulbous and other plants of low stature find congenial home, borders well protected for plants noted for their beautiful leaves, and others for their flowers, are things which should be sought for, found, and admired in every tropical garden.—*J. H. Hart, Jamaica in "Gardeners' Chronicle."*

Silver-leaf Disease.—There is a condition of things in stone-fruit trees, such as Plums, Peaches, Almonds, Apricots, and also in Portugal Laurels, which, for want of a better name, we have called silver-leaf. We have repeatedly examined such leaves, but never found any further injury than a separation of the upper skin from the substances of the leaf—whence the peculiar colour. It appears that in France the affection is called "plomb" (lead), and it has recently been studied by M. Prillieux, who, however, does not seem to have been more successful than his predecessors in ascertaining the causes of this malady. The disease is a serious matter in Plum orchards, as it generally causes the death of the tree.—*Gardeners' Chronicle.*

---

* West Indian terms for any thorny plant.

KILLING SCALE BUGS IN FLORIDA.

The method adopted by one Florida orange grower to rid his trees of scale bugs will undoubtedly interest some of our own people, and we suggest that the plan looks reasonable and might be profitably tried in sections where black scale exist. A writer in the Florida *Agriculturist* describes the process as follows:—

"A successful farmer and orchardist from Wisconsin, has a thousand young orange trees in Florida, not yet in bearing, which for years had been the scaliest trees I have ever seen. He was much perplexed, but not the man to give up the fight discouraged. He remembered that in early life he had fought insects successfully by throwing dry ashes over his fruit trees early in the morning when the dew was on. It occurred to him that soap might do good. He bought a box of common bar-soap, and cut it into oblong pieces the size of one's thumb, but not quite so thick, and stuck four or five on thorns, well up in each tree.

"When he returned in the fall, he found every tree clean and thrifty, except a very few from which the soap had been taken or got off. These latter was as scaly and scrawny as before. On most of the trees there were small remains of the soap still on the thorns, and on all the white coating that had been dissolved and washed down over the bark. Each spring since, before going north, he has applied the soap, always with the same happy results.

"I will add that his trees came out of the January freeze better than the average. Nothing lowers the vitality of an orange tree like scale in any and all of its half dozen forms. Nothing is easier killed in its earlier life, but most difficult when fixed on the bark, encased in its coat of mail of gum, which nothing seems able to dissolve or penetrate. Perhaps alcohol or naphtha might do it.

"The young scale (long scale for example) just hatched walks over the bark about four days, a tiny insect, so small and delicate as to be visible only to the keenest naked eyes. In this period of activity she mates, and is then ready to settle down for the balance of her brief life. She then inserts the beak of her head into the bark, and nestles down snugly. Her legs being of no further use soon fall off; gum exudes and encloses her completely, except a pair of breathing holes in her sides. Thus secure, she lives on the juices of the tree, and completes her life work of producing some 30 eggs for the continuance and multiplication of her species.

"A probable explanation of this soap remedy is that it is operating during the whole scale season. The dews and rains slowly dissolve and carry down the soap over the branches and trunk, and the insect thus finds its bane and perishes before it can settle down to its destructive work."—*Rural Californian.*

THE PUSHING OF INDIAN TEA.

The pushing of Indian tea is one of such paramount importance, that this must form the excuse for so soon again referring to it. Intrinsic merit sooner or later brings anything to the front, whether it is merchandise or brains. Indian tea up to date has achieved all its success through its intrinsic merit; it has been very little helped by advertising or puffing. Had Indian tea not been intrinsically good, it would have disappeared from public view. Annually there is a marked increase in the quantity consumed by the public, principally in Great Britain and Ireland. Had Indian tea been pushed in the same way as Ceylons have been, instead of an annual consumption of 60 millions, we should have had no stocks left at all now, and Indian tea would have been in a better statistical position than it now is. As it is with exchange so uncertain Banks are unwilling to do business except at ruinous rates, so that some means should be taken to avert calamity. It is significant that in the vicinity of great centres of population in Britain, for instance all round London, almost no pure Indian tea is to be met with, whilst Ceylon and occasionally Darjeeling teas (pure), can readily be bought. Wherever one goes Ceylon teas stare one in the face, done up in neat little packets of ½lb. and 1lb. At first the natural conclusion that one comes to is that the Ceylon planter has sprung a mine upon his Indian brother, is sending home the tea done up thus; but upon enquiry it turns out that the manipulation is effected in London, by the agents prior to delivery to the country dealer, showing how extremely careful the Ceylon agency houses are to place their wares before the public in a taking way. Nice little lead packages neatly done up with a taking label are infinitely more likely to attract attention than a great huge unwieldly chest roughly made. China teas are also got up in neat little packages, quite ornamental, and the tea dealer is proud to put them in his window, but when one does come across, or, rather ask to see the original case of any Indian tea, he finds it consigned to the background altogether, simply on account of its appearance. Of course put up in an attractive form tea thus must cost a little more, but looking at the enhanced values that Ceylons obtain, we doubt if it does not do far more than pay. With many gardens it is not a question of paying but of existence, and we consider that it is worth the while of some estates to do up their teas in this fashion so as to make them more attractive. Doing the teas up even in, say, five-pound packages with the "Linberry" patent cloth on paper would be a step in the right direction. We understand that the cost is very much less than tea-lead, and the weight for carriage is also much less. In addition the facilities for putting on a nice label are very much greater, and the paper would show off a label much better. The "heathen Chinee" takes care to cover his box with all sorts of heiroglyphics, which although perfectly unintelligible to the outside public, form an attraction, and no doubt even now assist to carry off the wares. The British public in this age of rapid progression are not easily satisfied, and competition is so great that Indian planters and agents must put Indian Tea before the public in a more presentable form. A few years ago it was supposed that the merit of the liquor of Indian tea had to a great extent done away with the necessity for paying so much attention to the appearance of the leaf. It is questionable if this so now. A large quantity of Indians is now bought from appearance, owing no doubt to the extraordinarily large amount of sampling, which falls to be done from the very large increase in imports. The generality of Indians are too leafy and large, and the dealers complain that the teas are too large in leaf to sell by themselves and that it necessitates a blend with China in order to make them a good marketable commodity. Another thing that strikes one with regard to Indian tea is the general complaint that it is not to be bought. What is called Indian is only a blend. In the case of Ceylon tea each little ½lb. package is labelled and guaranteed.—*Indian Planters' Gazette.*

THE INDIAN AND COLONIAL EXHIBITION AT SOUTH KENSINGTON.

Next in order to the Mauritius Court in the Eastern Arcade may be noticed the exhibits of the *Straits Settlements.*

An article which deserves a brief notice is coffee-tea. It appears that the Malays do not use the coffee berry, but prefer the leaves, giving as a reason that they contain a larger quantity of the bitter principle and are more nutritious. The mode in which they prepare the leaves for use is as follows:—A number of young leafy twigs are gathered and broken into lengths of about 12 or 18 inches. These are obtained largely from the suckers, which are allowed to grow for that purpose. The twigs are arranged between two strips of bamboo tied at the ends, so as to form a dense disc of green leaves about 18 or 20 inches in diameter, the free ends of the bamboo being used as a handle by which to move the leaves

to and fro over the fire, so as to prevent them from burning. The leaves are arranged all on one side and the stems on the other, in order, that the whole of the leaves may be equally exposed to the heat without nterfering with the drying of the stem. The process is completed when the leaves have turned to a rich brownish-green colour and have become crisp and brittle. The flavor and quality of the leaves depend on the care bestowed on this operation; if carefully performed the raw vegetable taste is entirely dissipated, which is not the case if sufficiently done. When singed, or overdone, the aroma is lost. It is also very necessary to have a clear smokeless fire, the creasote and other empyreumatic bodies contained in smoke spoiling the flavour of the leaves. This object is attained by using dried bamboo sticks as fuel. Previous to being used for making tea the dried leaves, which are very brittle, are rubbed to powder between the hands. The powder is then infused in boiling water exactly as in making tea, except that it is used in much larger quantities. It produces a dark brown liquid, looking like coffee, smelling like green tea and tasting like mixture of the two.* Mr. N. M. Ward, who had been for many years accustomed to the use of this coffee tea in Sumatra says of it:—

"While I find the use of the berry for a few days invariably to produce on me, as on many others, the effects of nervousness and bilious obstruction, I drink a strong infusion of the leaf daily with evident benefit to my health and strength. As a restorative on exhaustion from the severeties of labour or of the weather, from heat or cold, or long exposure to rain, I know nothing superior to it. . . . Of its nutritive power no proof can be stronger than that it suspends hunger and enables the labouring man to pursue his work for hours after he would otherwise be unable. . . . With a little boiled rice and infusion of the coffee leaf a man will support the labours of the field in rice planting for days and weeks sucessively, up to the knees in mud, under a burning sun or drenching rains, which we could not by the use of simple water or by the aid of spirituous or fermented liquors. I have had the opportunity of observing for twenty years the comparative use of the coffee leaf in one class of natives and of spirituous liquors in another, the natives of Sumatra using the former, and the natives of British India, settled here, the latter, and I find that while the former expose themselves with immunity for any period to every degree of heat, cold or wet, the latter can neither endure wet, nor cold for even a short period without danger to their health."†

Specimens of the coffee leaf tea were exhibited in London at the International Exhibition in 1851, together with caffeine prepared from them. Dr. John Gardiner, the exhibitor, subsequently took out a patent for preparing the leaves. According to a further statement made by Mr. N. M. Ward to the late Mr. D. Hanbury‡ the leaves could be prepared and packed Sumatra at a cost of 2*d.* per lb., and would even then afford sufficient profit to the planted especially if grown on low lands where berries are not freely produced. The leaves were analysed by Dr. Stenhouse, who found them to contain more caffeine, than coffee berries and as much as mate or Paraguay tea.§ Being thus rich in caffeine, if a little scientific skill were devoted to producing and retaining the aroma, there seems to be no ostensible reason why roasted coffee leaves in powder should not replace much of the chicory and other substances now used to cheapen coffee.

The seeds of *Bassia Latifolia* and the oil expressed from them, which in the Mauritius Court were labelled "illipe seeds and oil," are exhibited in the Perak collection under the name of "suring seeds and oil," while the name of "illipe nuts" is applied to the seeds of a Dipterocarpous tree, probably *Hopea macrophylla*, or an allied species,* which yield the fat known in Borneo as "minjak tangkawang," specimens of which are in North Borneo Court.

Several resins also derived from the same natural order, and marked "*Dipterocarpus Sp.*," are exhibited under the various names of "damar sesa," "damar" and "mata kuching," or cat's eye damar, and "damar renkong;" most of these come from Larut, Perak. They do not present a very bright appearance, but may be more valuable than their appearance indicates. The damar mata kuching is indentified by Professor Van Eeden as the product of *Hopea Mengarawan*, Miq.

The lesser cardamom (*Amomum Cardamomum*), shown at the same stand, was formerly official in this country, and is easily recognizable from its globular shape and smooth surface. The seeds closely resemble those of the official cardamom in flavour. They are used in medicine by the natives as a carminative. Another cardamom, unnamed, from Gapis, Perak, is labelled "wild cardamom."—*Pharmceutical Journal.*

* Hooker, *Journ. of Botany*, 1855, p. 41.
† *Pharm. Journ.*, [1], vol. xii., p. 443.
‡ *Pharm. Journ.*, [1], vol. xiii., p. 207.
§ *Pharm. Journ.*, [1], xiii., p. 382.

REPORT OF THE ADELAIDE BOTANIC GARDENS.

BY DR. R. SCHOMBURGK.

Botanic Gardens, March, 1886.

I have the honor to submit to you my report upon the progress and condition of the Botanic Garden and Park, and of the Museum of Economic Botany, for the year 1885. That year, I regret to say, was one of the driest and most ungenial that I have ever had to contend with, the rainfall having been no more than 15·887 inches. This is 2·851 inches less than the fall of 1884, and 5·272 inches below the average rainfall during the previous forty years. The minimum rainfall during that time was 14 inches. The spring and summer were very dry; during September, October, November, December and January no more than 3 inches of rain fell. The heat during these months was abnormally great, the maximum in the sun being 173° and 113° in the shade. The highest temperature in the sun was 182° in January, 1882, and 115° in the shade.

Such a temperature after a drought of nearly three months' duration could not fail to be most injurious to all vegetation, but especially to those trees and shrubs which are natives of cooler climates. It will be gratifying to all those who take an interest in this establishment to learn that the damage done to the plants, and the losses sustained, have not been so great or so extensive as might have been expected. It is a matter of sincere congratulation to know that the supply of water at high pressure is sufficient for the community, and that the Government has allowed me an unlimited quantity for watering purposes; but for this the unfavourable season would have proved most destructive to the vegetation in the gardens, and many very serious losses would have occurred. Most of the men employed in the garden have been engaged during the last three months in watering only, and I must continue to employ them in this manner throughout the season if the drought does not break up. Such a season could not fail to be disastrous to the farming interest—and we have had one of the worst crops of wheat hitherto recorded. In some parts of the colony the crop has been a total failure. The average yield is about three bushels to the acre, which is the smallest yet known. The fruit crops are about up to the average; but some fruits, especially those of the apples, have not attained their usual flavor and perfection. During May and June we had to suffer from severe frosts. The temperature on several nights was as low as 29° and 30°. As might have been expected, such weather had a very injurious effect upon the garden, and the tropical and sub-tropical plants and shrubs suffered greatly. In the spring, the cold and dry weather considerably retarded the growth and development of the florists' flowers. This was especially noticeable amongst the annuals, especially phloxes, stocks, &c. The commencement of the rose season was very promising. The first flowers reached

* See *Pharm. Journ.*, [3], xiv., p. 182.

a size and perfection not often noticed, but several hot days were experienced, and the whole of the blossoms, as well as the small buds, were destroyed.

With reference to my attempt to acclimatise the four new plants introduced last year, viz.:—the Cheese-maker, the *Kumara*, Eland's Boontjes, and the Tree Tomato, I have to state that, with the exception of the Tree Tomato, the plants, considering the very unpropitious season with which we were visited, afford hopes that they can be acclimatised in South Australia. It is perhaps premature to say positively that this can be done without at least another year's trial. The Cheese-maker (*Withania Coagulans*, Dunn.) has found a congenial climate in south Australia. The shrub has grown vigorously, and has stood the drought and hot weather uncommonly well, for its growth was not even checked. I am convinced that this plant will thrive with us. The "Eland's Boontjes" (*Elephantorrhiza Burchellii*, Benth.), which, as I mentioned in my last year's report, I had received from Mr. Wood, Director of the Botanic Garden, Natal, were planted in pots, and kept in the houses during the rainy season. During this period the plants died down. In the spring (September) they were planted in the experimental ground. They had already formed tubers of the size of small radishes. They soon began to sprout. Although their growth had been slow—perhaps owing to the dry season—the plants are healthy and strong. I kept several plants in pots; those kept in the shade-house show a more luxurious growth than the others. I entertain hopes that this plant will become acclimatised in this colony although it would be premature to hazard a positive opinion as yet. The experience of another season is necessary to determine that point, last season being very unfavorable for all outdoor plants. Of the *Kumara* (*Ipomoea chrysorrhiza*, Forst.) I am able to report favorably.

The *Kumara* has recently been introduced into the East Indies. It has produced first-class crops, and is highly spoken of. Dr. Duthie, the Director of the Botanic Gardens at Saharanpur, in his last report, says, "I consider the *Kumara* to be a very valuable addition to our varieties of vegetables."

The Tree Tomato *Cyphomandra betacea*, Hook).—I regret to say that this plant has proved itself to be quite unable to resist this climate in the open air. Our summer is altogether too dry, and our winter too cold. In the stove-house the plant grows vigorously.

I have sustained another failure in growing the Nielgherry nettle (*Girardinia Leschenaultii*, Gaud.), belonging to the natural order of *Urticeae*. It possesses in a strong degree the stinging properties of the common nettle, and it grows on the higher ranges of the Nielgherry hills. The plant yields a valuable fibre, which the natives obtain by first boiling the plants, in order to destroy its stinging energy. The fibre is of considerable value. It is of great fineness, and is worth, in England, £200 per ton. [R200, much more likely.—Ed.]

I received the seeds from India. The young plants grew well in the spring, but they failed under the trying hoot weather in the summer.

Insect Powder Plant.—I am glad to say that at last I have succeeded in introducing those valuable plants *Pyrethrum carneum* (Bbrst.) and *Pyrethrum roseum* (Bbrst). They are natives of the Caucasus, and perennial herbs of the order *Compositae*. A powder made from the dried flowers has been long in use in Persia and in Russia for the destruction of fleas and other insects. According to "Smith's Dictionary of Plants of Domestic and General Economy," the plant from which the powder was prepared was for a long time kept secret. It was eventually discovered by an Armenian merchant, who communicated his discovery to his son, who, in 1828, manufactured the powder for sale. It is estimated that the quantity of this powder consumed in Russia alone is nearly one million pounds a year, and is now in popular use everywhere. I understand that the Agricultural Department of Victoria has lately imported and distributed the seed of the *Pyrethrum*, in order to promote its cultivation and the production of the well-known powder in Victoria. I raised about a dozen plants from imported seeds. They were planted in various localities in the garden, and I am very glad to say that, in despite of the very unfavorable season, they have grown uncommonly well, and have flowered freely. I have not the slightest doubt but that these plants can be easily acclimatised in South Australia.

Rhopala (Spec.).—Mr Thiselton Dyer, the Director of the Botanic Garden at Kew, has favored me with a parcel of the seeds of a remarkable tree, a species of *Rhopala*, belonging to the natural order of *Proteaceae*. It is a native of Columbia, and possesses the property of being indestructible by fire. Mr. Dyer remarks upon this tree as follows:—"The *Rhopala* is a small contorted tree, growing to about twenty feet in height. It is remarkable for being absolutely indestructible by fire, in large districts where the dry pastures and bush are burnt twice a year. Its resistance to fire enables it to exist to the exclusion of all other trees and bushes, as a perfect natural plantation. The periodical burning destroys everything except this tree. The resemblance to a plantation is moreover enhanced by the circumstance that the trees never form thickets, and they are thickly and almost systematically dispersed over the land. The tree delights in the most sterile soils, but always of a stony or shingly character. Sometimes it grows in places so barren that even grass cannot exist. This suggests the idea that it may be turned to account in sterile districts within the tropics." [This tree ought to be tried on the Ceylon patanas.—Ed.]

Ferns.—The collection of ferns has been enriched by the addition of thirty-six interesting species, which now numbers 407 species. We have added five species to the Lycopodiaceæ, bringing the number up to thirty-four. All the Ferns in the Fernhouses and those distributed through the stove and other houses show a most luxuriant growth, the result of careful attention.

One of the most interesting events which occurred in the garden last year was the flowering of a large specimen of the Yucca filamentosa. The plant is about twenty-five years old. It has reached the height of 18ft., the circumference of the stem one foot above ground is 7ft. 4in. The bare stem is 14ft. high, It produced its first upright flower-stalk in 1873. After this had peen cut off, a number of young shoots sprung up around the crown, which formed a globular head. Last year it flowered again; and this time, instead of producing upright flower-stalks, it threw out eight pendulous flower-stalks, each about three feet long, and containing about 300 flowers. The sight was magnificent, so much so, that I append a drawing of the plant in flower to this report.

The number of new plants of economic value and of those available for ornamental purposes, not including Florist's flowers, amounted to 353 species. The collection of plants has thus been augmented from 12,160 to 12,513 species.

I find that it will be necessary to remove a number of the old gum trees which have died or are dying out, and I regret to think that in the course of a few years very few of these will be left in the park. The great difficulty will be to remove these giants without injuring the young trees which have been planted in their neighbourhood. They will have to be taken down piecemeal.

Retrospect.—In closing this report I have thought that it would be of some interest if I were to give a short retrospect of the progress of the Botanic Garden since the year 1879. It must not be supposed that the value of the garden is confined to the pleasure and amusements it affords to the inhabitants of Adelaide and its suburbs, or to visitors from the country, as well as those from other colonies and foreign parts. It has the high function imposed upon it of spreading a scientific as well as an economic knowledge of the flora of this colony to other parts of the world. By this means an acquaintance with one portion of the resources of the Province is placed within the reach of the scientific world through the agency of institutions similar to that over which I have the honor to be Director. The continual interchange of specimens of plants enables the recipient to acclimatise large numbers of trees and shrubs. After experience of their habits, and their adaptability

to different climates has been established in this way, their distribution amongst those who are engaged in the practical business of agriculture and horticulture follows. In like manner the benefits of the interchange of plants and seeds with other countries cannot fail to become of the highest value to the cultivators of our own soil by extending their resources in new directions, and consequently increasing the value of their possessions. To this end the distribution of rare and useful plants amongst farmers and others has been continuous—indeed almost contemporaneous with the establishment of the garden. By the introduction of plants, trees, &c, a wide field of experimental as well as economical cultivation can be opened out. Its tendency is to enable the agricultural industry to broach out into new and useful enterprises, and to render it less dependent upon the cultivation of cereals alone, which experience, especially the last few years, has shown to be most precarious. As yet no very great results have sprung from this, but signs are not wanting that the use of new plants is gaining ground. A few years will, I trust, prove that the time and trouble which have been expended in this way, and the energy that has been applied to the dissemination of the knowledge necessary to the successful cultivation of foreign plants, grasses, seeds, and roots have not been exerted in vain. [Then follow details of improvements and additions made.—Ed.]

THE COLONIAL EXHIBITION.

Straits Settlements.—This collection is a very large and varied one, and occupies a cosiderable space in the east arcade, near the Hong Kong court. The exhibits are largely drawn from the vegetable kingdom, articles in native woods and bamboo largely prevailing. The following are a few of the most remarkable exhibits from the point of view in which we are specially interested. Several varieties of Gum Damar are shown, which, though called gums, are really resins exuded mostly by Dipterocarpeous trees. These resins are sometimes used for varnish making, but they appear to be used by the natives also for giving light, for here are exhibited implements called Damar-holders, which are described as being used as candlesticks, indicating that the Damar is burnt as an illuminant; the smoke given off must, however, be abundant and stifling.

The fibrous husk of the betel-nut (Areca catechu) is shown as a paper material, and as a waste product is said to be produced in almost unlimited quantities. Considering the very general practice of betel chewing by the natives of the East, and the abundance of fruits produced, as well as the thickness of the fibrous husk, the adaptation of this hitherto useless material would seem to be a very probable benefit for the countries where the betel-nut palm is common.

The fruits of Coix lachryma, better known, perhaps, as Job's Tears, are, as is well known, frequently used for necklaces, bracelets, and similar articles of personal adornment, but specimens are shown here of a dark-coloured elongated form, which are stated to be grown in small quantities by the Malays, and eaten in the same way as rice, or made into a sort of bread. Another food-product of very much more importance is sago, from the trunk of Metroxylon sagu, which is cultivated extensively about Singapore for commercial purposes. Pearl sago is known in trade in different sizes, classified as small, medium and large, but samples are here shown the "pearls" of which are as large as marbles.

The young leaves of Nipa fruticans are, it seems, used in the Straits for making cigarette papers, not that paper is made from the leaves, but that strips, of the leaves themselves are used for holding the tobacco. Regarding tobacco itself there are many samples of very creditable appearance, and some cigars of very curious shape, being short and pointed at the ends, and thick and flattened in the middle. They are exhibited by the Deli Langkat Cigar and Cigarette Company, and are called by the euphonious name of "Little Devils," the trade mark of which is a black devil rampant.

British North Borneo.—In this collection tobacco also forms an important exhibit; there are some fine brands, but the tobacco is mostly of a dark colour; the cut tobaccos are in long thin threads so common to Siamese and other Eastern sorts. A report on this tobacco from experts in Amsterdam, dated so recently as April last, says, "The quality is beautiful, soft, and strong, and has that elasticity which is so liked for cigar purposes. The burning is sufficient, although the ash is not quite white, but our brokers say that this will improve by further fermentation. In general the opinion is in every respect favourable, and valuation above the average of Sumatra tobacco. . . . We further have to observe that we did not mention to our brokers where it came from, and they therefore thought it was Sumatra tobacco."

Special attention is also drawn in this Court to the woods of the country, many of which are described as being both useful and ornamental. Unfortunately, however, the forest trees of Borneo are but little known botanically, and two or three only have other than native names. The whole of them, however, are good specimens of large size, well seasoned, and carefully smoothed or polished. In some notes on these timbers and their uses it is stated that some of them are valuabe for world-wide uses, and exist in such quantities as render the use of them available in those countries where wood is scarce. In consequence of the figure and colour of some of these woods resembling certain well-known commercial kinds they have been named in trade Borneo Mahogany, Walnut, Cedar, Ironwood, and so on. Under the Malay name of Mirabou, the wood of Afzelia palembanica is shown. It is described as being plentiful in some parts of Borneo, and valuable for furniture, as it does not warp; is very durable, has a fine figure, and takes a good polish. It is proof against the attacks of ants, and can be obtained in logs 30 feet long and 2½ feet in diameter. Three different woods, known respectively as Rassak Banaar, Rassak Diaim, and Rassak Bungah, and said to be the species of Vatica, are highly valued for their hardness and durability for house building, planks, piles, &c., all of them being proof againt the attacks of insects.

A wood called in Malay Salangau, Seriah, or Majon, and in English Borneo Cedar, appears to be one of the very valuable woods of the country. It is described as a tall handsome tree, probably belonging to the order Dipterocarpeæ, and found formerly in abundance in the Malay Archipelago, and still obtainable in large quantities in British North Borneo. Several varieties of this wood are known, all of a more or less reddish colour, and all suitable for furniture. Although easily worked it is strong and tough, and takes a good polish. It can be supplied in any quantity in logs 40 feet long by 5 feet diameter. Perhaps one of the most striking woods shown in the collection is that of the Kayn Kapor (Dryobalanops aromatica); it is the source of the well-known Sumatra camphor, which is found crystallised in interstices in the wood, sometimes in large masses. It is not so volatile as ordinary camphor, and is harder and more brittle; it is bought in quantities by the Chinese, who value it for its many supposed properties. The tree also yields by incision a fragrant aromatic oil. The wood, it seems, is very durable, easily worked, and is much used for house building, planks, &c. A very fine plank of this wood is shown. Some interesting samples of "Tankawang" fat or vegetable tallow are shown in this collection; the fat is poured into the hollows of big bamboo stems some 2 feet or more long, and labelled as of two qualities, one being made from large berries, and one from small. The fat is used for frying fish, making cakes, and lubricating machinery. The source of the vegetable tallow is not accurately known, but it has been attributed on the one hand to a Dipterocarpeous tree, and probably a species of Hopea, and on the other to a Sapotaceous tree, and perhaps to a Bassia. See *Pharmaceutical Journal*, Nov. 24, 1883, p. 401; December 15, 1883, p. 462; and December 22, 1883, p. 481.—John R. Jackson, Museum, Kew.—*Gardeners' Chronicle.*

FACILITIES FOR BOTANICAL RESEARCH.

Under this heading Professor Bower, who recently visited Ceylon, writes the following interesting article in *Nature*. Colombo, it will be seen, is recognized as the Clapham Junction of the East:—

In an article under the above heading, published in nature, vol. xxxi. p. 460, I endeavoured to draw the attention of our younger botanists to the importance of extending their studies over a wider field than is at present usual, and mentioned some easily accessible stations at which students might observe tropical vegetation. Since that article was written, I have had the opportunity of acting on my own suggestion, and of visiting Ceylon; I am therefore now in a position to enlarge upon my previous suggestions, and to fill in from personal experince many details which, though often trivial in themselves, may yet bring the possibility of Eastern travel home to the mind of some in such a way as may lead to future action. But while giving some account of the facilities for botanical work in the East, care must be taken not to overcolour the picture; it happens too often that writers of an enthusiastic bent raise expectations in the minds of their readers, which actual experience can only disappoint: in the following paragraphs I shall endeavour to make a purely matter-of-fact statement, and leave the colouring to be filled in at the will or opportunity of the reader. Taking first Peradeniya, we may consider what are its attractions as a station for botanical work, and then pass on to discuss the relative merits of other stations.

In the first place, hardly any port in the east is more accessible than Colombo: it has been aptly called the "Clapham Junction" of the East: the steamers of all nations meet there, and the competition between them produces a moderate scale of fares. Once, there, a direct train service lands the traveller in about three hours almost at the gate of the Royal Gardens; the mechanical discomforts of many a journey to remote districts in the United Kingdom are greater than this. The cost of the journey will vary according to the line of steamers selected; by the Peninsular and Oriental line a return ticket can be had from London to Colombo for 90*l*., 100*l*., or 110*l*. according as the return journey is completed in three, six, or twelve months. The charges on the Messageries Maritimes are about the same. The Star, Clan, and British India lines make more moderate charges, but the pace is correspondingly slower. It is little use making a journey of more than 5000 miles for a brief visit; and it may be presumed that, except where the circumstances are extraordinary, students would find it convenient to stay in Ceylon for three or four months, or more. Little is to be gained by scamping an expedition such as this, in which it may often happen that a man may gain his first and last experience of tropical nature; further, the surroundings are so new that it is some little time before one with even a good knowledge of our temperate flora can accommodate himself sufficiently to them to carry on successful work. We may then regard the cost of the journey as 100*l*., and the time required to make it a success about six months. The choice of season is an important point; in a country of alternating wet and dry periods it is well to experience both, and for the botanical collector it is important that collections should be finally made up in dry whether; it would be found that leaving England in November, and landing at the beginning of December, the weather would still be wet and vegetation luxuriant, but preservation of dry species would be difficult; a gradual change would be experienced, till in February and March the dry and hot season would have come in, vegetation would be more or less checked, and the preservation of dry specimens would be easy. Returning towards the end of March the English winter would be past, and, if he be a teacher, the traveller would be in time for the summer session in our Universities or medical schools.

Once on the spot the first question is one of accommodation. At Peradeniya there are neither hotels nor lodgings; a house must be taken and temporarily furnished, and it is surprising how cheaply this can be done. I took a small bungalow, the rent, of which was R40 per month; friends lent me some articles of furniture, and an expenditure of R150 supplied all else that was required for temporary housekeeping. The cost of keeping house, including the wages of two native servants, rent, &c., with a margin for incidental expenses, may be set down at about R250 per month; allowing further some R200 for travelling expenses, it will be found that R1,500 will represent the total necessary expenses of residence in the island for four months. But in its present depreciated state, the rupee is worth only about 1*s*. 6*d*.: it will therefore be sufficient to lodge about 115*l*. at a bank in Ceylon to cover all necessary expenses for four months' residence. I would not advise, however, that that exact sum only should be transferred; it would be more prudent to allow a margin for possible contingencies. The total expenses of a six months' trip to Peradeniya may thus be set down as 250*l*. But there are various ways in which strict economy might reduce the cost, while if two friends were to club together, their individual expenses for housekeeping would be considerably below the sum above stated for one. Thus it will be seen that neither in difficulty of transit nor in point of expense are there sufficient obstacles to prevent a visit to Peradeniya, or some similar station, finding a place in the programme of the career of an average botanist. One of the chief obstacles will be felt by many to be the loss of possible opportunities while absent, or the break in continuity of teaching, or other work in which a man may be already engaged. I venture to think that these are much overrated objections; and against them may be set the very great advantages which a tropical visit carries with it. A further question is, at what period in a man's career will a visit of this sort best repay him? Some will say immediately after taking his degree, but I am inclined to think that even a first-class man is at that time hardly prepared to make the best of the opportunity should it offer. The experience gained by a few years of teaching and of original work at home will indicate what is to be expected and what is to be looked for, and will fit a man in many ways for striking out new lines for himself, even if it have not already defined for him a clear line of research. On the other hand, it is important that travelling should be undertaken before a man settles in life, so that his mind may be as free as possible from distractions and anxieties.

We may now pass on to consider what are the specific advantages presented by Peradeniya as a station for botanical work. It is, as I have said, easily accessible; being more than 1,500 feet above the sea, the excessive heat of the low country is avoided, and it may be regarded as a decidedly healthy place. Secondly, it is situated in a central position, both as regards the whole island, and as regards the chief lines of communication by rail and road. Thus it is easy to gain excess to the low country by train to Colombo, whence roads, traversed often by horse coaches, will lead alone the coast, or inland in various directions; or, taking the upcountry line, Nuwara Eliya may be visited, which lies about 6,000 feet above the sea, and would serve as a good centre for working the higher levels; or again, a journey northwards by train and coach to Anuradhapura would give an insight into the low-level vegetation of the drier northern districts. From the above notes it will be readily seen how varied is the character of the country within easy reach from Peradeniya, presenting within a comparatively small area districts varying from the sea-level to 8,000 feet, and including both damp and relatively dry areas at low levels. This in itself would lead one to expect a rich and varied flora; and in fact the list of native plants now numbers some 3,000 species, a very considerable proportion of which are peculiar to the island. These and other natural advantages are,

however, eclipsed by the importance of the Royal Gardens themselves as providing a field for those hitherto unfamiliar with tropical nature. Here, there are collected in a small area a great variety of species, both native and imported; truly no botanist who has resided at Peradeniya can any longer complain of want of scope; if he does not find ample material for future work, he can only lay the blame on his own want of imagination. In the excellent herbarium and library, as well as in the fine series of coloured figures of native plants which are lodged in the Garden, he would find the greatest assistance in recognising and naming plants collected; while lastly, in the presence of the Director, who is the best living authority on the flora of Ceylon, are found those social and scientific elements which go far to enhance the pleasure of a visit to Ceylon.

In my former article mention was made of Java, where the Gardens of Buitenzorg, presided over by Dr. Treub, present great attractions for botanists. In my case, shortness of the time at my disposal prevented a visit to this famous Garden, and probably the same difficulty will present itself to others. There is, however, one conspicuous advantage which it possesses over Peradeniya as a station for botanical research, viz, a well appointed laboratory.* If, as seems not improbable, a Journey to the tropics and a period of steady work among tropical plants become a usual prelude to a career of active teaching in botany, ought not the English to provide themselves with some suitable station for such work? Is every man, whether well-to-do or impecunious, to depend upon his own resources alone for laboratory accommodation, re-agents, glass, and all other accessories necessary for his work? or are we to be content to send our botanists to suck what advantage they can from the hospitable Dutch, just as we send our forestry students to study with the French? Surely it would be a most legitimate way of extending the usefulness of the Garden at Peradeniya, and, in a small way it is true, of guarding the credit of England as a tropical Power, to establish a laboratory for the use of travellers. It need not be a large or conspicuous building. Dr. Trimen tells me that suitable accommodation for the present could be found in the buildings already standing in the Gardens, and probably 100*l.* would cover the initial cost of supplying the bare necessaries of life in the laboratory. The knowledge that such accommodation would be found at the other end would certainly encourage those who are doubtful to undertake a Journey to Ceylon.

It may be noted that no mention has been made of the Western tropics as a field for research; there can be no doubt as to the richness of the field, but I am not aware that there are any stations in the West which can compare with Peradeniya or Buitenzorg in convenience, accessibility, and general adaptation to the requirements of those who contemplate only a comparatively short visit.

Lastly, the cost of the journey will be found to be the most frequent deterrent from undertaking it; 250*l.* is a large sum to spend upon six months' work which can bring no direct financial return, however great may be the ultimate advantage gained from it; travelling Fellowships are few; but still there are other sources from which grants may well be made to assist really promising students in attaining so desirable an end; and it is to be hoped that it may be regarded as a legitmate and not unfrequent outlet for public or private grants, to enable young men, who will ultimately engage in teaching, towards the attainment of experience which must always be of value to them in the exercise of their profession.—F. O. Bower.

* The laboratory, herbarium and a splendid library are located in a splendid hall, which the gardens at Buitenzorg and the cause of science owe to Governor-General Charles Pahud, whose name is unfortunately associated with an inferior species of cinchona. The Buitenzorg gardens are of great extent and species are carefully arranged in groups. The numerous varieties of palms and pandanus are specially remakable. There is one particular palm with a scarlet stem which is a veritable thing of beauty.—Ed.

THE COLONIAL EXHIBITION.

The Coconut Palm in the Indian Court.—As supplementary to the description of the manufacture of coir matting, given by Mr. Jackson in a recent number, it may be interesting to furnish a few details as to the importance of the trade in coir and coconut-oil, and to draw prominent attention to one of the most complete and varied collections of the products of this palm ever perhaps shown, and which is now on view in the economic and commercial Indian Court of the Exhibition at South Kensington, prepared by Mr. M. C. Pereira of Bombay. The value of the coconut-oil, nuts, and fibre which we receive annually, exceeds half a million sterling. The oil and coir are chiefly received from Madras and Ceylon, the nuts from Brazil and the West Indies.

The collection of Mr. Pereira will be found near the bamboo trophy, and his descriptive enumeration of the exhibits (eighty-three in number) deserves a more extensive publicity. First is shown coir, the fibre obtained from the husk of the coconut, which in this state is used for stuffing cushions, beds, pillows, making rope mats, cordage, &c. Spoon made of the shell, used in the cook-rooms of Europeans, and by the natives for drinking gruel (rice conjee); it has the advantage over the metallic one of not corrodiug. A drainer used for draining food that has been fried in *ghee* (clarified butter) or oil; a large ladle, used for water; a smaller one, used by the natives for taking out oil for daily use from an earthen vessel containing the yearly or quarterly stock; it is not corroded by the oil. Hubble-bubble; or hookah of the poorer classes. beads, made of the shell. Vinegar, made of the juice or sap of the palm. Pickle made of the pith of the top of the fresh tree, with vinegar of the juice (toddy) of the same palm. The spathe of the blossom, the rib of the leaf. A broom made of the leaf-ribs: these are much used for sweeping purposes. A strainer made from the bracts of the tree, by which the leaves are held firm to the tree. It is used for straining (toddy) coconut-juice and coconut-milk, and for general straining in the cook-room. Wooly floss, much used as a styptic for cuts by the toddy drawers and cultivators. The blossom in the state when it is tapped for drawing juice (toddy). Chain used round the waist to retain the loin-cloth: the size is for a child—set in metal it may be used as a watch-guard. Drum made of a piece of the trunk of the tree. Wood, pieces of rafter made of the lower part of the tree, 10, 20, and 25 feet in length. Oil, as expressed in the native mills for commerce. Oil extracted from fresh coconuts by rasping fine, drying and pressing between coir, and twisting with the hands, or by extracting the milk and seperating the oil by heat. It is used internally in lieu of cod liver oil, and externally tor ulcers with good results. Coconut hair-oil, arrack, a spirituous liquor, 60° u. p., distilled from coconut juice (toddy) and drukhot. Punch made from the juice of the coconut palm, with spices and sugar, from the recipe of the Portuguese. One or two cupfuls are drunk hot for a cold. Liquor made of toddy by re-distillation, 20° u. p., formerly much used for making medicinal tinctures and country brandy; a coconut (the fruit takes a year to ripen). A sweetmeat prepared from the kernel of the nut; another kind is flavoured with saffron. Splints made of spathe of the blossom used for this purpose by the toddy drawers and natives of Goa, &c. Door mats made of the fibre, of many shapes and sizes by natives, and in the gaols. Buggy mats and carriage mats are also shown. Floor mats are also made in Malabar, and in the Bombay gaols of different sorts and colours. A bird-cage made of the rib of the leaf. Horns, large and small, made of the leaf of the palm give a loud sound when fresh. Toy-parrots in cage, made by children, of the leaf

of the palm. Cadjan or woven leaf of the tree, used for thatching houses; has the advantage over tiles of keeping the house cool. The astringent root is used medicinally, and as a gargle for sore mouth. Coir ropes of various sizes are extensively used for different purposes. An oil bottle hung beneath the labour cart with castor-oil and brush in it for lubricating axles. Immature nut, used medicinally as an astringent; children are fond of it.

Trough made of coconut tree used for catching water drawn from a well with a Persian wheel for irrigation purposes, of which a model is shown. A conduit as put under the trough for conveying the water. Piece of the adapter used for connecting the native still to the condenser. Tuntuna, a native musical instrument used by the poorer classes. Piece of beam of the shape used for houses. It is also used for fishing-stakes in the sea; generally two coconut trees make a stake 60 to 70 feet long. A rosary-box made of immature coconuts.

Charcoal powder, the burnt shell, used for preparing black and lead coloured washes for houses. Broom made of the ribs of the leaf, used by the Bombay and other municipalities for sweeping roads, streets, yards, &c. Brooms made of the stems of the blossoms and nuts are used by the cultivators for collecting dry leaves for burning on the fields. Crab traps are made of the stems of the leaf, and fish traps of the ribs.

String of Pots.—This is made of the fibre of 60 or 70 feet in length, and about fifty or sixty earthen pots fixed to it and put on the Persian wheel, which in rotating brings up the pots filled with water and takes down the empty one.

Vio.in used by the lower classes of natives, particularly the Gosavies, a class of professional beggars. A sling, used for keeping sundry articles of food out of the reach of cats, rats, and ants, by hanging it on a hook to the ceiling. Tied to the ends of a bamboo it serves for carrying water-pots, baskets, &c. A small one is used by milkmen for carrying milk for sale.

Flesh-glove, used for washing and rubbing cattle and horses. Tar with acetic acid, made by burning the shells in a pot with a small hole in the bottom, placed on another, heated by fire on all sides. It is used by the natives for ringworm and skin diseases. A brush made of the husk of the nut for cleaning sieves, washing baskets, and rice-strainers. Sugar and molasses made of the toddy or juice in Goa.

A band peeled from the outer part of the stem of the leaf, which is used as a cord by the toddy drawers. A gilded coconut, offered by the higher classes of Hindoos to appease the sea on the coconut fair day. At weddings the bridegroom and bride carry it in their hands. Coconut husk, used as fuel, especially for baking purposes and for making fibre; scoops made of the shell—the round and deep ones are used as drinking cups. Neck-belts, used for yoking bullocks and buffaloes to carts, ploughs, oil-mills, &c. Sack, used for sending out articles in; a somewhat similar one is attached to the cart for carrying straw or grass. The pedicles of the blossom are used for tooth brushes, and the peduncles are used as brushes for whitewashing houses, &c. A blind, used for blinding bullocks and buffalo while yoked to the Persian wheel, oil-mills, &c. Nest, made by birds out of the fibre of the leaf. Soap, made with coconut oil, which holds a larger percentage of water than any other soap. Rings, whips, neckties, rattles, crosses, puzzles, and toys are made of it, also cricket-pads of the wood. Poonac or oil-cake from the native mill, used for manure and feeding poultry. A patensur or ship and fishing boat, made by boys of the fisherman class.

Copra or kobral, the dried albuminous kernel of the nut—the stem used as a broom. Model of a charpai or cot used by the natives. Crude potash from the stem of the leaves; they produce 20 per cent, of ash. Abortive coconuts used as floats for beginners in swimming. The spadix, prepared for drawing juice or toddy. A thin slice is cut from the palm stem three times a day. The juice flows from this and drips down into an earthen pot suspended on purpose. A small piece of the leaf is fixed above to prevent the bottom of the pot from touching the point, the sheath of the leaf covering the mouth of the pot to keep out flies.

Cultivation.—This useful palm requires considerable care and cost to bring it to the state of bearing fruit. The ripe good-sized nuts from an old tree are kept in a well of water for three months, until they germinate; they are then put into the ground in beds of fifty or a hundred, and watered every day. In three months more they begin to grow up, and after three years or more they may be transplanted in regular spaces of from 15 to 20 feet, watered regularly every other day, and manured occasionally. In about twelve or fifteen years they come to bearing, but the yield is in proportion to the care taken to water and manure; at this stage the value of the tree is from £2 10s. to £3 each.

Ceylon.

From Ceylon it is officially stated that the cultivation of the coconut palm, with its multifarious uses, is the most important in the life of the low-country Sinhalese. The spirit he drinks is distilled from the sap, the kernel of the nut is a necessary element in his daily curry, the "milk" of the nut is the beverage offered to every visitor; his only lamp is fed from the oil; the nets for fishing are manufactured from the fibre, as is also the rope which keeps his goat or cow from straying; while the rafters of his house, the thatch of the roof, and the window-blinds, are made from its leaf and wood. The extent and value of the cultivation of this palm may be gathered from the fact, that while, as already stated, its many products are a universal necessity in the daily life of the island population of 3,000,000, the export of oil, copra, and fibre, exceeds in amount £700,000 annually, and the revenue derived from the excise duty levied on the spirit (arrack) distilled from the sap exceeds £170,000.

The shipments of coconut oil from Ceylon in 1884 were 383,955 cwt., valued at £447,948; and of arrack, 140,742 gallons, value £24,290; exclusive of the coir-fibre, £77,454, and nuts, £6,900. Under the name of poonac, 150,000 to 200,000 cwt. of coconut oil-cake is also imported annually for manure from the Malabar coast, to the value of £60,000 to £70,000.

Besides India, coconut products are shown in the Ceylon, Fiji, the West Indian Courts, and Honduras. The value of the exports from Fiji in 1884 were:—

Coconuts	£2,219
Copra	59,241
Coir-fibre	1,301
	£62,761

Trinidad has 3,000 acres planted with coconut palms. About 5,500,000 coconuts were shipped from Jamaica in 1884, which realised nearly £21,000.—P. L. Simmonds.—*Gardeners' Chronicle.*

The Bark of the Sapu Tree as a febrifuge is thus noticed in an account of the Mauritius Court in the *Pharmaceutical Journal*:—"The bark of *Michelia Champaca* is stated by Bouton to act very effectually as an antiperiodic, and to clean the tongue in fever and subdue nervous symptoms."

Petroleum Fuel.—At the conclusion of a paper on petroleum by A. H. Samuels, F. C. S., he stated:—I must not omit to mention the use of the special product of petrol distillation for fuel. The Russians call it astatki, and Messrs. Nobel's fleet of petroleum vessels on the Caspian Sea are all worked entirely with this astatki. It is burnt by being passed along a narrow tube, and as it drips from the tube a current of steam is blown through it and scatters it in a fine spray, which keeps in a continual blaze. Various patents have been taken out for burning petroleum for fuel, and is likely to supersede coal at sea owing to its great cheapness and economy as regards bulk.—*Pharmaceutical Journal.*

Root-worms in the Sugarcane.—M. Treub, the excellent Director of the Buitenzorg Botanic Garden, has published an account of a third species, Heterodera javanica, which affects the roots of Sugarcane in the same manner as the two other species, H. Schachtii (found on numerous plants, especially in Beetroot), and H. radicola, also found in numerous plants.—*Gardeners' Chronicle.*

Maracaibo Coffee.—Consul Plumacher, in his annual report just submitted to the State Department on the commerce of the consular district of Maracaibo, says that coffee continues the principal product of that region, and New York its most advantageous Market. The export of coffee to the United States, which was thirty million pounds during 1884, was less than twenty-eight million pounds during 1885. The production of coffee was not less than heretofore, but low prices led inland producers to store and hold their coffee to await better prices. Recent revolutions and low water in the rivers have also interfered with the shipment of coffee from the interior to ports of export. The exports have been mainly in American bottoms. The new crop promises to be plentiful and good. The export of cacao is steadily increasing, and will probably be doubled by the completion of railroads now in course of construction. The demand and prices for hides and skins were uniformly good. Commerce at Maracaibo suffers from a monetary crisis, revolution, monopolies, political uneasiness, postal irregularities, and prevailing low prices of principal articles of export. The total expots of the year to the United States were estimated at $2,827,682.—*N. Y. Commercial Bulletin.*

The Trade in Jute.—Some curious facts in connection with the trade in manufactured goods between Germany and England are brought to light in a report by H. M. Chargéd' Affairs at Dresden "on the effects of the German Customs Tariff Reform of 1879, and on the revision of 1885." The points with which we are more immediately interested are those treated of in chap. 4 under the head of "Jute Manufactures," in which Mr. Strachey says:—"Germany began to spin and weave Junte fibre about a quarter of a century ago. In 1874 the spindles were estimated at about 17,000; they are now nearly 60,000. These may seem miserable figures by the side of the 18,000 Indian spindles, to say nothing of the Scotch, but they show the vigour with which the youngest of the textile manufactures has been pursued by the Germans. All the coarse Jute tissues such as granary sacks, baggings, hessians, and tarpaulins, are now made in Saxony, Prussia, Bremen, Gua Elsass, and elsewhere in the empire. When spun in high numbers the fibre has a fine golden glance, and in its natural shade, or dyed, may be woven into cloths and plushes of great durability and beauty. Jute may also be printed or interwoven with cotton, woollen, and silk, making the cheap and effective furniture stuffs now so largely used in hotels, railway stations, theatres, &c., and in Germany in private houses. It is hardly a secret that the fibre of the Corchorus capsularis is the real component of most of the real Algerian curtains positively imported from Algiers, of the genuine cloths of Smyrna, of the undoubted tapestries of Teheran and Herat. Germany contributes her share to the productions of all these fabrics, whether sold under their proper names, or under the more attractive foreign euphemisms. Chemnitz and Zittau in Saxony, Elberfeld, and some other Prussian wool centres, now compete with the analogous goods of Paris, Amiens, of Tourcoing and Roubaix, and with our own made in Bradford and Huddersfield."—*Gardeners' Chronicle.*

The Colonial Exhibition.—One of the most interesting of the minor features consists in the illustrations of the uses made of flowers, grasses, &c., for ornamental purposes. In the Cape Court, for instance, a botanist of our acquaintance who has made the Restiaceæ a subject of special study for nearly a quarter of a century, and has been twitted for his devotion to so unattractive and so generally useless a race of plants, was delighted to find his favourites thought ornamental enough by the Cape ladies to be used as decorations for their hats, together with leaves of the Silver tree (Leucadendron), everlasting flowers, &c. In the West Australian Court are some ornaments constructed of what we take to be scales from the involucre of a Protead. They are effective, but we have not yet been able to examine them closely. Popular names are, as usual, an intolerable nuisance; some magnificient things are made in various Australian Courts from "Cedar," but the Cedar of one court is not the Cedar of another; and whatever be the true name neither of them is entitled to be called Cedar; the collections of timber, economic plants and their products by Baron Von Mueller, Dr. Schomburgk, Mr. Brown (South Australia), Mr. Bailey, the colonial botanist of Queensland, the officers at the Cape and Natal, British Guiana, Canada and India are full of interest to the botanist and cultivator. Baron Von Mueller sends his wood samples in the form of little books, which admit of the various sections, transverse, vertical, or radial, being seen, while it allows the specimens to be packed book-fashion in small compass. Each "book" has for title the name of the plant from which it is produced. Mr. Brown mounts small sections of wood bark, &c., with the dried flowers on grey board—the whole very neat, compact, and effective. The Queensland woods are in the form of small slabs let into card-board mounts like photographs. The photographs of the Melbourne and Sydney Botanic Gardens, as well as those of Ceylon and Calcutta are excellent. Our readers will be familiar with some of these from the illustrations that we have from time to time published. The Botanic Gardens, Ballarat, is, however, new to us. The models of fruit from Australia are interesting, but their interest is lessened by the considerable importations, in excellent condition, of fresh samples.—*Ibid.*

Coco-De-Mer, or Double Coconut.—Frederick Stearns has on exhibition, at his office in the laboratory, two specimens of the Coco-de-mer, or Double Coconut, a remarkable fruit of one of the largest and most wonderful palm-trees. They were sent him by the Hon. E. V. Mussey, United States Consul at the Seychelles, a small group of islands in the Indian Ocean, north of Madagascar. This palm-tree, it is stated attains a height of 100 feet, its stem being nearly two feet in diameter, bearing on its summit a crown of fan-shaped leaves. It is remarkable for growing in a socket of a hard, woody texture, perforated with holes made by the roots. This curious appendage derives its origin from the Coteyledon, which in the palm attains the extraordinary length of 2 feet, growing downwards like a root, having the germ seated in its thickned end. When perfect, the thick end opens on one side, like a sheath. In time, the nutriment of the nut becomes exhausted, and the part of the cotyledon between it and the young plant withers. The latter, however, maintains its placental vital connections with the sheath end of the cotyledon, which is henceforth nourished by the plant, and increases in size with its growth, which thus continues seated in the cradle of its birth through life. This formation appears, however, to be common to the palms, but very much more largely developed in this variety. The fruit is a large oblong nut, covered with a thin rind. After the removal of the outer rind it has the appearance of two oblong nuts firmly united together, often weighing 30 to 40 pounds. They are borne in bunches, each consisting of nine or ten nuts, so that a whole bunch will often weigh 400 pounds. It takes 10 years to ripen its fruit, the albumen of which is similar to that of the common coconut, but it is too hard and horny to serve as food. The shell is converted into many useful articles by the natives. The leaves are made into hats, baskets, and the like. The demand of late years has become so great that in order to obtain the leaves the trees are cut down, and, as no care is taken to form new plantations, it was at one time feared this palm would eventually become extinct. In 1861 the leading botanists in England petitioned the Government for its protection. By more recent information, however, it appears that in one island alone there are many thousands of these palm-trees.—*Detroit Free Press.*

ADULTERATION OF COFFEE.

Planters' Association of Ceylon, Kandy, 13th July 1886.

The Editors, *the Ceylon Observer*, Colombo.

Sirs,—With reference to your editorial note in regard to the leaflet on the subject of the adulteration of coffee mentioned in Mr. Shand's letter published in your issue of yesterday, I now beg to enclose a copy of it.

The Planters' Association and Chamber of Commerce were recently invited by Mr. Thomas Dickson, Managing Director of the Scottish Trust and Loan Company of Ceylon, Limited, to again move in the matter, when it was decided that the subject be brought before the Associated Chambers of Commerce of the British Empire by Mr. F. W. Bois, the delegate of the Ceylon Chamber of Commerce, but I think Mr. Shand's statement that the Planters' Association of Ceylon was not asked to join in the particular movement under remark is correct.—I am, sirs, yours faithfully, A PHILIP, *Secretary*.

(*Printed under the Authority of the Indian Coffee Planters' Committee.*)

COLONIAL AND INDIAN EXHIBITION (LONDON, 1886).

INDIAN COFFEE, ITS USE AND ADULTERATION.

Samples of Indian Coffee, 230 in number, have been arranged at the Exhibition, by the Indian Coffee Planters' Committee, under the sanction of the Royal Commissioners. These samples represent (1) the "cherry" (that is, the coffee fruit as plucked from the tree); (2) the "parchment" bean (that is, the berry when pulped but enveloped in an outer skin or husk, resembling parchment); and (3) the berries stripped of this covering, and sized and sorted as they come into the English market, before roasting. The coffee thus exhibited is from the crop of 1885-6, produced by British planters in the following districts:—Mysore, Coorg, the Wynaad, the Neilgherries and Travancore. Upon coffee estates in these districts the investment of British capital is annually increasing, and the finest coffee which comes into the English market, fetching higher prices in many cases than even Mocha coffee itself, is grown in the districts above mentioned.

Visitors are invited to test the quality of the coffee by purchasing, in the coffee stalls of the Royal Commission, cups of Indian coffee, or they may buy at the same stalls packets of roasted coffee, ground or unground which may, if they wish, be forwarded to any address through the Parcels Post. If desired, unroasted coffee will be supplied.

Coffee, when carefully made, with a sufficient quantity (say from an ounce and a half to two ounces to a pint of water), is, perhaps, the most delicious and refreshing of all non-alcoholic beverages. It produces a buoyancy and exhilaration which are not followed by reaction or subsequent depression; it acts as a stimulus to the mental powers, lightens fatigue, sustains the strength, whether under mental or physical exertion, and contains medicinal and restorative properties long recognized as of the highest value. No other beverage so amply repays, by its aroma and fragrance, a little care and attention in preparing it. In every other civilized country, excepting the United Kingdom and Russia, it is among non-alcoholic beverages that which is most largely consumed.

In the United Kingdom its consumption, unfortunately, has been hindered to a great extent by many and shameful adulterations carried to such lengths that large classes of the population hardly know the flavour of genuine coffee. Chicory is the chief ingredient in the cheap mixtures, because it soon makes hot water black, thick and bitter, and so little gives apparent strength to what may contain little of the coffee berry. Among numerous other substances used to adulterate coffee are burnt sugar, roasted and ground roots of dandelion, carrot and parsnip, together with beans, lupins and other seeds. Notwithstanding the provisions of the Adulteration Act, and, indeed, under cover of these provisions, the adulterants above-mentioned are made up with coffee in different proportions, and are everyday sold, especially among the poor, labelled as coffee mixtures. They are also sold under various high-sounding names to consumers among the middle and upper classes.

An analysis of forty-three samples of coffee and coffee mixtures purchased in London during March and April 1886, shows an average proportion of coffee in these samples of just fifty per cent, added to fifty per cent of burnt sugar and various vegetable substances. Twenty-two of the samples bear a label very commonly used; and nine of those contain from sixty-two to ninety-three per cent of chicory, &c., averaging seventy per cent of other substances than coffee. These mixtures are sold at prices ranging from 10d up to 1s 4d per pound. The price of the pure Indian coffee sold in packets at the Royal Commission's stalls is 1s 4d per pound. Upon a moderate calculation the vendors of many of the wretched compounds just mentioned must be realizing profits of something like a hundred per cent, and the worse the mixture the greater the profit.

On this subject the Committee may cite the following extract from the Annual Report of the local Government Board for 1884-5 (pp. cvi, cvii:—"Coffee continues to be one of the chief subjects of adulteration, and about one-fifth of the samples examined were reported against. The peculiarity in one case was that the berries were actually shown to the Inspector, and were ground in his presence, so that there seemed to be no likelihood of adulteration. Chicory, however, was found on analysis to be present, and the vendor was fined. It is possible that this fraud was due to the revival of an old practice of compressing chicory by machinery into the size and shape of coffee-berries. These sham berries are mixed with real ones, and the purchaser, who sees what he believes to be coffee being ground before his eyes, is hopelessly deceived. As chicory only costs threepence or fourpence per pound, the fraud is very profitable. It is no rare thing for so-called 'coffee' to be sold which proves on analysis to be composed of one-fourth part of coffee added to three-fourths of chicory."

From an abstract of reports made by the public analysts contained in the same official document (p. 298) it appears that, out of 357 samples examined in the Metropolis during the year 1884, fifty-three, or about fifteen per cent, were adulterated. In various counties of England and Wales adulteration was still more general, for out of 981 samples examined 219 were adulterated, or about twenty-two per cent. And these were not the coffee "mixtures," which may be sold as such if so labelled (see section 8 of Sale of Food and Drugs Act, 1875), but samples sold as pure coffee.

Thus it appears that from the sale of coffee mixture enormous profits are realized by vendors while the public palate is depraved and genuine coffee discredited. In the interest of consumers, as well as of British producers and importers, the Indian Coffee Planters' Committee wish to point out that pure and wholesome coffee may be bought at reasonable prices, varying, of course, according to quality, but often little if at all exceeding the prices charged for spurious fabrications. This Exhibition, with its samples of genuine products from the Colonies and India, appears to offer a legitimate opportunity for pointing out the wholesale manufacture and retailing of spurious compounds in the United Kingdom, practices most prejudicially affecting consumers, and also seriously discouraging British enterprise in the growth and importation of coffee. Visitors are respectfully invited to note these facts, and not allow themselves to be deluded into the belief that coffee mixtures are aught but a miserable substitute for genuine coffee.

A Few Practical Hints to coffee-drinkers:—*

1. Raw coffee (the unroasted berry) if kept in a dry place improves with age.

2. Those who wish to enjoy coffee in perfection should have it fresh roasted.

3. If the usual rotating cylinders are not available, it is easy to roast coffee over a clear fire in an earthenware pipkin, or a small frying-pan: it must be kept constantly stirred to prevent burning; the time required is from 15 to 20 minutes.

4. Roasted coffee should be kept in an air-tight vessel; the Viennese prefer a glass bottle to a canister. Coffee is very absorbent, and according to good authorities, should at no time come into contact with metal.

5. A mill, though convenient, is not essential. The Turks do not grind their coffee, but pound it in a mortar with wooden pestles. Brillat Savarin, the great French epicure, who tried both pounded and ground coffee, preferred the former.

6. One ounce of coffee to a pint of water makes poor coffee; an ounce and a half to a pint makes fairly good coffee; two ounces to a pint make excellent coffee.

7. Such coffee mixed, with half, or even three parts, its bulk of boiling milk, forms an ideal breakfast-food for body workers and brain workers. A very small quantity without milk, taken after a full meal, stimulates the stomach to the necessary effort of digestion, and wards off the drowsiness which often follows satiety.

8. This neat infusion is generally known as "black" coffee. But genuine coffee, when infused is not very black. An excessive black colour is given by means of burnt sugar, and is no sure indication of strength.

9. It is a mistake to suppose that costly and cumbersome machines are necessary for making coffee. The Brazilians insist that coffee-pots should be made of porcelain or earthenware, not metal. Excellent coffee may be made in a common jug provided with a strainer.

10. Warm the jug, put in the coffee, pour boiling-water on it, and the thing is done.

11. Coffee must not be boiled; let it gently simmer; violent ebullition dissipates the aroma.

12. If a quantity be wanted, good coffee can be made some hours beforehand, even overnight if necessary. For this purpose use any large earthenware vessel; heat it to receive the coffee; fill up with boiling-water; protect the contents from the air by a wet cloth over the lid or other covering. When required, pour gently off the clear infusion and heat it to the simmering point.

13. Complicated filters are unnecessary if your coffee be pure; if mixed with chicory, dandelion root, roasted acorns, roasted cabbage stumps, or other forms of vegetable offal, which on boiling disintegrate and yield a thick, starchy, albuminous, sugary soup, you will then want an ingenious filter.

14. According to recent German analyses, the dietetic value of a cup of coffee is more than twice that of a cup of tea; as a stimulant a cup of coffee has more than three times the value of a cup of tea.

MR. RUTHERFORD ON THE DETERIORATION OF CEYLON TEA.

10th July.

Sir,—The following have been given me by various tea planters as the causes which they consider have brought about such a great fall in the price of Ceylon teas this season:—

No. 1 considers that the poor quality is because there have been those conditions of heat and moisture to produce leaf flush, without the plant drawing upon the minerals of the soil, and that on this account there is a poverty of cellular tissue.

No. 2 does not believe in the deterioration of quality, and attributes the low prices entirely to larger supplies and a depressed trade.

No. 3 considers that, as a rule Ceylon eatates are plucking coarser leaf than they did in the days when Mr. Cameron was among us.

No. 4 considers that much better tea would have been made had there not been such a lack of electricity in the air this season—a fact which, he says, he has particularly noted.

No. 5 considers we have been working our bushes too hard, and that they are on many estates becoming exhausted; and if good quality is to be maintained we *must* manure.

No. 6 considers that low prices might to a certain extent be averted if London brokers would not so invariably sell *without* reserve.

None admit that tea-makers have become careless in the manufacture of their teas, and none attribute a deterioration from using any particular roller or dryer.

The above expressions of opinion are from those who have given some attention to the subject; and, although none of them may have hit upon the true reason for the great fall in price and alleged deterioration, their opinions may assist others in solving the mystery.

H. K RUTHERFORD.

Local "Times."

CEYLON REVOLUTIONIZING THE MARKETS OF THE WORLD.

IN RESPECT OF CINCHONA BARK AND CARDAMOMS. IN FIVE YEARS, MAY NOT THIS ALSO BE THE CASE WITH TEA?

The time was—not so long ago—when "New Products" were the subject of contempt on the part of a great many people in Ceylon. The old coffee planter wedded to his staple and justly proud of a plant that had so long been the mainstay of the colony, for years poohpoohed the cry over "new products." Absent proprietors, as in the case of Mr. Wm. Smith's partners in Craigie Lea, some dozen years ago, would have nothing to say to cinchona on their plantations. Who would devote time and money to a "medicine plant?" "Intelligent natives" for a long time, thought it a poor look-out when they saw their European neighbours and superiors given over to experimental nurseries and gardens with a variety of new-fangled notions about bark, rubber-juice, cacao-pods and even the despised native cardamoms. Officials, with one notable exception, generally looked upon the "New Products" era as the beginning of the end, and many of them rather chuckled over the thought that Ceylon was in a fair way to relapse into the paradise described by Mr. Wm. Charles Gibson when there was no coffee planter in the island to worry and disturb Her Majesty's Civil Service. We have spoken of one notable exception. We refer to Governor Sir Wm. Gregory who was so far ahead of the Service and of the generality of planters, as to devote special headings and paragraphs in his Opening Speeches year by year to Cinchona, Cacao, Tea, Rubber, &c., long before those industries had been practically appreciated on our plantations.

But the day of small and despised things is at end, and lo! the little one has become a thousand. Who would have believed in 1861 (the year that Clements Markham brought the first cinchona plants to the East), or in 1871 when our total export of bark was 80 pacakages valued at R313, or even in 1881 when it had reached 1,100,000 lb., that in 1884-5-6 it would be found that Ceylon had completely revolutionized the ancient South American trade in cinchona bark and acquired the complete control of the European market?

* Most of these "hints" are condensed from "Coffee and Tea," a lecture given by Dr. G. V. Poore, at the Parkes Museum, 74 (a) Margaret Street W., where persons desiring to pursue the subject further may obtain copies of this lecture (price 1d) or by writing to the Secretary.

Sending from 11 to 15 million lb. of bark of all grades into the European market in a single year, the produce of Ceylon may now be said to equal, if not exceed, that of all the rest of the world put together! And yet less than seventeen years ago, the Director of our Botanic Gardens (the late Dr. Thwaites), had to beg, and beg in vain, to have a trial given by our planters to his cinchona plants, offering them as a free gift! The cinchona planting industry has indeed become a veritable giant in Ceylon; the shipment of a couple millions lb. of bark in a single month from Colombo is not now deemed extraordinary and as a correspondent well says elsewhere, it depends entirely on Ceylon producers whether the price of this product should rise again, or fall to a mere fraction of what it was a few years ago. There is certainly reason therefore for a Cinchona Planters' Syndicate in this island.

But it is not simply in respect of cinchona bark that the markets of Europe have been revolutionised. There is another "new product" despised and comparatively little known, and yet it has put many useful rupees into the pockets of numerous Ceylon planters during the last five years, until now the cry comes from the brokers and merchants of London that in respect of CARDAMOMS too, Ceylon has revolutionised the trade of the world as centred in the great distributing metropolis. How strange this result! Ceylon began by shipping only 5,000 lb. of this product so recently as 1876, and now we are up to 205,000 lb. for 9½ months with the probability of touching 250,000 lb. for the twelve months ending 30th September next.

It is surely then no small compliment to the energy of our planters and the world-wide importance of their industry in this island, to learn that in respect of two of our new products—Cinchona and Cardamoms—the whole trade of the world has been revolutionised through the influence of Ceylon. Who daresay that it may not be possible in five or seven years hence, to say the same thing in respect of "TEA"? We ought to have taken special notice before now of the fact that in April last Ceylon had made another great stride forward, in shipping over one million lb. of tea in the one month. The day is not far distant, we believe, when the same quantity will be shipped in a week from Colombo. There can be no question that we are, as a colony, in for "a big thing" as the Americans would say, in respect of "tea." The sooner our neighbours in India, Java and China realize the fact, that this little island is bound to go on exporting 12, 20, 30 and 40 millions of lb. in successive seasons until, perhaps, the 50 or 60 millions are reached, the better for their own peace of mind and business arrangements. It is impossible to arrest the great enterprise in which practically the entire planting community of Ceylon are now engaged. CARDAMOMS has done great things; CINCHONA can shew marvellous results (and CACAO or COCOA should not be forgotten); but among all the NEW PRODUCTS OF CEYLON, none are so full of promise, potency and revolution as regards the markets of the West, and the prosperity of this little island, as TEA.

EXHIBITION CONFERENCE ON FIBRES, DRUGS, &c.

(*From a London Correspondent.*)

20th June 1886.

A notice was issued from the Colonial Exhibition dated 15th June, signed E. C. Buck, inviting gentlemen to meet at a Conference at the Economic Court in the Indian Department on fibres, silk, drugs, gums and resins, minerals, oils, oil seeds, timbers, tanning materials and food stuff. The first meeting was on the 16th instant, when Dr. Forbes Watson, Messrs. Christy, Routledge, Collier, Cross and Johnston attended. Dr. Watt had the different fibres laid out in bundles, but owing to the want of commercial information no practical results were arrived at. One gentleman asked the names of the fibres referred to in *The Times* 31st May. Dr. WATT replied that the names of the fibres could not be given as some visitors at the Exhibition who had their attention called to these fibres had undertaken to patent the employment of two for certain purposes. This created considerable surprise to the gentlemen who were asked to attend this conference. Mr. Cross working with Mr. Bevan and Mr. Johnston asked if the Indian Government would pay for a chemical report upon the fibres from India if he examined them chemically and microscopically. Mr. BUCK said that he was confident that the Indian Government would not pay any expenses as they were most anxious that this expense should devolve upon merchants in England, and this was one of the reasons why they hoped to form a Colonial and Indian Museum. Mr. Cross then asked, supposing he did the whole of this work, would Mr. Buck undertake to have the whole published at the expense of the Government. He replied that if the future recipients of the Indian collection would not support the expense, he undertook to say that the Government would do so. It is rather a singular coincidence that on the same day as this first conference was held that a letter should appear from Mr. T. Christy, F.L.S., in the *City Press* upon the subject of Colonial Museums.

THE PRICE OF QUININE.

Quinine, the alkaloid of cinchona that is most largely used in medicine, is now lower in price than it has ever before been in the history of its manufacture. When Congress removed the import duty on the various salts of quinine in July 1879, the price of sulphate of quinine of American manufacture, was $3.35 per ounce in bulk, but since that date the price, with the exception of a few slight fluctuations, has steadily tended downward, until at the present time the American drug is quoted at 68 cents per ounce in bulk, while the foreign article is quoted at about four cents per ounce less.

The question naturally arises as to what extent did the removal of the duty affected the price of the drug. Immediately after the removal of the duty there was a decided fall in the price, occasioned by large quantities of foreign sulphate of quinine being sent to this country, but it was not long before prices advanced, not to the same point, however, as prevailed at the time of the removal of the duty. The cheapness of the salts of quinine is almost entirely due to the low price at which the cinchona bark, from which they are obtained, is now being sold, and the bark is cheap because it is in plentiful supply. For many years quinine manufacturers in this country and abroad relied principally upon South America for the supply of cinchona bark, and, as the amount furnished was insufficient, the price was high; but during recent years the efforts made by the English and Dutch Governments more than twenty years ago to grow the cinchona tree in other places have begun to bring forth good results, so that the bark, instead of coming almost exclusively from South America, is now supplied from the East Indies, Ceylon, Java, etc. The first shipments from Ceylon, which is now one of the largest growers of the cinchona tree, were made

n 1869, and did not exceed a few pounds, but now the exports of bark from this island annually amount to over 15,000,000 pounds.

With the cheapness of sulphate of quinine there followed an increase in the consumption, for the world's production is now greater than ever before. Not only is this increased output shown by foreign manufacturers, but American producers have largely increased their production of sulphate of quinine during the past few years. The American industry is carried on by a few large manufacturers in New York and Philadelphia. We are unable to show the increase in production in this country, as it is impossible to obtain statistics from the manufacturers of their output: but, as all the bark used in this country is imported, an examination of the Customs returns will give the imports of bark, which will fairly show the increase that has taken place in the production of sulphate of quinine. The imports of cinchona bark in the fiscal years ended June 30th, 1884, 1885 and 1886 were as follows: For 1886 the statistics for nine months of the year only were at hand, so that a careful estimate for the balance of the year has been made and added to the imports for the nine months.

	Pounds.	*Values.*
1884	2,580,052	$717,614
1885	3,513.391	914,508
1886	4,100,000	830,000

It will be seen that the increase in the imports since 1884 has been nearly 60 per cent. While the imports increased the average import value per pound decreased, being 28 cents in 1884, a little over 26 cents in 1885, and only 21 cents in 1886.

Although American manufacturers are producing large quantities of quinine, a considerable amount of the foreign drug is being imported, but the quantity is now much less than it has been. In the nine months ended March 31st last, the imports into this country of the salts of quinine amounted to 1,469,901 ounces, valued at $759,669 against 1,716,897 ounces, valued at $1,405,957, imported in the corresponding period of last year. The American sulphate of quinine, although somewhat higher in price than the foreign article, is preferred by most consumers because of its known purity. Foreign quinine is brought here in bulk and in some cases is adulterated, but if the consumer takes proper precautions in purchasing, the quinine he obtains is considered in every respect equal to the American product.—*Bradstreet.*

THE AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

Besides a mass of other interesting matter, the latest issued volume of the transactions contains a history of the institution, rise and progress of the Society, by Mr. A. H. Blechynden, the Secretary. From this valuable paper we learn that this Society which has done so much to promote the material progress of India, was founded in 1820 at the suggestion of that wonderful cobbler, William Carey, the Baptist missionary, "who combined with his attainments as an oriental scholar and author, a knowledge of botany, agriculture and horticulture." A marble bust of this great and useful man occupies a conspicuous place in the Society's meeting-room in the Metcalfe Hall. As Secretary and then President, Dr. Carey, saw great improvement as the result of the Society's efforts but we can imagine his surprise if he could see the India of today with its enormous production and export, not only of rice and cotton but of wheat, linseed, jute, tea, &c. There are two significant notes to the following effect:—

Scarcely 40 years have elapsed since the first shipments of jute on a large scale were made from Calcutta, and now, independently of local consumption, which is annually increasing, the exports exceed 360,000 tons. Fifty years ago, not an ounce of linseed was exported from India. During the current year (1885), about 448,000,000 pounds have been imported into Great Britain to the exclusion of Russian produce!

If only a cheap method of cleaning Rhea fibre could be established, the probability is that India would outstrip China in the production of this fine fibre. The exports of Sugar and Silk from India have declined, but in the case of sugar the satisfactory reason is that the local consumption has so largely increased as to leave little surplus. From first to last the Society has laboured to encourage the production of all valuable vegetable products, whether indigenous or introduced. To this end they established gardens, in which gardeners were trained and whence plants and seeds were distributed. They sought and disseminated information, and offered prizes for special papers and essays. How they helped forward the enterprise in tea, a plant which was not generally known or believed to be indigenous for fully ten years after the founding of the Society, is thus recorded:—

Tea Cultivation in India.—This important subject has naturally received much attention at the hands of the Society from the time when public enquiry was first called thereto to the present. The valuable reports of Drs. Griffith and McClelland on the tea plant of Upper Assam, and on its physical condition with reference to geological structure, soils and climate, will be found in the transactions of the Society. The result is a matter of history. The Government of India acted as pioneers, and then, when the culture was fairly established, transferred their experimental plantation to the now well known "Assam Company." Several other gardens were subsequently formed in Assam and also in Cachar, where the plant was likewise discovered in 1855 to be indigenous by Captain Verner, the Superintendent of that district, who communicated the fact to the Society in an interesting paper printed in Vol. 9 of the Journal. It was found, in a comparatively short space of time, that this most valuable plant could be successfully grown in several other parts of India, in Darjeeling, and certain other Himalayan localities, in the Punjab, Hazareebagh and Chittagong.* So numerous were the specimens submitted to the Society during several years on the earlier stage of this industry, that a Special Committee was appointed to examine them, and many reports will be found in the pages of the Transactions and subsequently of the Journal. Before leaving this section, it may not be out of place to put on record the fact that the Museum contains a specimen of the first production of Tea from the Assam Gardens, which was forwarded by the Indian Government for sale in the London market in 1839 or 1840. In less than half a century the produce of British India has increased from a few hundred pounds (90 chests), of which this first consignment consisted, to upwards of sixty-five millions! Is it unreasonable to suppose that before this century closes it will reach a figure of not less than one hundred millions, or two-thirds of what is now supplied to the English markets by China and Japan? Upwards of 300,000 acres of land are now under tea cultivation in India.

* Its culture has recently been most successfully attempted on the abandoned coffee gardens of Ceylon. The quality of the produce is second to none other in the East. About five million pounds have already been exported in 1885. The tea plant has also been recently introduced into Natal in South Africa.

It is a curious fact, however, that the true nature of the indigenous tea of Assam, was not for some years recognized, in consequence of Dr. Wallich, an eminent botanist, and at one time Secretary of the Society, insisting that it was a camellia! Tea is allied to the camellias, but the difference in foliage and flower is great. Our experience is that in reverse proportion as a tea-plant simulates the foliage of camellias, is its flush-yielding quality.

As our readers are aware the production of tea in India in 1886 is estimated at considerably over seventy millions of pounds, the contingent from Ceylon going far to round off the figure of 80,000,000 lb.

Amongst the other important articles to which attention was devoted were: sugar, cotton, silk, tobacco, coffee, fibre-yielding plants, maize, paddy and cereals. In 1843, attempts were made to get Indian wheat admitted into England at the same rate of duty as wheat from Canada. It seems to us now monstrous that grain should be the subject of discriminating or of any duties in Britain. The influence on India of the abolition of the corn laws has been great. Greater still has been the effect of the opening of the Suez Canal and the construction in India of railways, so that Indian wheat has taken a foremost place in the food markets of the world. Forage plants and tanning and dyeing substances received much attention, as also plants yielding oils, fats, &c. The Society helped to bring Gutta-percha into notice, and they did not lose sight of Vanilla or the great and successful experiment of introducing the Cinchonas into India. Wool and cattle received a good deal of attention. We quote another paragraph :—

Library and Museum.—A portion of the abovementioned space is appropriated for the library, which now comprises several thousand standard works and Transactions and Journals of Societies, treating principally on Agricultural, Horticultural and Botanical subjects. It also contains a small museum and models of implements. A room is set apart for the reception of seeds which are annually imported from foreign countries for distribution to members.

Again :—

The publications of the Society have been steadily continued. The "Transactions" (8 volumes) were superseded by the "Journal," of which 21 volumes have been issued, namely, 14 of the *old* and 7 of the *new series*. Some of the earlier volumes of the Transactions have been translated into Bengali, and a volume in the same language entitled *Krishi Patha* (Agricultural Gleanings) has been issued. A mass of useful information connected with the introduction into India of plants of commercial value has likewise been published in a separate form, irrespective of the Journal. In addition to these the "Proceedings" of each monthly meeting have been regularly printed for the last 50 years, as soon after the occurrence of each discussion as possible, for the purpose of furnishing distant members with an account of the doings of the Society, and also to put into the hands of congenial institutions the nature of the information brought forward for discussion. To enumerate even a little of the mass of valuable practical information and useful reading, embodied in the abovementioned publications, would far exceed the limits of the paper; suffice it to say, that they refer, among other subjects, to cotton, sugar, indigo, tea, coffee, tobacco, rice, silk, wool, vegetable fibres, cochineal, caoutchouc, lac-dye, Indian fruits, manures, timber trees, topographical account of various districts, many of which are treated very extensively and satisfactorily.

Much of the work of the Society has been accomplished or has been taken up by other agencies, as Mr. Cogswell showed in his presidential address in 1882 :—

"In former days the Society stood alone as the depository for all matters connected with agri-horticulture, and the Government of the day recognized it as a very useful medium of communication with the public. Now, however, times are greatly changed. The Government of India have inaugurated a department of their own, whilst the Government of Bengal have established an Economic Museum, to which are naturally referred specimens of produce which were formerly submitted to this Society. Again, certain industries have their own publications, such as the *Indian Tea Gazette*, the *Indian Forester*, and for general subjects the *Indian Agriculturist*, consequently the Society's Journal has become an annual instead of a quarterly publication. If, however, we refer to the monthly proceedings during the past few years, we shall find that they contain many subjects of great interest."

Amongst the articles in this volume is an elaborate paper on Rhea, which we mean to transfer to the *Tropical Agriculturist*. Amongst the selections is a translation from the French of a detailed paper on the Vegetable Products of Japan, containing much interesting matter, as the following extract will show :—

It may be stated, briefly, that the uses of the bamboo in Japan, comprise nearly all the requirements of the Japanese. The large kinds, such as the *Matake* and the *Maso*, are used for making the timber work of houses, of coach-houses, clothes-horses, silk-filatures, roofing, spouts, toll-bars, bridges, foot bridges, pallisades, ladders and all purposes for which thick and strong stems are required. When the Japanese wish to utilize the bamboo, they commence by rendering it more supple and less hard by soaking it in boiling water, or by exposing it to the action of steam. These same kinds are also used for water pipes. The Japanese remove the divisions which are in the stems, when these are opened, they rub them over with oil both inside and outside, and then blacken them with fire; they thereby become more resistent, impermeable, unassailable throughout, and can remain a long time under ground without rotting. The same process is employed in China. The *Matake* and the *Moso* are also utilized for kitchen utensils, such as buckets for drawing water, and measures of capacity. They are also employed for rafts, and for mats for boats. The reefs of sails are made with the *metake* bamboo and the sails themselves are frequently made of mats twisted in plaits of the same. Cordage, ropes, the straps which are used to fasten bales of merchandize, are of bamboo, nearly all kinds are utilized for this purpose. These bands are not perhaps so durable, as those made of hemp; but they are prepared at a much more moderate price, Baskets for fruits and fish, for cleaning and holding rice, for silkworms eggs, and sieves, are made of plaited bamboo. The bamboos *Metake* and *Chino-take*, the *Bambusa aurea*, *Quilioi violascens* and *nigra* are employed for the handles of musical instruments, also for lances and arrows, canes and rods for fishing, and for games. With the stems of thinner bamboos: *Metake*, *Hatchiku*, and *Chino-take*, *B. aurea*, *Quilioi nigra*, they make beds, chairs, footstools, couches, furniture of all kinds, and the stairs which the Japanese often cover with the lacquer varnish. Musical instruments, especially most kinds of flutes, are made with thinner kinds. The *B. nigra* and the *Sudzu-take* are used for the outer-casing of pipes. The trade of such in bamboo is considerable and necessitates the employment of a great number of boats which are specially used for that purpose. And so with opium pipes which are often made with the *Metake*. They are the object of a special trade. Among the most important of industries with the bamboo, that of hats may be alluded to, which are principally made in the department of Kanagawa (province of Musai). Screens and fans are also made of bamboo, trimmed with paper with well executed designs. According to Mons. Verdier-Latour, the trade with fans to Europe and America is very important. The town of Osaka has furnished, by itself, annually four millions of fans of the value of 480,000 francs. Their price varies from 4 francs 50 cents to 20 francs.

the hundred. This will give one an idea, with the number of fans used in the interior of Japan, of the real importance of the industry with fans and screens. The handles and frames of umbrellas are made of bamboo, the latter covered with paper oiled with the *Urushe*. There is a large trade in these, as also of lanterns, mats and window-blinds made with plaited bamboo. Another well executed industry is that of cups and saucers in porcelain, covered outside with finely woven bamboo; these porcelains are principally met with in the Province of Suruga. Ornamental furniture is also covered with fine woven bamboo. It is in that province (Suraga) we find the best executed works in bamboo.

Many other uses are mentioned. We can only repeat our conviction that India, and we may add Ceylon, owe much to the Society whose career and operations we have glanced at.

CEYLON TEA IN ENGLAND.

It is impossible to read without some feeling of alarm, the remarks made by our London Correspondent in his last letter relative to the quality of the island tea now being vended in London. It has been repeatedly pointed out how essential it is that our planters should endeavour to secure quality and not quantity alone in the outturn of their estates. We believe that that caution has been taken well to heart, and whatever may be said of the complaints from Mincing Lane, the faults referred to in our London Letter are referrable, not to any shortcomings on this side, but to the conditions which prevail on the other side of the water. But it is of comparatively slight importance with whom the blame rests that so-called "Ceylon" teas of such markedly inferior quality are supplied to the English consumers. The fact remains, and it is one which, if not grappled with, must largely and seriously affect the prosperity of our growing industry.

We were well prepared to hear that ordinary retailers in London and other English cities and towns resorted to discreditable means for lowering the standard of Ceylon teas sold by them in accordance with their practice with so many other articles of consumption; but we were, until recently, quite unprepared to hear of charges of a similar character brought against firms of known reputation who have made the supply of such teas their speciality, and have boasted of the good they were doing to our planters and our young but promising staple planting industry. It is dangerous, indeed, to find our enemies among those of "our own household." If we cannot rely upon such men to deal honourably, how little can we feel reliance or expect higher dealing, among the class of retailers to whom we have just referred? We shall have to consider in such a case how we may best be assured against a course, the result of which can only be to arrest and destroy that appreciation of our island teas which has so grown within the last few years in England. We thought the question "Where can we be sure of obtaining pure Ceylon tea?" had been fully and satisfactorily answered, and it is most regrettable to find that our English friends constantly discover that their reliance has been misplaced. It will be of no avail to go on largely increasing the area of the cultivation of tea in this island if its reputation is ultimately to sink in the consuming countries to the level of that of those inferior growths so largely of late years imported from China. We have all seen the results of such exports from the last-named country. We have seen the China tea exports fall off in quantity year by year until there seem to be strong signs that the great tea trade of the celestial Empire is permanently on the wane. There is no room to doubt but that this has been due to the competition of the superior qualities hitherto furnished from the tea producing districts of India In that competition Ceylon is now sharing, and so successfully that even India herself is feeling the pinch of it. Are we to go back from that position? Manifestly we must do so, if complaints such as are now made to us from consumers at home are allowed to continue. It is vital to the best interests of this colony to prevent there being any good reason for these complaints; and means should at once be considered and adopted for checking the dishonesty or carelessness of those by whom our teas are distributed in England. How this may best be done is therefore the question to which we desire to call the urgent attention of those interested. Its solution is of public importance, and we greatly doubt if it can be arrived at with out public action.

It is suggested to us from home that there should be established in London a confederation of our leading tea growers and exporters which shall, by advertisements, make itself widely known throughout the United Kingdom and other consuming countries, and which shall adopt such a system of guarantee for all teas imported under its auspices that their quality may at all times be relied upon. The gentleman who makes this suggestion, adds: —"I fear you may be unwilling, indeed be most averse, to any course which may seem to tend to set public action against individual enterprize. But the matter is too grave in its ultimate bearing upon the revival of prosperity in your island to permit of our setting such considerations too prominently forward. If you feel you cannot rely upon such individual enterprize, your planters must plan some method to save themselves, and so some course akin to the suggestion I make, must necessarily be adopted."

Our friend was, of course, not aware when he wrote, of the proposal on this side for a "Ceylon Tea Syndicate," nor of how fully the very subject he dwells on, had been discussed and action matured with reference both to the United Kingdom and other tea-consuming countries. We are still of opinion that America (the United States and Canada) present the most promising field for an extension of the consumption of our own and Indian teas; but certainly a most important part of the work of the Syndicate, must now be the establishment of an agency or agencies in the Mother Country where consumers of Ceylon teas can be quite certain of always obtaining the genuine article.

That the result must prove inimical to the success of those who have hitherto been endeavouring to establish a special business in England in Ceylon teas must of course follow. But how can the Ceylon planters help this when so many persons have continued to act so as to justify charges such as those to which our London Correspondent has given publicity? It would never do for the producers to sit quietly looking on, while all their best efforts are negatived by the want of proper care—to use the mildest phrase—of those in whom they have hitherto trusted. The demand for Ceylon tea at the India and Colonial Exhibition is a proof of how it is appreciated by the English public when and where its purity can be guaranteed. Are we to see the prospect of such appreciation receiving fuller development, sacrificed to the interests of a few individuals, or to that dishonesty of the relating class, which has, unhappily, become proverbial? The answer to this question will no doubt be afforded after a very practicable fashion by the Ceylon Tea Syndicate.

THE MADRAS CHAMBER OF COMMERCE AND THE MADRAS GOVERNMENT ON THE GOVERNMENT CINCHONA PLANTATIONS.

The Government of Madras has sent us the following important correspondence :—

Read—the following letter from P. Macfadyen, Esq., Chairman, Chamber of Commerce, Madras, to the Chief Secretary to Government, dated 4th February 1886 :—

I have the honour to inform you that the attention of the Chamber of Commerce has recently been directed to the extension of the number of trees in the Government Cinchona Plantations near Ootacamund. According to the Administration Report it appears that that number advanced from 1,122,766 to 1,620,744, or by about 45 per cent in the year ended 31st March 1885, and the Chamber has reason to suppose that in the current year the work of planting fresh trees over and above the replacement of those that die or are felled has not been intermitted. I am therefore desired to submit, on the Chamber's behalf, that such extension seems opposed to the spirit in which the plantations were set on foot as well as to spirit of the Government of India's policy of encouraging private enterprise.

2. The Chamber has no reason to suppose that the plantations were established as a commercial enterprise in view to the creation, for the exclusive benefit of the treasury, of a lucrative industry hitherto unknown in India. The scourge of fever had, from time to time, brought very forcibly to the notice of the Government the suffering and loss that were due to the want in this country of a febrifuge that could be brought within reach of all classes. The experiment of obtaining the cinchona plant in its native habitat, of transferring it to, and of acclimatising it in, India was one that entailed heavy expenditure which it was vain to expect private individuals to incur on philanthropic grounds. It came, however, legitimately within the province of the State to expend public money in giving a fair trial, under competent scientific directions, to the experimental cultivation of a plant that offered a defence against the most fertile of all the causes that contribute to the mortuary returns. The Government, therefore, took a broad view of its duty in this matter, and it succeeded beyond its most sanguine expectations in its benevolent scheme. It was possible for the State to patiently wait for a return on the large investment that it made in the cultivation of the exotic. That return eventually came, and not only was the surplus of revenue over expenditure from 1860-61 to 1884-85 R5,51,743, but the Government now possessed in the plantations an estate that would realise a large sum of money were it offered for sale tomorrow. Thus the enterprise has not only been successful as proving incontestably the suitability of the climate of the Nilgiris—as well as of other hill ranges in India—for the growth of cinchona, but it has yielded the State a handsome pecuniary profit. But it is no more consistent or desirable for the Government to make money by cultivating cinchona than by cultivating coffee, rice, indigo or cotton. The Government has established the fact that the cinchona tree flourishes in India, and there has been no reluctance on the part of private individuals to avail themselves of the offer of seed at low prices which was made by the Government. No longer, therefore, is the Government the only grower of the tree, but private plantations are assisting to cheapen the drug, or to achieve the object that the Government had originally in view. But private enterprise cannot compete on equal terms with the Government, which has the command of the public purse, and is free to sell at a loss when it cares to do so. The *raison d'être* of the Government Plantations exists no longer, yet the plantations are being extended with an assiduity worthy of a very opulent Joint Stock Company ambitious of paying handsome dividends to shareholders. In 1877-78 the number of plants was 569,031, and the net profit for the year was R2,88,980. Now, as has been shown above, the plants are three times as numerous. The Chamber fails to comprehend the aim of such extension, and I am therefore to submit that in the Chamber's judgment it is time for the Government to reassure planters by announcing that the State, so far from increasing the severity of the competition that it offers to private enterprise, will gradually retire from the field, permit the usual operations of the laws of supply and demand, and confine its own attention to the introduction and acclimatisation of new varieties of cinchona for the guidance and encouragement of those who engage in the production of the plant.

Order of Government—dated 15th June 1886 :—

In the letter read above the Chairman of the Chamber of Commerce states that the attention of the Chamber has recently been directed to the extension of the number of trees in the Government Cinchona Plantations which advanced from 1,122,766 to 1,620,744 in the year ending 31st March 1885. The Chairman then proceeds to notice that the object with which these plantations were set on foot was to provide a febrifuge which could be brought within the reach of all classes, but he urges that private growers of cinchona are now assisting to achieve this object, and that the *raison d'être* of the Government plantations, therefore, no longer exists. The Chairman states that he is accordingly directed to submit that as private enterprise cannot compete on equal terms with the Government which has the command of the public purse and is free to sell at a loss when it cares to do so, it is time for the Government to reassure planters by announcing that the State will gradually retire from the field and permit the usual operations of the law of supply and demand.

2. As regards the extension of the number of trees, it will be sufficient to observe that the increase which is caused almost entirely by renewals is apparent only; for, with the exception of one or two pieces of land of inconsiderable area which were added to the plantations for the purpose of rounding off the estates where danger from fire was to be feared, no new land has been planted in recent years. The reason of the ostensible increase is that when plants are first put down they are placed at comparatively short distances apart for the purpose of affording mutual shelter, but as soon as they have become firmly established, they are thinned to a very considerable extent. For example, on the Government plantations the plants are first planted out usually at intervals of 3 feet, but are afterwards thinned out until the space between each tree is 9 feet, *i. e.*, out of every nine trees planted only one is left to attain maturity.

3. Turning now to the question of the suggested retirement of the Government from the cinchona enterprise, His Excellency the Governor in Council cannot admit the *raison d'être* of these plantations no longer exists. It is true that the price of sulphate of quinine has, of late years, fallen considerably, but it is still so high as to be prohibitive to a very large majority of the natives of this presidency. The desired febrifuge must be sought, therefore, in some cheaper preparation of cinchona bark than sulphate of quinine, and although the extract recently prepared by Mr. Hooper has met with some measure of success, this problem must be regarded as one that has not yet been fully solved.

4. Nor can it be admitted that the plantations have yet completely served the second of the purposes for which they were established, viz., the conduct of experiments and investigations in connection with the culture of cinchona. Many most valuable results have already been obtained, but in a report made to this Government in 1883, Dr. Trimen, one of the greatest living authorities on the subject, pointed out that there are many questions of the greatest importance to cultivators of cinchona still pressing for solution. As examples of these, he mentioned the causes of the difference in proportion and quantities of the alkaloids in barks from trees of identical botanical type, the testing of the results which Mr. Broughton obtained from experimental manuring, the cause of the increase of alkaloids in renewed bark, and, lastly, the influence of age on the alkaloids. These investigations, Dr. Trimen considers, can only be carried on in a Government establishmnet, as the work must

be performed by a resident analyst and must, of necessity, be spread over many years.

5. Lastly, His Excellency the Governor in Council cannot admit the correctness of the argument, implied rather than expressed, that the connection of the Government with cinchona planting has interfered with the usual operation of the law of supply and demand. It might be sufficient to reply to this that the outturn of the Government plantations is so trifling when compared with the total quantity of cinchona bark placed on the market, that prices would not be perceptibly influenced even if the Government bark was sold at a loss. As a matter of fact, however, it was always been sold by public auction, and the prices realised have been those ruling in the market at the time of sale.

INDIAN AND CEYLON TEA.

Intrinsic merit sooner or later brings anything to the front, whether it is merchandise or brains. Indian tea up to date has achieved all its success through its intrinsic merit; it has been very little helped by advertising or puffing. Had Indian tea not been intrinsically good, it would have disappeared from public view. Annually there is a marked increase in the quantity consumed by the public, principally in Great Britain and Ireland. Had Indian tea been pushed in the same way as Ceylon has been, instead of an annual consumption of 60 millions pounds, we should have had no stocks left at all now, and Indian tea would have been in a better statistical position than it now is. As it is with exchange so uncertain Banks are unwilling to do business except at ruinous rates, so that some means should be taken to avert calamity. It is significant that in the vicinity of great centres of population in Britain, for instance all round London, almost no pure Indian tea is to be met with, whilst Ceylon and occasionally Darjeeling teas (pure), can readily be bought. Wherever one goes Ceylon teas stare one in the face done up in neat little packets of ¼ lb. and 1 lb. At first the natural conclusion that one comes to is that the Ceylon planter has sprung a mine upon his Indian brother, is sending home the tea done up thus; but upon enquiry it turns out that the manipulation is effected in London, by the agents prior to delivery to the country dealer, showing how extremely careful the Ceylon agency houses are to place their wares before the public in a taking way. Nice little lead packages neatly done up with a taking label are infinitely more likely to attract attention than a great huge unwieldy chest roughly made. China teas are also got up in neat little packages, quite ornamental, and the tea dealer is proud to put them in his window, but when one does come across, or rather ask to see the original case of any Indian tea, he finds it consigned to the back ground altogether, simply on account of its appearance. Of course put up in an attractive form tea thus must cost a little more, but looking at the enhanced values that Ceylons obtain, we doubt if it does not do far more than pay. With many gardens it is not a question of paying but of existence, and we consider that it is worth the while of some estates to do up their teas in this fashion so as to make them more attractive. Doing the teas up even in, say, five-pound packages with the "Linberry" patent cloth on paper would be a step in the right direction. We understand that the cost is very much less than tea lead and the weight for carriage is also much less. In addition the facilities for putting on a nice label are very much greater, and the paper would show off a label to advantage. The "heathen Chinee" takes care to cover his box with all sorts of hieroglyphics, which although perfectly unintelligible to the outside public, form an attraction, and no doubt even now assist to carry off the wares. The British public in this age of rapid progresson are not easily satisfied, and competion is so great that Indian planters and agents must put Indian tea before the public in a more presentable form. A few years ago it was supposed that the merit of the liquor of Indian tea had to a great extent done away with the necessity for paying so much attention to the appearance of the leaf. It is questionable if this is so now. A large quantity of Indians is now bought from appearance, owing no doubt to the extraordinarily large amount of sampling, which falls to be done from the very large increase in imports. The generality of Indians are too leafy and large, and the dealers complain that the teas are too large in leaf to sell by themselves and that it necessitates a blend with China in order to make them a good marketable commodity. Another thing that strikes one with regard to Indian tea is the general complaint that it is not to be bought. What is called Indian is only a blend. In the case of Ceylon tea each little ½ lb. package is labelled and guaranteed.—*Nilgiri Express.*

Tea Rollers.—Three new patent Tea Rollers are likely erelong to be dividing attention with those now in use: they are Gilruth's (to be manufactured in Calcutta); Michie's, and Hutsen's. The last is described as being very compact, handy and likely to be successful machine.

The Crocidolite.—If our readers have before heard of this semi-precious stone they have the advantage of us. It is thus noticed in the Exhibition Supplement to the *Colonies and India*:—The crocidolite, of which there is a great abundance found in Griqualand West, is a stone containing a large amount of asbestos in different stages of formation or disintegration. It takes a beautiful polish, and many fancy articles are now made from it. The crocidolite working and polishing is another industry lately added to the several specialities peculiar to the Cape. We have been told by a dealer in precious stones that about five years ago they purchased crocidolite in England by the carat, giving 25s per carat for it.

"Crocidolite."—In the "Manual of Mineralogy" by Professor Dana (Trübner, London), I find page 246, chap. xiv "Iron ores—Crocidolite has a fibrous structure much resembling asbestos and has been called *blue asbestos*; color lavender-blue or leekgreen. Hardness=4. Gravity=3·2 to 3·3. From South Africa.—*Cor.*

The Indian Coffee Planters' Committee (says *Colonies and India*) have issued a little pamphlet which, besides affording some interesting particulars of the samples of Indian coffee now exhibiting at South Kensington, also gives some useful hints about the properties of coffee and the best way of preparing the "fragrant berry" for the table. Good coffee is not always to be had, and when it is forthcoming it is too often spoiled in the "making." A study of the samples of Indian coffee displayed at the Exhibition, combined with practice of the rules set forth in the leaflet referred to, should enable everybody to avoid the adulterated article, and to drink the real product in perfection. The samples, 230 in number, which have been arranged by the Indian Coffee Planters' Committee, under the sanction of the Royal Commissioners, represent (1) the "cherry" (that is, the coffee fruit as plucked from the tree); (2) the "parchment" bean (that is, the berry when pulped but enveloped in an outer skin or husk, resembling parchment); and (3) the berries stripped of this covering, and sized and sorted as they come into the English market, before roasting. The coffee thus exhibited is from the crop of 1885-86, produced by British planters in the following districts:—Mysore, Coorg, the Wynaad, the Neilgherries, and Travancore. The finest coffee which comes into the English market, fetching higher prices in many cases than even Mocha itself, is grown in these districts, and upon coffee estates there the investment of British capital is annually increasing.

Correspondence.

To the Editor of the "Ceylon Observer."

TEA MAKING AND THE FUTURE FUEL SUPPLY IN DIMBULA, &c.

Dimbula Planters' Association, 7th July 1886.

Dear Sir,—I am requested to forward to you for publication the enclosed interesting letter.—I am, yours faithfully, GEO. BECK, *Hony. Secy.*

Lippakelle, Dimbula, Ceylon, 29th June 1886.

George Beck, Esq., Hony. Secretary, Dimbula Planters' Association.

Dear Sir,—Seeing that many of the estates in the Dimbula district (and this applies equally to some other planting districts) are without reserves of timber and erelong will be forced to import fuel of some kind, not only for tea-making purposes, but some day even for their coolies, it becomes a serious question, and one which it behoves planters to take in hand at once, how the cheapest fuel is to be had. I need hardly point out at this moment, how necessary it is becoming to keep down at the lowest point, everything that goes to make up the cost of the production of tea, and it appears to me that this matter of the fuel supply of the near future is so vital, that it calls for the immediate consideration of the Planters' Association of the island.

The choice at present seems to be between coals, patent fuel and petroleum, and it is more especially to the last that I now wish to direct attention, not only as now becoming procurable in any quantity, but as being less bulky, and, as I understand, in every respect, a cheaper and, for our purposes, likely to be the most serviceable description of fuel. Placed as Ceylon is between the Black Sea and Suez on the one hand and Burma on the other, we ought to be most favourably situated as regards cost of carriage from all three. From the first the supply would appear to be practically unlimited; the Red Sea promises great things; and Burma, I know, from some experience of that country, can now export a large quantity at low cost. It is to the last named, which lies nearest our doors, that I would particularly call attention. The oil wells are situated in Upper Burma, now part of the British Empire and within a mile or so of the river Irrawaddy and the produce is brought down by boat (in bulk principally) to Rangoon, the voyage from which to Colombo is a very short one. Hitherto this petroleum has been a royal monopoly, but as the British Government cannot recognize monopolies, the result will be, this industry will shortly be thrown open to British traders, and the production of the wells, which have so far been worked in the most primitive native fashion, will increase tenfold. I may add here the oil is very fine

I regret that I am unable to furnish any statistics of supply or cost from any of the above sources. My object in writing is rather to urge the importance of getting all necessary information without delay, as to how far it is practicable to have our wants supplied, which, I would submit, falls within the province of a Planters' Association. I think it would be well to apply to the Chief Commissioner of Burma, Rangoon, who can, no doubt, give much valuable information as to the supply, and also to communicate with the Rangoon Chamber of Commerce whom it would be well to inform of the probability of a large demand springing up in Ceylon for petroleum. This will serve to call the attention of the mercantile community to a new opening for trade, of which it is natural they should avail themselves.

I would also suggest that the British Consul, say at Odessa, be written to for information regarding the supply and cost of the Russian article which is now largely consumed in Russian steamers and manufactories, the result of whose actual experience it would be valuable to know. What may be the real importance of the Suez find of petroleum (fortunately at *this* end of the Suez Canal) the representative of the British Government in Egypt ought to be able to testify to.

It occurs to me that perhaps the most practical commencement in this matter of fuel would be, for the different Planters' Associations to call for returns from all tea estates of their probable fuel requirements. There would then be something more or less definite in the extent of demand to hold out to induce supplies.

The only other suggestion I have to make is, that it would be well to consult makers of tea-driers like Messrs. Jackson and Davidson how far it would be practicable to burn petroleum without injuring the tea, and how far, and at what cost, their furnaces could be adopted to this purpose.—Yours faithfully

K. C. MACIVER.

COST OF TEA PREPARATION, &c.

Balmoral, 9th July 1886.

Dear Sir,—In your *Tropical Agriculturist* of this month I have carefully read the answers of the Sub-Committee of the Maskeliya Planters' Association on tea manufacture, and in the 34th answer I find it stated that the "cost of manufacture per lb. made tea including superintendence 5 cents, plucking 12 cents, manufacture 3 cents, packing 3 cents, transport 1 cent." Will you kindly explain why manufacture is *twice* entered, first at 5 cents and secondly at 3 cents per lb.? Will you also inform me if in the charges abovementioned, the following items are included, viz., chest, lead, hoop-iron, nails and solder? An early reply will much oblige, yurs faithfully, R. B. L.

[We have referred to a good authority who states:—Perhaps if the word 'including' were omitted the sentence would be more intelligible. I believe it means:—Cost of manufacture per lb. made tea—superintendence 5 cents; plucking 12 cents; manufacture 3 cents; packing (including chests, lead, &c.) 3 cents; transport 1 cent: total 24 cents." Thus, if superintendence, or more plainly superintendents' salaries, be deducted, the actual cost of plucking the tea. leaf making it into tea, packing and sending it down to Colombo is cents nineteen per lb. of made tea: these rates are considered low.—Ed.]

TEA-MAKING AND BURMA PETROLEUM AS FUEL.

Colombo, 10th July 1886.

Dear Sir,—Referring to Mr. K. C. Maciver's letter, addressed to the Honorary Secretary of the Dimbula Planters' Association, which appears in your last night's issue, it may be of service to those who take an interest in the matter discussed by Mr. Maciver to know that our senior is proprietor of the Rangoon Oil Company, at whose works in Rangoon the crude oil from Upper Burma is manipulated and made into the different kinds of mercantile oils, such as Burning Oil, Lubricating Oil, Ordnance Oil, &c., &c. If those who wish information respecting supply, prices, &c., will be good enough to formulate their enquiries and send them to us, we will be happy to forward them on to the agents of the Company in Rangoon, who will be able to answer them satisfactorily. The Company's Oils are not unknown in the island.—Yours faithfully,

CARGILL & Co.

CEYLON TEAS FOR THE UNITED STATES.

Louisa, Talawakele, 13th July 1886.

Dear Sir,—I have to thank you for the kind notice you inserted in the *Observer* of the 12th. We have almost decided to leave by the "Clan MacArthur" on the 3rd September and I hope

to come to some agreement with the members of the Syndicate, or their representatives before that date. I am in correspondence with American connections, late of Ceylon, with regard to co-operation in driving the Ceylon tea trade in the States. I consider co-operation *necessary* to success when the immense field represented by the United States of America, is taken into account, and, should my correspondent fall in with my views, I think good business may be anticipated so long as the proprietors of Ceylon unite in the one common cause and endeavour to enlarge the market for their produce.

It is better for the owner of an engine-boiler to provide the boiler with a safety value *previous* to explosion. The unanimity of the Ceylon planters with regard to the Syndicate scheme seems to me to be a *proof* that they are *unanimous* in the opinion that their present field is too limited, and that to save themselves, they must bestir themselves; in short find a safety value in the markets of other countries. I note in Mr. Shelton Agar's letter dated 8th inst., that he considers "the mixing of two, three or four different 'brands' is admitted to be the best plan for getting at a *really good* beverage." From this I understand that Ceylon Teas *do mix*, that is, *one* with *another*. I have never ventured an opinion of my own as yet; but from what I hear from authorities on the subject I gather that a mixture of low-grown with high-grown teas turns out a *perfect* liquor, inasmuch as the low-grown teas give pungency, and the *high-grown* flavour.

Should the foregoing statement be correct, there can be little doubt as to the advisability of bulking Ceylon teas sent by the Syndicate to the *world*. That *difficulties* with regard to bulking the several teas sent by different estates through the Syndicate, will *have* to be met and *dealt* with, is a matter of certainty; and to be overcome, a corresponding ability on the part to the expert employed must be looked for in order to *meet* these difficulties. Given then that the idea of general bulking is good, where should the expert be located? Surely, where he has the easiest means of communication with those with whom he has to deal, that is in the *very* neighbourhood of the planters (certainly *not in* America or Australia or any other country where it is not at all improbable agents would take the matter into their own hands and bulk for themselves). One advantage of general bulking would be the interest of noting the difference in prices obtained in the several countries *for the same tea*.

Naturally the more extensive the field the greater the expenses incurred *at first*, but nothing could point out the path of profit to the proprietor better than the Syndicate bulked tea, exposed to public trial in the several countries suggested in draft proposal now being circulated.—I am, your very sincerely, J. McCOMBIE MURRAY.

THE PRESENT POSITION OF THE CINCHONA MARKET: A CEYLON CINCHONA PLANTERS' SYNDICATE WANTED.

14th July 1886.

Sir,—The present position of the cinchona market is worth the attention of all interested in its cultivation. The large quantity of bark which has been sent into Europe during the last three years has brought the price down to a level which has virtually destroyed the Columbian trade. Many of those connected with it have been ruined, and thousands of men employed in it left the country. It is generally admitted that a rise in the value of bark to 9d a unit would be required to admit of a revival of the enterprise.

Ceylon is now supplying nearly ¾ of the bark manufactured in the world. The increase in the consumption and manufacture of quinine has been so considerable that the latter has fully kept pace with the production, and the stocks of bark in Europe are by no means large: indeed, at the end of 1885 Mr. Moens gives them as 19,000 packages less than they were two years ago.

It is only the immense supplies which Ceylon continues to send into the market which keeps the value at its present low point. Any important decrease in the shipments from this, would immediately produce a rise in the price. It is thus no exaggeration to say that the market is at the present moment entirely under the command of Ceylon cinchona growers.

If all who possess cinchona will cease harvesting *branch* bark, and agree to send away in all cases just *half the weight* of good bark which they have dispatched during this season, they are likely to obtain as much money for the reduced quantity as they have this year for the larger amount. The operation is surely simple enough; the result can hardly be doubtful. If Colombo merchants will only combine with growers to restrict the supply for the next year or two, the value of our export would probably be increased by several hundred thousand pounds whilst the present wholesale and in many instances premature destruction of a produce which is of immense value to the world would be prevented.—I am, sir, your obedient servant, A PLANTER.

LIBERIAN COFFEE FROM JAVA.

Sir,—I received from Sourabaya this week a sample of Liberian coffee with a request that I would get it valued and tried. It had been grown on land in the middle of Java. The fermentation and treatment it had received had entirely cleared off all the skin and it left a beautifully bright berry. The valuation ranges from 55s to 68s and perhaps more as it was the finest sample that had ever been seen here. Some was roasted and tasted by experienced coffee buyers without knowing anything about it and they pronounced it very good and equal to fine old East India or Java coffee: it had, they say, the clean yellow look about it. There is a great difference over the price of ordinary Liberian coffee coming from Ceylon which I maintain requires more careful fermentation and cleaning.—Yours truly, THOS. CHRISTY.

London, June 24th.

CEYLON TEA AND COCOA AT THE EXHIBITION: A RELIABLE OPINION.

Kandy, 15th July 1886.

The Editors, the *Ceylon Observer*, Colombo.

Sirs,—Reference having been made to the quality of the Ceylon Tea sold in the cup at the Colonial and Indian Exhibition, it may not be out of place if I quote the following extract from the letter of a correspondent received yesterday. He has, I need hardly say, no interest whatever one way or other, and the remarks are quite spontaneously made in a private letter. He writes:—"It (the Colonial and Indian Exhibition) seems to me simply admirable at *every* point, and is being enormously successful. We had pure and most delicious Ceylon Tea in the verandah, and bought some at 2s 6d per lb.; also some chocolate (purity guaranteed by your Association). It was of fine flavour, but a little sticky and not quite equal in *manufacture* to French, I thought. I assure you, we scrutinised everything most closely and were thoroughly delighted. The photos illustrating your Tea industry were uncommonly good."—I am, sirs, yours faithfully,

A. PHILIP.

LABOUR SUPPLY FOR TEA CULTURE.

Rattota, 18th July 1886.

Dear Sir,—I am afraid considerably exaggerated notions as to the extent of our future labour requirements have been prevailing lately, and have given rise to a good deal of unnecessary alarm. People have been speaking and writing about one cooly and a half per acre being required for tea, whereas as I hope presently to show you an average of half that will probably be more than tea can afford.

In the days when coffee gave crops and working short time was not the rule, it used to be calculated that every cooly working on an estate cost R100 per annum, and I presume the same figures would still hold good. Let us try an estimate on this basis and see how it will work out. For the purpose of argument we will suppose the island to be yielding an average of 400 lb. per acre, that it is put f.o.b. at 35 cents per lb.,—both pretty liberal figures you must admit. So you have on one side

400 lb. tea at 35 cents..		R140·00
and on the other		
Superintendence on 400 lb. at 5 cts. per lb...	..R20·00	
Packing and transport at 4 cts. per lb.	16·00	
Colombo charges ,, 1 ,, ,,	4·00	40·00
Leaving you the cost of *one* cooly for a year..		R100·00

out of which you have to pay for manure, tools, repairs to machinery and buidings, medical charges, money charges, and all the other etceteras, which go to make up a monthly report. A smaller yield or a lessened cost of production would obviously reduce the amount available for labour proportionately.

From the above it seems pretty clear that a much smaller labour force than is commonly supposed will meet our wants unless we have grievously overestimated the profits to be derived from tea cultivation.—Yours truly,

GEO. WAUGH BURNET.

[We can scarcely follow Mr. Burnett in all his conclusions. That tea culture, continued practically over the whole year, will require more labour than coffee did is certain, but of course the expenditure on labour as on every other detail must be reduced, in sympathy with reduced yield and low prices. But if economy in labour is carried below a certain point, it is clear, estates cannot be kept in proper order.—Ed.]

"CROCIDOLITE."

Customs, 19th July 1886.

Sir,—The enclosed is a specimen of "Crocidolite" but the head of the stick which I send by bearer is a much better specimen. If you care to cut up and examine the smaller piece you are welcome to keep it, but please return the stick when you have done with it. There is a curious popular error in the pronunciation of the word, most people call it "Crock-o-dile-ite" as if connected with the Saurian which frequents our waters. The proper pronunciation is "Cro-sid-o lite" with accent on the second syllable.—Yours faithfully,

C. E. DUNLOP.

[We are much obliged to Mr. Dunlop for a sight of his handsome stick surmounted by a round head of crocidolite with moving rays as striking as if it were a gigantic cats's-eye. The smaller piece we have kept to experiment with, as he has kindly suggested.—Ed.]

TEA LAND IN THE LOWCOUNTRY, &c.

Dear Sir,—In days gone by when a 'cute man selected and planted up a coffee estate in some unknown locality, if the venture turned out a success, there was then a rush for *all* the land near or adjoining the place without regard to the condition of the soil and its suitability for the product to be planted. It seems as if this practice obtains now for a great many places have been planted when much superior though isolated blocks could be got farther off. The so-called Kelani Valley district is certainly a good one for tea, chiefly as regards rainfall, but there are many blocks lying out and near it certainly superior in many other respects. This Kelani Valley district is made up of patches of other districts and extends from the foot of the Dolosbage and Kadugannawa hills, right down to Labugama. The planting commenced midway, but the tendency is to buy and open southward and westward to Labugama, and again near the hills of the Central Province where the soil is richer and the rainfall the same as on the hills. Much of the land in Kegalla as in Yatiyantota will soon be under tea. In the early days of coffee planting there were several estates in this district opened on fine heavy forest lands, selected owing to the soil being equal to those found in the Central Province; unfortunateiy the climate was too warm and only the shaded native coffee lasted till leaf-disease swept that little off. There is of course an immense tract of land lying south of the Kelani Valley district down to Morawaka suited for tea, but the planting of this will be a matter of time. No one is so mad as to select a block in such localities where fever will drive away superintendents and labourers and where it is not easily accessible owing to the want of roads. There are many blocks of abandoned estates in Kegalla and Yatiyantota owned by parties in Europe and chetties on the Coast, places "sold up" and purchased at Fiscal's sales for debts. These are of course now much sought after, as they are in healthy localities, with good roads to them opened years ago. It is preferablo to pay R20 to R25 an acre for such, than to wait *over* 12 months and pay about R13 for Crown land in almost unapproachable localities however tempting the soil &c. may seem. It is not easy to secure in the Kegalla and Yatiyantota districts Government land averaging 250 acres. The blocks surveyed are small and not adjoining, fields and native chenas intervening. The original purchasers of Government land so far back as 1846 obtained *tracts* of 400 to 2,500! acres, and these were subsequently cut up by the owners and sold to many who sank their money in coffee. All that these estates then shewed was *leaf* in such profusion, as to tempt others to buy and try to make the places pay. The old Kandy road promises once more to make itself useful, for much of the land in and about Kegalla and Ambepussa will be planted with tea and those who do not mind an extra day's or two days' delay will be able to place their tea in Colombo by the road much cheaper than by sending it to a branch station and thence by rail! The lowcountry estates seem to have an advantage over those in the Kandyan districts in the matter of labor, for the women and children leave their homes even if 4 miles away and pick very satisfactorily, beating the Tamils, and I am certain that with this new industry a good many rupees won't find their way to the Coast. One gentleman gave a small field to a Sinhalese woman to weed on contract and she gave satisfaction and she profited too, for she asked for a contract for three years to weed the whole estate! Of course the removal of Sinhalese laborers *from their homes* to places over *a day's journey* never did and never will succeed, but otherwise the employment of them as laborers for most kinds of work, is not a loss or disadvantage. When the Tamils leave their homes they are prepared to do so as temporary exiles. In the coffee districts in Southern India, they are as unreliable as the Sinhalese, so long as the estates are not a few miles from their homes. That the Sinhalese will not emigrate is a nonsensical idea. All won't, but a good portion of genuine rustics are quite prepared for temporary exile especially after hearing of the benefits the small party of them in Queensland are deriving, so much so that some mean to stay away altogether!

Cannot some measures be adopted to induce the petty land-owners to grow cacao in the Yatiyantota, Kegalla and Ambepussa districts? In small plots between 30,000 to 40,000 acres can thus be made to yield this more stable product. If they planted *tea* our labour supply in the lowcountry will be lessened, while the benefit to the Sinhalese will not be much with such a product.

B. T. J.

TEA CULTIVATION IN SOUTHERN INDIA AND CEYLON.

(*The Editor of the T. A.*)

Sir,—In a late number of the T. A. a correspondent writes about the Tea Estate Superintendent who orders his men to cut 300 holes a day and other nonsense of the same kind not worth repeating. To beginners like myself, it would by more to the purpose if he told us the number of holes a cooly might fairly be asked to cut as a day's work. I myself get 60 holes (1 × 1½ ft.) a day out of my men. I find a man can fill from 300 to 400 holes a day and one man can plant carefully 800 plants per day. As regards plants I prefer 18 months' old plants as I can then stump both the tops and the roots of them and plant out in ordinary damp weather. Plants of that age and so treated begin to grow almost at once.

As regards the alleged deterioration of Ceylon teas, can close planting have anything to do with it? I myself plant indigenous 5 × 4 and good hybrid 4½ × 4 but do not know that I am right. M.

Southern India, July 12th.

[Our correspondent will very soon have authentic information as to the practice in Ceylon in the "Tea Planter's Manual."—Ed.]

Tea in Assam.—We call special attention to the Report on Tea Cultivation in Assam printed elsewhere. In round numbers the increase in the six years 1880-85 has been in clutivated land:—

Mature plants	...	40,000 acres
Immature ,,	...	4,500 ,,
Total...		44,500 acres,

While the increase in total area is enormous, no less than 455,500 acres; the area held has, in truth, nearly doubled.

China Teas.—Of the new season's China tea the *Grocer* says:—"China has already been warned that, if she does not make teas better suited to the British palate than those forwarded of late years, she will lose her hold of the London market, and we think that the threatened loss of us as a nation of customers has not been made in vain, for the teas now arriving from that quarter are, if a correct opinion can be formed from the first shipments, superior to those sent here in 1885. Samples from the Glenogle were to be seen in Mincing Lane by 6 o'clock on Monday evening last, and were pronounced as being decidedly above the average of recent years. Further inspections have confirmed this impression, and most of the dealers are quite pleased with the new teas, as they possess rare good keeping qualities. There are some judges, however, who complain of the teas being thin and light in the cup; but this may not be the fault of the teas, but only because the 'fire' on them has not had time to go off before they were landed; and the best China authorities say that, give the new teas time to develop, and they will in the course of another week or so turn out to be thicker, better, and stronger than they are now."

Chestnut Water, also called Water Caltrops (*Trapa, natans*), an acquatic plant belonging to the family Onagrariaceæ. It is a native of Southern Europe and has creeping, floating stems, producing hair-like roots, from which rises a cluster of triangular, toothed floating leaves with swollen foot-stalks which buoy them up. The flowers are small. The lobes of the calyx two or four, increasing in size, and with its tube involving the ovary, which becomes a hard, horned fruit about the size of a chestnut. They contain much farinaceous matter, and form a considerable article of food. In Italy they are known by the name of Jesuit Chestnuts, and in France as Water Chestnuts. In Cashmere the seeds of *T. bispinosa* form an important article of food to a large population. *T. bicornis* is also extensively used for food in China under the name of Ling. The stiff, horn-like projections of these fruits convey to the mind the idea of Caltrops.

The New Green Bug has, we regret to hear, worked its way up from the Northern districts through Pussellawa and Pundaluoya to the coffee in the adjacent corner of Dimbula, and it is merely a question of time until it crosses the river to the poposite division of the district. Mr. Bosanquet of Yoxford considers the pest much worse than the old black bug, and he is not sure of its identification in Nietner. The leaves with the insect require to be examined. But it is a matter for congratulation that tea should have been so generally planted in Dimbula before this pest appeared. From a careful observant planter, since writing the above we have received the following:—"I send you herewith some specimens of what I call the new bug as well as a few of the brown and white. The new bug is easily distinguishable by its being on the upper sides of the leaves and on the berries, which was never seen with the old bug. I could not get any good specimens of the old brown bug as the rains have washed it away from most of the estates; a few weeks ago I had any quantity of it. The new one seems indifferent to weather. My idea is that the new bug is a descendant of the old one on the theory of evolution. I do not think it agrees with the one described by Nietner as it is green to the end of its existence. The old bug never killed out coffee as this one does, nor did it march steadily on from district to district as this one does, and it gave way to several remedies, whereas I have found nothing which will keep this one in check. I shall be interested to hear what your entomological referee says of it, though he has probably had it under observation before this. Its disappearance as far as my experience of it goes is only coincident with the death of the coffee over the greater proportion of the estate, a patch here and there may unaccountably recover from an attack. I believe there are some who think this nothing more than the old bug; but they can have had no experience of the districts north of Kandy. I send a spray of tea also on which bug is present which looks like a cross between the brown and the green. I hope the specimens will arrive fresh; should they not do so, I will find other means of keeping the branches alive."—We sent the specimens on to our entomological authority, who, after examination and consideration, wrote:—"I return Mr. ——'s letter. The scale bug that has attacked his coffee is undoubtedly the pale green bug that is destroying the coffee in some other districts. It is not described by Nietner, and cannot have come under his observation, but still it may have been in existence somewhere in his time. Mr. —— remarks that 'the old bug never killed out coffee.' It is possible, however, that a bad attack of the 'old bug' might prove fatal in the present weak condition of the tree. Nietner's Lecanium coffeæ (brown or scaly bug) may be found in small numbers, on the brinjal plant in Colombo. It is of a pale brown colour."

The Cultivation of Rice will soon become one of the leading occupations of the Northern settlers in Australia. Rice grows there so easily, says the *Queenslander*, and yields such heavy crops of good quality, that it wants no prophet to say that the farmers will soon turn to it as a substitute for maize.—*M. Mail*..

Furniture Polish.—

Yellow wax	1½	oz.
Common soap	6	„
Carbonate of potash	½	„
Water	10	„

Heat and stir all together until a milky mixture is formed, then transfer to a stone bottle and add

Turpentine .. .. .. 15 oz.

by small portions, shaking well all the time. Continue to shake occasionally until cold, then add 1 oz. of solution of ammonia.—*Chemist and Druggist.*

"Pink Ivory."—Amongst the specimens of woods in the Natal Court, one is thus described:—The specimens of native woods are very interesting, many of them taking a fine polish and showing a beautiful grain. One used by the natives in making ornamental assegais and sticks, and called by them *umumoi*, is exceedingly pretty, and the most unique as regards colour. It is as pink as the old-fashioned cabbage rose, is very close grained, and, when polished, looks like what the Natal colonists call it, "pink ivory." A piece of it can be seen in the lid of a box made of several native woods. This box contains sixty different native medicines, and is in itself a great curiosity. —*Exhibition Supplement to the Colonies and India.*

The Export of Copra from Fiji is thus given by the *Fiji Times*:—

The proper figures of actual local export as given by the Receiver-General are as follows:—

1875 ..	2,397	tons
76 ..	1,603	„
77 ..	4,404	„
78 ..	5,372	„
79 ..	2,772	„
80 ..	5,242	„
81 ..	4,779	„
82 ..	5,480	„
83 ..	4,892	„
84 ..	4,978	„
85 ..	4,888	„

The Receiver-General gives all the above figures, as those of the export of copra raised in Fiji, except the last. This can be checked by taking the nut export, reckoning 90 nuts in a bag, according to the new practice adopted since '83, and calculating 5,500 nuts as equivalent to one ton of copra. It will be found that the result adds on 175 tons, which is purely European produce, as natives do not export nuts.

Pearl Shells and Pearls in the Western Australia Court are thus described in the Exhibition Supplement to the *Colonies and India*:—We see the crown and glory of the West Australian section, the trophy of giant mother-o'-pearl shells, a S. Simeon Stylites of nacre, glistening and glinting in silvery sheen, no less than one thousand shells being used in its construction. Would you see them separately, here they are ranged against the wall, the contribution of Messrs. McRae & Harper, twenty-three shells weighing 2 cwt. These are the bodyguard of the treasure of the show, the "Southern Cross Pearl," a perfect cross formed of nine pearls together into one solid mass—no freak, rather a faierie fancy, of nature. This was found at Roebourne, W. A., in 1884, by Shiner Kelly, of the schooner "Ethel," and opened by a lad named Clarke, in the presence of his father. This *lusus naturæ*, which has been inspected by Her Majesty, the Prince and Princess, and all the Royalties who have visited the Colinderies, is valued at 10,000*l*.—a present to give a wife or a sweetheart—"a lass and a lac," the toast of Clive's chaplain. Half, and only half, of the story of the pearl fishing industry is told in the cabinet representing the depths of the sea, with pearlshells and curious formations of coral. The black fellows need no diving dress, but go under water, as do the sponge fishers in the Mediterranean when they dive from their speronares. The pearl industry owes much to the enterprise of Mr. E. W. Streeter whose son was the plucky diamonder of Kimberley Cape Mines—the eminent jeweller, who has an establishment at Cossack, and a fine display of pearls has been set on view.

A Veterinary Class in connection with the Medical College in Colombo is suggested by an Uva correspondent with reference to the prevalence of cattle murrain, and the suggestion is one deserving of the special attention of the Government. There is nothing, next to seasonable weather and water supply, of so much importance to the native agricultural class in Ceylon—and this virtually means the mass of the people, both Sinhalese and Tamil—as the preservation of the health of their cattle. And we cannot conceive of anything more practically important than the spread of a sound knowledge of the proper treatment of cattle among the headmen and intelligent leaders of the people. If the sons of village headmen, after the completion of their ordinary education, were induced to pass a year or two in attendance on a Veterinary Class under proper guidance, a great deal would soon be done for the inculcation of proper treatment of cattle throughout the villages and rural districts. The Government by some little mark of distinction to such as secure a certificate of attendance and attainment of a certain amount of knowledge, would very speedily secure ample attendance, and still more if it were understood that in the selection of minor headmen, such certificate-bearers, other things being equal, would have preference. But the first point is to get the special Veterinary Class established, and this Sir Arthur Gordon in conjunction with his Principal Medical Officer can easily manage if he sets about it in earnest. It might be possible, too, for the Director of Public Instruction to allow some of his rural teachers to attend the class, so as to enable them to help the poor people with advice during a season of murrain or other trouble with their cattle.

Large and Moderate breaks of tea are thus noticed by *The Produce Markets' Review*:—As the Tea trade increased, and with it the necessity for disposing of a large portion of the imports by public sale, it was found a few years back that the system of offering parcels in lots of six or nine packages made the auctions insufferably long. It was therefore suggested that the lots should be materially increased in size—say to the extent of 36 or 50 packages in each. Some of the leading importers and buyers were desirous of trying an even more sweeping change, and began to offer entire parcels in single lots. This no doubt, materially shortened the sales, but it was found in other respects very injurious, because it led to greatly diminished competition. The smaller buyers were often prevented from buying, first, by the size of the lots, and next, by the fact that, in order to purchase, they had to bid an advance of ¼d. per lb., which often rendered the Tea too dear. The leading China importers, therefore decided to try the plan of offering their Teas in lots of 36 half-chests, and the result was quite satisfactory. Competition was much increased, of course, in itself, tended to maintain prices while buyers could often afford to give an extra farthing for 36 half-chests when they could not do so for 200 half-chests. There has been some discussion on this subject, though arising out of another matter, at the China sales this week, at which the system of offering tea in lots of 36 half-chests was generally approved, and it is understood that the example of the leading importers is likely to be followed in this matter in the China sales.

Tea.—The intelligence from home by telegraph is rather more encouraging for our staple: doubtless the tea dealers in the North of Ireland, where much of our fine teas go, have more confidence in their business, now that "Home Rule" is shelved if not for ever laid in its extreme form. It is pointed out to us that many of the London broking houses are largely interested in Indian tea estates and teas, and therefore their judgment on the young and vigorous Ceylon rivalteas must be accepted *cum grano*.

Indian *vs.* Ceylon Teas.—Of last week's sales of Indian and Ceylon teas the *Produce Markets' Review* says:—"The demand for Indian tea has been less active, and owing to the poor quality of most of the supplies, lower prices, with few exceptions, have been established. The better descriptions of Indian teas are now in a much smaller compass, and remain comparatively firm. More especially has this been the case with good Broken Pekoes, for which there is brisk competion. The market has been largely supplied with Ceylon teas, and although they have met with a good enquiry, prices generally have been favourable to buyers. With a continuance of large supplies from Ceylon, the values of fine Indian teas, notwithstanding their comparative scarcity at the moment, are not likely to advance further, as the briskness, strength and growing similarity in flavour of some of the Ceylon sorts, make them generally excellent substitutes for Indian teas.

Sugar in British Guiana.—The weather since sailing of last mail has been too dry for planting operations, but yesterday and today rain has fallen in abundance all over the countries gladdening the hearts of our planter friends. The growing crop in this country are described as very fine and above an average. The same may be said of Essequebo, but Berbice has suffered severely from drought, and the rain have come too late to admit of making up lee way. Nothing much doing in way of sugar making beyond a few pieces to give plants and the juice is poor in sacharine. Strange to say with complaints rife of want of work on the part of transcient labourers, we hear great complaints from planters of their planting work being kept back for want of hands at fair rates of wages. Some put this down to the very liberal wages which are paid by those prosecuting the minor industries. Where six dollars per acre is readily paid for cutting down an acre of sage ready for fire stick and the fork and $16 per acre is paid for forking an acre of ground all over; (and this work can be done in a fortnight by an able-bodied man, which means $8 per week), the cane planters have indeed formidable opponents to compete with.—*Royal Gazette*.

Coffee:—Brazil Crops and Increased Consumption.—Say James Cook & Co. in their *Weekly Despatch*, July 2nd:—The total export for crop year (1st July to 30th June) is telegraphed as follows:—

For Europe	1,051,000 bags	Rio	3,614,000 Bags
,, United States	2,440,000	,, ,,	
,, Elsewhere	114,000	,, ,,	
,, Europe	1,175,000	,, Santos	1,658,000 Bags
,, United States	475,000	,, ,,	
,, Cape, &c.	8,000	,, ,,	

The Brazilian crops for the three seasons ending 1883-4 average 5,530,269 bags, and if estimates are correct, the average for the three seasons ending 1886-7 will be somewhat above 6,000,000 bags. This appears, perhaps, beyond current views, but friends adhere to there estimate of *Santos* of about 2,800,000 bags, and reckon the quantity left in the interior of 1885-6 at 200,000 bags. The *Rio* receipts are now mostly new coffee of small bean. *Santos* markets very active, *Rio* strong and advancing. It will be interesting to note at the close of 1886 what the deliveries have been, The returns of the duty payments for 1882 led us to calculate upon requirements of 360,000 tons for Europe. If we are right in considering the present delivery from January to May as actual consumption, we should be inclined now to reckon upon 435 to 440,000 tons as necessary this year for European wants, and America we should assess at 220,000 tons, though, so far, the figures point to no reduction. This would place the consumption of coffee for the twelve months, say at 660,000 tons, an increase since 1882 at the rate of 3¾ per cent per annum.

Tea Crops and Prospects.—Writing in June, Messrs. Hulbert & Co. made the following remarks: what is said about exhibition samples and labour of tasting so many samples, deserves attention:—Reports of the New Crop state that most gardens in Assam and Cachar are backward, but in Darjeeling the weather has been more favourable, and the quantity manufactured to date compares well with last year. Estimates for next season place the available supply of Indian for the United Kingdom at about 72 millions, against Imports of 67 millions for 1885-86, or an increase of 7½ per cent. If we assess the arrivals of Ceylon for the same 12 months at 15 millions, we have a total of 87 millions for the season, 1886-87, and allowing 3 millions for anticipated export to Continent, &c., we shall require an average monthly delivery of 7 millions to dispose of this supply, or an increase of 1½ millions per month, as compared with the past season. This we maintain can well be effected by a slight decline in the price of common Teas, by which means a large proportion of low China Congou will be reduced to a point at which it will not pay to import, and the market will be gradually relieved of the over supply. The results of last season were very bad to importers at the beginning and the end, although from October to December fair of profits were made; no doubt our market was inflated at that period, which led Calcutta buyers subsequently to pay high prices, but the quantity of early and late shipments was much overrated, and this we think is responsible for much of the wide margins between Calcutta and London prices. On the whole, Assam showed the best quality, but this as usual was not maintained when the quantity of leaf to be manufactured became much larger. Cachars have been, with few exceptions, poor throughout; also Darjeelings, which were lacking both in strength and flavour. Teas from Kangara were generally without point, although a few good parcels were sold in the early part of the season. Dehra Doons occasionally showed improvement, and we think will be in better demand if managers could make them a little more brisk with a fresh smell to the dry leaf. Owing to the firmness of the common grades during the past season we are likely to get a large quantity of low class Teas this year, and we would advise managers not to neglect quality, but to devote their attention to manufacture and endeavour to obtain the best result possible from an average amount of Leaf. We think it most necessary that increased facilities should be given to buyers on this market to get through the enormous amount of tasting by reducing the number of samples for public sale. Importers would not suffer by bulking the lower grades of different gardens when character is equal, as in Tea for price, the garden mark is not of much importance, and the Trade have no objection to dividing a line of such Teas into lots of 24 or 30 chests, to suit the smaller houses. With the increased supplies from India and Ceylon, unless something is done in this direction it is not unlikely that we all arrived at a deadlock before long. We have noticed the Indian and Ceylon Tea samples at the Colonial and Indian Exhibition, and while much struck with the beauty of their appearance, and the care bestowed on manufacture, we hardly consider that this is sufficient to bring the article prominently before the notice of the public. Such choice specimens as we have seen do not accurately represent the merchantable article, and must only confuse the mind of the beholder; we should have thought that if a few standard qualities selected from each district were prepared for tasting at fixed periods, and the public invited to pronounce their opinion, it would have assisted to a larger degree in extending a knowledge of the article.

HOW LEMON, ORANGE AND BERGAMOT ESSENCE IS MADE.

Wallace S. Jones, U. S. Consul at Messina, gives the following interesting account of the manufacture of essential oil (essence) from the peel of the lemon, sweet orange, sour orange and bergamot, and also of the extraction of the lemon and bergamot juice, in the island of Sicily:—

Essence of Lemon, Orange and Bergamot.—The operative with *three* strokes of a sharp knife peels the lemon lengthwise, then cuts it in two and throws it into a basket; the peel falls into an earthen platter below the chopping block. Before the essence is extracted the peels are soaked fifteen minutes in water, which causes them to swell and offer a greater resistance when pressed against the sponge. In his left hand the operative holds a sponge, through which, that he may grasp it more firmly, runs a piece of reed cane. The peel, piece by piece, is pressed against the sponge two or three times in succession, simple pressure being supplemented by rotary pressure. The rushing of the oil cells liberates the essence therein contained. The sponge when full of essence is squeezed in an earthen vessel that the operative holds in his lap. It is the outside of the peel that is pressed against the spoon, as the oil glands are in the epicarp. This can be ascertained by holding the pressed peel to the flame of a candle; if it neither crackles nor affects the flame the cells are empty. This process yields along with the essence a small quantity of the juice and feccia (dregs). The feccia is composed of the membraneous residue of the oil cells and the resinous substances transfused throughout the epicarp of the lemon and orange. It is of a mucilaginous consistency, and of a pale colour. It has not been analyzed chemically up to date, and is put to no use. The seperation of the essence, juice and feccia takes place of its own accord; if the earthen vessels are not disturbed the oil floats on the juice and the dregs fall to the bottom. These three products of different density derived from the peel have no affinity with one another. As the essence rises to the surface it is transferred to bottles and left a few days to settle; it is then drawn off with a glass siphon into copper cans, which are hermetically sealed. After the essence has been expresed the peels are pressed (to extract what little juice they may contain), and are then thrown on the manure pile and *well* rotted—or they would make too heating a fertilizer.

In a bergamot essence establishment at Reggio, on the mainland, I recently saw in operation a hand machine for extracting essential oil. A thermopneumatic essence extractor worked by steam power, has also been invented, but the primitive method of hand-work still generally prevails in Sicily.

The yield of essence is very variable. Immature lemons contain the most oil. From November to April in the Province of Messina, 1,000 lemons yield about fourteen ounces of essence and ten gallons of juice. This industry is carried on during five months of the year. An operative can express three baskets of lemon peel (weighing 190 pounds) a day. He is paid seventeen cents a basket. The essence is so valuable that the operators are closely watched, as they are most ingenious in secreting it.

During the year 1885 the essence exported from Messina were valued at $982,894, of which sum $137,375 were shipped direct to the United States.

Lemon essence is quoted here to-day at $2.47 per pound.

Bergamot essence $2.45 per pound.
Sweet orange essence $2.30 per pound.
Sour orange essence $1.90 per pound.

The copper cans weigh (on an average) four pounds, and contain twenty pounds of essence each.

Lemon peels, valued at $980, were exported to the United States in 1884.

Six men work up 8,000 lemons a day, two cutting off the peels while four extact the essence of juice, and obtain:

Eighty-four gallons of juice.
Seven pounds of essence.

Which, after deducting the cost of labour, fruit, and incidental expenses, leaves a net profit of $6. Speculators frequently adulterate the essence, but these frauds are easily detected.

Lemons grow on clay soil yield more essence than those grown on calcarious or rocky soil.

Extraction of Lemon Juice.—Closely connected with the extraction of essence from the lemon and bergamot is the extraction of lemon and bergamot juice. When the juice has been concentrated by boiling it is called *agrocotto*. Lemons unfit for exportation are used for this purpose.

The method in use is as follows:—On the marble bed of the press are superposed nine mats (made of bulrushes) three feet in diameter; in their centre is a hole six inches in diameter; their outer edge turns back a half-foot. These mats are filled with peeled lemons, and piled one on the other. A following block is placed on top of these mats. These presses have two wooden screws, firmly set in masonry, about six feet apart. There is a tap for each screw; the taps are worked down by hand-lever. The juice flows from the bed of the press into tubs. If the juice is to be exported raw, sound lemons only are pressed; if the juice is to be boiled, which is generally the case, 25 per cent. of spoilt lemons may be used. Lemon juice does not keep well unless boiled. Sound fruit when pressed yields a slightly perfumed yellowish juice. The lemons remain in the press twelve hours. Independently of the intrinsic quality of the lemons, the amount of juice and its degree of acidity varies from month to month. The yield is greatest in the spring, but of less acidity, owing to the winter rains.

There is a machine for cutting up the lemons, but the Sicilians are wedded to their old methods of hand labour.

In 1885 the concentrated lemon juice exported from Messina was valued $298,707, of which $49,203 worth was shipped to the United States.

Taxes in Italy are very onerous. Manufacturers fearing an increase of taxation, should the extent of their business become known, are so reticent that it is impossible to ascertain accurately their profits from the lemon juice industry. It may be safely said, however, that their profits are very handsome.

Concentrated lemon juice is quoted at $160 a pipe (105 gallons).

Concentrated bergamot juice is quoted at $130.50 a pipe (105 gallons).—*Florida Dispatch.*

Useful Grass for a Warm District.—A sample of a rare and valuable grass named Euchlæna (Reeana) luxurians, the teasinte of Central America, was exhibited (writes the *Leader*) at the show of the Belfast Horticultural Society. This splendid grass comparable in size with the pampas grass, is one of the best and most productive forage plants known, the leaves attaining a length of 3 feet. A large number of stems, says Baron von Mueller, springs from the same root, and attain a height of 11 feet or more. The young shoots, when boiled, constitute a fair culinary esculent. As to its prolificacy, it is said that Dr. Schweinfurth harvested at Cairo from three seeds a return of 12,000 in one year. The plant particularly in its young state, is remarkably saccharine. Vilmorin estimated that one plant is sufficient for two ead of catttle during twenty-four hours. It is already grown in Queensland, where Mons. Thoset, at Rockhampton obtained plants 12 feet in height and the same in width, in damp, alluvial soil, each with 32 main stalks bearing nearly 100 flower bunches. It is rather slower in growth than maize, but lasts longer for green fodder, and not so hardy as sorghum. As a forage plant it is without a rival in climes free from frost. It likes humid soil best, but is able to resist extreme dryness. It is therefore, certainly worthy of extensive trial wherever frosts are light, for though a tender plant it would not likely be killed by a light frost after being thoroughly established.—*New Zealand Paper.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, July 1st, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White ...	Slightly softish to good hard bright ...	£6 10s a £7 10
Yellow ...	Do. drossy & dark ditto...	£5 a £6
CINCHONA BARK—Crown	Renewed	1s a 3s
	Medium to fine Quill ...	1s 4d a 2s 6d
	Spoke shavings	9d a 1s 6d
	Branch	2d a 8d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill ...	6d a 2s 6d
	Spoke shavings	5d a 10d
	Branch	2d a 6d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	1s 10d a 2s 6d
and Ceylon	Middling, stalky & lean	8d a 1s 9d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine ...	1s 6d a 2s 2d
	Brownish ...	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s
Long Ceylon	Middling to good... ...	8d a 1s 4d
CINNAMON 1sts	Ord. to fine pale quill ...	8d a 1s 11d
2nds	,, ,, ,, ,, ...	7½d a 1s 6d
3rds	,, ,, ,, ,, ...	6d a 1s 2d
4ths	Woody and hard	5d a 11d
Chips ...	Fair to fine plant... ...	1½d a 7d
COCOA, Ceylon ...	Bold to good bold ...	80s a 88s 6
...	Medium ..	72s a 78s
	Triage to ordinary ...	55s a 68s
COFFEE Ceylon Plantation	Bold to fine bold colory...	78s a 100s
	Middling to fine mid. ...	61s a 75s
	Low middling	55s a 60s
	Smalls	48s a 58s 6d
,, Native	Good ordinary	42s a 44s
Liberian ...	Small to bold	33s a 48s
East Indian ...	Bold to fine bold... ...	78s a 121s
	Medium to fine	60s a 75s
	Small	50s a 58s
Native	Good to fine ordinary ...	44s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£7 a £17
FIBRE, Brush ...	Ord. to fine long straight	£12 a £39
Stuffing ...	Coarse to fine	£7 a £18
YARN, Ceylon ...	Ordinary to superior ...	£12 a £30
Cochin ...	Ordinary to fine	£11 a £35
Do ...	Roping fair to good ...	£8 a £13
COLOMBO ROOT, sifted ...	Middling wormy to fine...	16s a 33s
CROTON SEEDS, sifted ...	Fair to fine fresh... ...	30s a 55s
GINGER, Cochin, Cut	Good to fine bold... ...	65s a 100s
,,	Small and medium ...	45s a 65s
Rough	Fair to good bold... ...	30s a 45s
,, ...	Small	25s a 30s
NUX VOMICA ...	Fair to fine bold fresh ...	8s a 12s
	Small ordinary and fair...	5s a 7s
MYRABOLANES, pale ...	Good to fine picked ...	6s a 8s
	Common to middling ...	5s a 6s 6d
	Fair Coast...	6s a 6d 6s
Pickings	Burnt and defective ...	4s a 5s
OIL, CINNAMON ...	Good to fine heavy ...	1s a 3s
CITRONELLE ...	Bright & good flavour ...	¾d a 1d
LEMON GRASS ...	,, ,, ,, ,, ...	1½d a 1¾d
ORCHELLA WEED ...	Mid. to fine, not woody...	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7½d a 7¾d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White ...	,, ,, ,, ...	10d a 2s 6d
PLUMBAGO, Lump ...	Fair to fine bright bold...	11s a 15s
	Middling to good small...	7s a 10s
Chips ...	Slight foul to fine bright	7s a 11s
Dust ...	Ordinary to fine bright ...	3s a 10s
RED WOOD ...	Fair and fine bold ...	£5 5s
SAPAN WOOD ...	Middling coated to good	£6 a £7
SANDAL WOOD, logs ...	Fair to good flavor ...	£20 a £44
Do. chips ...	... ...	£10 a £16
SENNA, Tinnevelli ...	Good to fine bold green...	9d a 1s 5d
	Fair middling bold ...	4½d a 8d
	Common dark and small	1½d a 3½d
TURMERIC, Madras ...	Finger fair to fine bold	12s a 13s
Do. ...	Mixed middling [bright	11s a 12s
Do. ...	Bulbs whole	11s 6d a 12s 6d
Cochin ...	Do split	7s 6d a 8s 6d
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 24s
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches ...	5s a 9s
4th	Low, foxy, inferior and [pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.		
ALOES, Soccotrine and	Good and fine dry ...	£7 a £10
Hepatic...	Common and good ...	£4 a £8
CHILLIES, Zanzibar ...	Good to fine bright ...	32s a 34s
	Ordinary and middling...	29s a 31s
CLOVES, Zanzibar and Pembs	Good and fine bright ...	9¾d a 10d
	Ordinary dull to fair ...	9½d a 9¾d

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTATIONS
CLOVES, Mother ...	Fair, usual dry ...	None
,, Stems...	,, fresh ...	2d a 2 1-16d
COCULUS INDICUS ...	Fair ...	8s 6d
GALLS, Bussorah & Turkey blue	Fair to fine dark ...	52s a 57s 6d
	Good white and green...	42s 6da 52s 6d
GUM AMMONIACUM—	Blocky to fine clean ...	30s a 60s
drop ...	Picked fine pale in sorts,	£14 a £17
ANIMI, washed ...	part yellow and mixed	£11 a £13
	Bean & Pea size ditto ...	£4 10s a £8
	amber and dark bold ...	£8 a £12
scraped...	Medium & bold sorts ...	£5 a £8
ARABIC, E.I. & Aden ..	Sorts	65s a 100s
Ghatti ...	Fair to good pale ...	32s a 65s
Amrad cha	Good and fine pale ...	70s a 100s
	Reddish clean ...	32s a 55s
ASSAFŒTIDA ...	Clean fair to fine ...	30s a 85s
	Slightly stony and foul ...	20s a 26s
KINO ...	Fair to fine bright ...	38s a 40s
MYRRH, picked ...	Fair to fine pale ...	£6 a £7 10s
Aden sorts	Middling to good ...	70s a 100s
OLIBANUM, drop	Fair to fine white ...	45s a 55s
,,	Reddish to middling ...	32s a 44s
pickings...	Middling to good pale ...	9s a 11s
siftings ...	Slightly foul to fine ...	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage		2s a 2s 4d
,, ,, Ball		
	unripe root ...	9d a 1s
	liver ...	1s 6d a 1s 10d
SAFFLOWER, Persian ...	Ordinary to good ...	5s a 15s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts ...	Nearly water white ...	3½d a 4¼d
2nds ...	Fair and good pale ...	2 15-16d a 3d
3rds ...	Brown and brownish ...	2¾d a 2¾d
INDIARUBBER Assam ...	Good to fine ...	1s 9d a 2s 4d
	Common foul and mixed	6d a 1s 8d
Rangoon ...	Fair to good clean ...	1s 10d a 2s 3d
Madagascar	Good to fine pinky & white	2s 2d a 2s 5d
	Fair to good black ...	1s 9d a 1s 11d
SAFFLOWER ...	Good to fine pinky ...	£4 10s a £5 10s
	Middling to fair ...	£3 5s a £4 2s 6d
	Inferior and pickings ...	£1 a £1 10s
TAMARINDS ...	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior ...	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape ...	Fair dry to fine bright ...	30s a 33s
...	Common & middling soft	20s a 29s
,, Natal ...	Fair to fine ...	35s a 40s
ARROWROOT Natal ...	Middling to fine ...	3½d a 6d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China ...	Good, pure, & dry white	63s a 68s
Japan ...	,, ,, pink	
GAMBIER, Cubes ...	Ordinary to fine free ...	28s a 29s
	Pressed ...	23s a 24s
Block ...	Good ...	22s
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra...	Barky to fair [sar	6d a 2s 3d
Reboiled...	Common to fine clean ...	1d a 1s 4d
White Borneo ...	Good to fine clean ...	11d a 1s 3d
	Inferior and barky ...	1d a 8d
NUTMEGS, large ...	61's a 80's, garbled ...	2s 2½d a 3s 5d
Medium ...	83's a 95's ...	1s 11d a 2s 1d
Small ...	100's a 160's ...	1s 3d a 1s 11d
MACE ...	Pale reddish to pale ...	1s 6d a 2s 8d
	Ordinary to red ...	1s 3d a 1s 5d
	Chips ...	1s a 1s 2d
RHUBARB, Sun dried ...	Good to fine sound ...	1s 9d a 2s 9d
	Dark ordinary & middling	8d a 1s 6d
High dried ...	Good to fine ...	1s 1d a 1s 3d
	Dark, rough & middling	7d a 1s
SAGO, Pearl, large ...	Fair to fine ...	12s 6d a 15s
medium ...	,, ,, ,, ...	12s a 13s 6d
small ...	,, ,, ,, ...	9s 3d a 11s 6d
Flour ...	Good pinky to white ...	8s 6d a 10s
TAPIOCA, Penang Flake...	Fair to fine ...	1¼d a 2½d
Singapore ...	,, ,, ...	1¼d a 2¼d
Flour ...	,, ,, ...	1¼d a 1¾d
Pearl ...	Bullets ...	14s a 15s
	Medium ...	15s a 17s
	Seed ...	15s 9d a 16s 6d

"THE TROPICAL AGRICULTURIST."

(From a Planting Correspondent.)

The new volume of the *Tropical Agriculturist* reached me a few days ago, and I have revelled in its contents for 3 or 4 hours after dinner every night since. What a wonderful compendium of information it is. I was not surprised with the work, as after the Directory it would take a great deal to excite such a feeling, but I made a discovery in connection with it which caused me a good deal of annoyance. It was this, that *all* the useful information which at great expense of time and trouble, I had clipped from the columns of the daily paper and pasted in a book kept for the purpose, reappears here ready to my hand at a moment's notice by reason of the index, saving me all the trouble of searching through a volume of indexless pages, and is besides augmented by a vast amount of valuable information which I had no other means of reaching. I found the book of immediate practical service to me too, on a question of horse-power which I had to settle at once, and upon which I would probably have had to take and pay for an engineer's opinion. I doubt whether he would have accepted the price of the *T. A.* as his fee. You may naturally ask why I have not been a regular subscriber all these years. I was under the delusion that I couldn't afford it. New books, magazines, papers &c. cost me on an average fully R200 a year. When the *T. A.* was first published, I said "No, I cannot afford it. I've reached my limit of expenditure on literature." But I must in justice to myself explain that I was under an entirely erroneous impression regarding its price. I cannot tell you how, but some way or other I had got the notion into my head that it cost R20 a year, and the impression was only removed by the appearance of your recent circular. You know how hard it is to remove such impressions. Having once made up your mind that a thing is unattainable you cease to think of it, so it was in my case, and it was only when I sat down to address my proprietors on the subject of its being subscribed for by the estate that I discovered my error. That letter was never sent. I want the *T. A.* all to myself from this date. Why it 's little more than the cost of a dozen of beer, and there are few men in Ceylon who regulate their house expenses so carefully that a single bottle of beer more or less per month would be reckoned of importance.

COCONUT CULTIVATION IN CEYLON: THE APPLICATON OF LIME.

(By an old Coconut Planter.)

The *Tropical Agriculturist* has not succeeded in lighting up some of the dark places in the land of its birth, witness the enquiries of "Agriculturist" in *Ceylon Observer* of 8th July. As, however, I have never been appealed to in vain for any information that my reading or experience can supply, the following are my views regarding the use of lime in coconut cultivation :—

The amount of lime directly required by the coconut plant, is so small that two bushels per acre would be an ample supply for ten years, supposing the soil originally deficient in that element.

Lime is not used in agriculture as a direct manure, but for its chemical and mechanical action on the soil. Quicklime warms a cold soil, opens and loosens a stiff soil, and quickens into active fertility an inert soil. The application of lime is always beneficial on heavy compact loams, and in combination with draining on flats where the rain-water is neither readily absorbed nor flows freely off, such soils contain much organic matter in an inert state, which the contact of quicklime, reduces to the state of available plant food. On what are called hungry soils, that is, poor loose sands and gravels, the application of lime can do nothing but injury, except in minute quantities. On such soils as lime will do good to, not less than 20 bushels to the acre should be given (50 bushels is better), and in this climate it should be dug or ploughed in to save it from being washed off in heavy rains. It should be spread as equally as practicable over the whole surface.

THE ASSAM TEA REPORT.

The Secretary to the Chief Commissioner of Assam has just issued the usual Report on Tea Culture. During the course of the year 21 new gardens were opened and 10 closed. The tendency is still apparent, and probably will be for a considerable period, of amalgamating smaller gardens with larger. The total number of gardens in existence at the end of 1885 was 911.

The following figures exhibit very clearly the steady growth of the industry :—

Years.	Under mature plants. Acres.	Under immature plants. Acres.	Total area of land held by tea-planters. Acres.
1880 ..	120,512	33,145	566,277
1881 ..	133,293	25,134	706,648
1882 ..	156,707	22,144	783,362
1883 ..	161,707	27,716	923,664
1884 ..	158,158	31,694	913,476
1885 ..	159,876	37,634	921,891

From this table it appears that there has been a decided increase since last year, both in the area under cultivation and in the total area held by tea-planters ; and it is satisfactory to note that the tea industry continues to expand in Assam. The Deputy Commissioner of Nowgong says :—

"To make tea cheaply the area, wherever practicable, must be increased. The same establishment and the same buildings do for, say, 150 acres as for 100, while the cost per pound is materially reduced."

The Deputy Commissioner of Sibsaugor writes :—

"The theory of extension is that more work can be got out of existing establishments, * * * and experience seems to show that much larger areas can be worked under the same supervision than was formerly thought possible."

The Deputy Commissioner of Cachar also takes the same view, and quotes the opinions of some of the leading planters in his district to support it.

The total area returned as under cultivation is 197,510 acres, as against 189,852 shown at the close of 1884. The details according to the various districts are given below :—

District.	Total area under mature and immature plants. 1884.	1885.
Cachar	52,333	53,205.
Sylhet	30,822	86,288
Khasi and Jaintia Hills	30	30
Goalpara	495	495
Kamroop	6,343	6,321
Durrung	16,679	18,125
Nowgong	10,854	11,606
Sibsaugor	43,884	43,622
Lukhimpore	28,405	27,818
Total	189,852	197,510

The figures given by district officers for the years under report give a total yield of 53,617,620 lb., or an increase of 2,490,82 lb., when compared with 1884.

The estimate of the Tea Association was 51,226,605 lb. that is, something less by 2,392,015 lb. than the figures of the district officers. This difference is explained by the fact that many native and private European con-

cerns have no Calcutta agents, and they, of course, give no returns to the Tea Association.

The following table shows the yield per acre for the Brahmapootra Valley, the Surma Valley, and the whole Province respectively, according to the returns:—

	Yield per acre.	
	1884.	1885.
	lb.	lb.
Brahmapootra Valley.....	354	359
Surma „	279	305
For the whole Province	323	335

Here, again, the figures of the Indian Tea Association are less than those of the district officers for the reason noted above. Lukhimpore stands first in order of productiveness. The Deputy Commissioner writes:—

"I take the three largest concerns in the district. I can vouch for the absolute correctness of the returns from these gardens; they are Hilika and Hookunguri, representing an area of 1,560 acres of mature plant in one unbroken expanse, Talap with 1,020 acres, and the gardens of the Doom Dooma Company with 1,555 acres. The yield is as follows:—Hilika and Hookunguri, 1,399,040 lb. Talap, 782,200 lb. Doom Dooma, 1,089,287 lb. The average yield per acre is 790 lb."

The Commissioner of the Assam Valley district remarks that the printed reports made by Directors to shareholders corroborate these figures. The Deputy Commissioner gives the yield of three more gardens in Lukhimpore as follows:—

	lb.	Average per acre.
Khobong	282,720	589
Panitollah...	436,320	595
Sookerating	224,800	702

The average outturn of the whole district is 479 lb. This outturn is, indeed, remarkable, if compared with that of some other districts. In Kamroop, for instance, the gardens managed by Europeans exhibit an average yield of 189 lb., and the native gardens still less.

The estimates as to cost of production are not altogether trustworthy and vary considerably.

The following are some of the district figures:—

	Cost of cultivation per acre. Rs. As. P.	Cost of manufacture per lb. As. P.
Cachar	67 0 0	5 0
Sylhet	49 7 3	8 5
Durrung	25 0 0	3 0
Nowgong	70 0 0	6 0
Sibsaugor	95 0 0	5 9

The Deputy Commissioner of Kemroop says the cost of cultivation varies from R22 to R140, and of manufacture from 5 to 9 annas. The Deputy Commissioner of Lukhimpore says the returns vary so much that it is impossible to say what the costs are. There can be no doubt that the chief reason why the figures under these heads are always so unsatisfactory is because of the number of different interpretations put on the words "cultivation' and "manufacture." Another reason is that no returns are sent in or separate accounts kept by managers showing the different expenditure incurred in each phase of the production. In future, planters and agents will be asked to give the average cost of tea laid down in the sale room in Calcutta or London. This is in accordance with the opinion of the London Tea Association, who consider that it is the only possible way of arriving at a fair estimate of the cost.

The prices obtained by gardens throughout the Brahmapootra Valley were generally better than in 1884, and seem to have compensated for a bad outturn. Those obtained by gardens in Cachar, on the contrary, continue to range low. The Deputy Commissioner of Sibsaugor writes as follows:—

"Prices were better than last year to the extent of about an anna-and-a-half per lb. Especially good prices were obtained at the beginning of the season. This was attributed by the London brokers to the good quality of the tea. Later in the season the untoward weather* produced its effect on the quality as well as the quantity of the outturn, and prices waned accordingly. The prevalent fears of over-production were not, apparently, justified by the event. In spite of the large supply thrown on the London market by Ceylon, the stock on the merchants' hands in December was less than at the end of 1884. Altogether firmer prices did much to compensate for one of the worst season's production known for many years past."

The Deputy Commissioners of Durrung, Nowgong, and Lukhimpore all write in the same strain, bearing witness that prices ranged higher than in 1884. Mr. Aitchison, of Dalu, Cachar, writes:—

"Though the yield of Cachar gardens was generally good and heavier than previous years, great complaints have been made, both by the Calcutta and London tea brokers of the quality of the teas, until towards the end of the season, when some slight improvement showed itself. Prices have, therefore, ruled lower than in 1884, especially in London market. The difference in the prices between 1884 and 1885 in the Calcutta market is hardly apparent from the figures given, but the actual fall for the average of Cachar teas, I should think, would represent about half-an-anna per lb. The Calcutta market began strong for all teas, and high prices were realised even for Cachar teas for the first two or three sales, it then fell to almost the lowest ebb it has ever been at for Cachar teas. About the end of September it suddenly took a spring, owing partly to some improvement in the quality and lower exchange, as well as to a slight hardening of the London market."—*Indian Planters' Gazette.*

CEYLON UPCOUNTRY PLANTING REPORT.

LOW PRICES OF TEA AND MODEST TEA FACTORIES—"GREEK MEETING GREEK"—FUEL SUPPLIES AND TIMBER RESOURCES—CENTRAL FACTORIES—CACAO—ADVANCES AND KANGANIES.

20th July 1886.

The rapid and serious fall in the Price of Tea which we all deplore, and which, although anticipated by some wiseacres, has found us more or less unprepared for, is having one good effect in putting a stop to the absurd competition that was springing up in regard to Tea Factories.

The Ceylon planter is all the better of a curb; for his nature is such that he puts into his work all the heart and soul he has, and cannot rest until he has gained for himself a place in the first rank. When he takes up a new industry he generally manages to knock his rivals into "a cocked-hat" with the, alas! sorrowful sequel of too often coming out of the struggle pretty much in the same condition himself. When this sort of thing happens with the outside world, it is not hard to conjecture the nature of the friendly competition which is engaged in when Ceylon planter strives with Ceylon planter. Then it is "Greek meeting Greek," and the heights and lengths to which they will go in the "tug of war," are measured very often by the fullness of the purse or the extent of the credit. One man builds a finely lighted and spacious factory, stocks it with the best machinery procurable, oversteps his estimate in a princely way, and to the planting world for a little while, the building marks as it were the highwater limit as to factories.

Bye-and-bye, however, you hear of a bigger and better than this, and the factory which a little while before was regarded as a model, and to which streams of visitors kept flowing, is looked upon as a matter-of-course, and the tide rolls elsewhere. Now, however, that the fancy prices have disappeared, and the necessity arises of girding for the struggle which seems inevitable, this race for

*N.B.—The effect of weather on the quality of tea, —Ed.

fine factories will have to be given up. From humbler buildings it will be quite possible to send out as fine teas as ever.

Already I hear of amended plans, and overhauling of estimates in regard to factories; and small gardens are less anxious to see their names figuring in the broker's circulars, giving up, when practicable, the fondly hoped-for tea-house, contented to sell their leaf, and sink the estate's individuality in some well-known mark.

That there is wisdom in this course, is undoubted; and although we all believe that there is in each of us, potentialities as to tea-making which, if awarded a suitable sphere, would astonish our Indian brethren and drive "the heathen Chinee" to despair still the necessity may be laid upon us to postpone the manifestation of these high qualities, and direct our energies into a humbler channel.

As to our future FUEL SUPPLIES on estates without TIMBER RESERVES, there does not seem to be any kind of definite idea where they are to come from. The old coffee stumps are meanwhile standing us in good stead, but this, the last service of an old friend, is within hailable distance of the end, and then what? "We will be sure to get something," is the comforting assurance of those who have not yet had to grapple with the difficulty; but what that something is, is like the unexpressed emotions of the man who "never told his lord." Oil, coal, coke and other things have been suggested and if the margin of profit in tea manufacture was to remain even as it is today, there might be found in some such substances a suitable substitute for wood.

But besides these, there is the idea of a CENTRAL FACTORY to which neighbouring places might send their leaf, provided that it could be so arranged that every contributing estate had a share in it, so that what might be earned there might not pass into alien hands, but flow back again to the planter in the form of dividends. The providing fuel for such a district tea-house could be managed so as to reduce its price to the lowest, while the cost of manufacturing might be less than could possibly be done in the smaller but private tea factory, and in all probability better too.

The fine showery weather which we are having at present, and which is so good for the young tea-plants, has also been clothing the CACAO with new verdure, and covering stem and branch with clustering blossoms. As a promise for next half-year, it is indeed a glad sight, while it shows us how much depends on seasons in the cultivation of this tea. The welcome shade is everywhere springing up, and when it has grown high enough it is to be hoped that the bad effects of dry seasons will be considerably mitigated if indeed not altogether disappear.

In these days of increasing ADVANCES and COOLY crimping, the wily KANGANI manages "to score," having been kept so close up for some years back; now that the sun of his prosperity is beginning to shine, he shows an alacrity to enjoy its cheering beams to the full, that speaks volumes for the unchangeableness of his nature. What is a kangani without an advance? In his own eyes and that of his gang a mere nobody, and, alas! he knows it. A planter the other day paying off a lot of coolies was asked for the usual letter, which absolves a neighbour from unneighbourliness if he chooses to employ the gang, and opens the labour market wherever it is produced. But it was not the common "tundu" that was going to please. The kangani wanted his advances to be stated with R100 added! This little addition which his "durai" was coolly requested to certify, was an ingenious dodge for raising the wind. He said he had other debts besides the estate advance, and hit upon this charming plan of liquidating them. When the planter refused to state aught else than the truth, the man went off to his head kangani, got from him a Tamil "tundu," with the advances increased by R100, sought for work, and obtained it, on the terms as stated in the Tamil letter. Somebody was let in, for the money was all paid, and the kangani for the time being was satisfied. Moral: Beware of head kanganies' "tundus." PEPPERCORN.

CINCHONA CULTIVATION IN SOUTHERN INDIA: GREAT RESULTS.

Addressing a Special meeting of the Wentworth Gold Mining and Indian Estates Company Limited, Mr. Ryan said: * * * I pass on to the question, which will naturally occur to each shareholder, "What have I got for my money in Wentworth?" I will not answer it from facts of my own; but so lately as the 7th of May last a valuation was put upon the Government plantations which run on all-fours with ours, and which I am bound to say cannot compare with ours. If I take those figures as my basis our estates are worth at this moment £188,000. I go further. The other day a leading Coast firm was asked to value the property of one of our neighbours, and, if I take their figures, our estates are worth £194,000. This is external evidence. (Cheers.) Now let us see what the trees have done. The returns from your bark have maintained this vast area, and have more than paid for every expenditure. They have brought the younger fields to maturity. Not a call has been made for that. The last two calls were entirely for extensions. The estate has been self-supporting. You had a right to expect up to this date 145,000 lb. of bark of the value of £10,000, and you have actually received 141,000 lb., of the value of £8,200. You were led to expect £10,000, and at the values upon which that estimate was framed (3s for renewed bark and 1s 6d for natural bark), I should have been able to give you £4,000 more than you had any reason to expect, but at that time quinine was 12s, and now it is 2s 4d. I know some are disquieted about what they suppose to be the enlarged area brought under cultivation, and the great drop in the price of quinine, but I do not share their fears. (Hear, hear.) I have been at considerable pains to gather the statistics of the world. I find that there are, or will be in the very near future, something like only 31,000 acres under cultivation—that is, where cinchona is cultivated and that the requirements of the world will be something like 35,000,000 lb. of bark, whilst the production will fall short of that considerably. I think that that ought to point to us the advisibility of being ready to supply any deficiency. And then I think we lose sight of the larger consumption of quinine. In the Madras Presidency Official statistics, compiled by Dr. Bidie, the head of the Sanitary Department, show that there are over 200,000 preventible deaths a year in the Madras Presidency if quinine could be brought cheaply to the doors of the population. Multiply that 200,000 by 100 to represent those who recover, and you will find what a blessing quinine will be to this enormous mass of people, and what a favourable opportunity it offers to us as growers of the bark. Only lately I was reading a most interesting article upon a new use for quinine. They have extracted a most beautiful blue dye, and they only want a mordant to give it commercial value. There is no end to the use to which quinine may be put, I am sure the day is far distant when I shall not be able to send home bark that will pay a profit.—*Nilgiri Express.*

USEFUL DOMESTIC HINTS.

"Y."—Grease spots may generally be removed from the most delicate materials by the employment of benzine or oil of turpentine, care being taken that sufficient be employed to remove all line of demarcation. Oxgall is particularly useful in extracting grease stains from woollen goods. If the stain be very thickly crusted nd old, it may be sometimes advantageous to soften

the grease previous to the application of benzine by means of a warm iron laid on a piece of thick blotting paper which has been placed over the spot. To remove grease or oil from white linen or cotton goods use soap or weak lye. From coloured goods warm soapsuds. From woollens soapsuds or ammonia. From silks benzine, ether, ammonia, magnesia, chalk, yolk of egg, with water. From a carpet, upon the grease stain lay a little damp Fullers earth, and after standing for some time, rub it gently into the carpet, and then wash off by using a little carbonate of ammonia, and the colour will be restored. For all kinds of fabrics chloroform is best, but must be carefully used. Stains of paint or varnish, after being softened with olive oil, may generally be removed by the same means as ordinary grease. Saturate the spots with a solution of equal parts of turpentine and spirits of ammonia ; wash out with strong soapsuds.

"Marian."—To Clean Kid Boots.—In the first place the boots should be thoroughly cleansed from dust and dirt, and this is best done with a sponge and milk, than rubbing with a clean cloth. As long as the boots are tolerably new, this is all that is required. Afterwards mix a little oil and ink, and keep this well rubbed in when necessary. They should be done long before they are wanted to be worn, and they should be carefully kept from the dust. It is far better to do them yourself ; they will last twice as long.

HOUSEHOLD HINTS.

Oil of lavender will drive away flies.

Grained wood should be washed with cold tea.

Copperas mixed with the whitewash put upon the cellar walls will keep vermin away.

Ceilings that have been smoked by a kerosene lamp should be washed off with soda water.

Drain pipes and all places that are sour or impure may be cleansed with lime water or carbolic acid.

Strong brine may be used to advantage in washing bedsteads. Hot alum water is also good for this purpose.

The warmth of floors is greatly increased by having carpet lining or layers of paper under the carpet.

Cayenne pepper blown into the cracks where ants congregate will drive them away. The same remedy is also good for mice.

If gilt frames, when new, are covered with a coat of white varnish, all specks can then be washed off with water without harm.

If a little salad oil is mixed with mustard for the table, it is greatly improved.

Moth-infested articles should be saturated in naphtha or benzine. It injures nothing and kills the destroyer.

It soothes a feverish patient to bathe him with warm water, in which a little saleratus has been dissolved.—*Australasian*.

DR. TRIMEN'S LECTURE ON THE VEGETATION OF CEYLON.

LONDON, 2nd July 1886.

After all, I was present at the delivery, last Saturday, of Dr. Trimen's lecture on the vegetation of Ceylon in the conference hall at the Colindian Exhibition. The attendance was not large, and unfortunately, owing to the defective acoustic properties of the room and the voice of the lecturer being pitched too low, a great part of the interesting paper was lost to the audience. However, Dr. Trimen has kindly sent me the paper to look over, so I am able to summarize its contents. Before proceeding to do so, however, I may mention that the chair was occupied by our former Governor Sir Wm. Gregory, who was supported on the platform by Mr. Geo. Vane, C. M. G. (whom I was glad to see looking as young and active as ever) and Mr. J. T. White. Among those present were Mr. George Wall (whose eyesight has happily not totally been lost to him), Mr. and Mrs. D. Morris, and Mr. J. H. Barber. Your lady correspondent "Penelope" was also there, and will no doubt refer to the lecture in her letter by next mail. The chairman in introducing the lecturer dwelt for some little time on the natural beauties of Ceylon, apologizing for the length of his remarks by stating that his heart was full of Ceylon, and "out of the abundance of the heart the mouth speaketh." Dr. Trimen's paper opened with an apology for introducing into the series of lectures one of a scientific character but went on to show that after all no apology was required, "for Ceylon owes everything to its plants and its agriculture and the climate which fosters them. Its ancient renown, and its prosperity under European rule, have alike depended upon its vegetable productions so freely and abundantly given, and if a disregard of nature's unvarying rules have brought about in several cases the inevitable penalty one cannot but recognize with gratitude and admiration the wonderfully recuperative powers of the land, which indeed seem able to prevail over almost every natural drawback and artificial obstacle." The lecturer then went on to call attention to certain characteristics of the physiography of Ceylon which are generally overlooked, there being in fact two distinct regions in our island the wet and the dry. A large map hung on the wall, showing the rainfall in the different parts of the island, was freely used by the lecturer in illustrating his remarks. Dr. Trimen then went on to show that there were great differences in the vegetable productions of these strongly marked climatic districts, and the more prominent of these were referred to; and the remarkable fact was mentioned, that by far the greater part of the trees and shrubs which produce the splendour which strikes the eye of the visitor are not natives of Ceylon at all but foreigners. It is chiefly in the low moist district of the island, that these are so frequent, the original forests having been destroyed by chenaing and part of the land being now under cultivation with paddy, jak and breadfruit trees, &c., while the rest was almost worthless, being covered with lantana and the small bamboo. The Sinharaja forest between Galle and Ratnapura is the most extensive remnant of the original forest, and the characteristics of this were described, the most valuable of the timber trees being the calamander and the nedun. On the summits of isolated rocks also, such as the Hayeock and the Millowe hills, which the chena cultivation has not been able to reach, a number of remarkable species mostly peculiar to Ceylon, are found crowded together. Dr. Trimen then referred to the remarkable fact that about 800 species (30 per cent) of the whole number of plants found in Ceylon are peculiar to the island, and that they are related far more closely to the floras of the Malay Islands and Peninsula than to those of Southern India. The lecturer then referred to the belt on the hills about Adam's Peak up to 3,000 feet which has since the British occupation been brought under coffee, cinchona and tea cultivation and where foreign weeds have taken the place of native ones. The true hill region (above 5,000 feet) was then examined, that height been chosen because it was the limit fixed by Government, above which no forest land was sold. The trees of this region were described, and it was stated that the flora here resembled more that of Southern India than that of the Malayan peninsula. The patanas were then described, and it was said that the cause of the marked separation between these and the forest was due to an equilibrium having been arrived at by the vegetation, so that one was unable to encroach on

the other. The dry regions of the island were then touched upon, and the lecturer expressed the opinion that there must be a certain amount of truth in the native traditions, that these parts, where the stupendous ruins are now found, were once "the granary of India." On this subject Dr. Trimen remarked:—

Modern experience shows us that, given only water continuously, the soil is capable of great things; it is I think in many parts more productive than in the parts of the island more favored by rainfall. If then the great tanks, sluices and anicuts, whose magnitude and skilful construction still fill us with wonder, were ever in good working order an immense amount of land may have been under cultivation and very fertile. But beyond the ruins of these vast works we cannot now trace any evidence of a large population; unbroken forest covers everything. The question is of great interest, for if the country were really occupied by a large and industrious people engaged in paddy cultivation, we have to believe that the comparatively short space of 1,000 or 1,200 years has been sufficient to completely restore an aboriginal forest vegetation over a large tract of country. But the explanation may perhaps be found in the consideration that probably no great extent was cleared and cultivated at any one time or for any long period. It is well known from the native records of the island that the population was constantly being driven from one district to another by the frequent invasions from India, and thus their fields would be abandoned after comparatively short periods of culture. At that time too, it must be remembered, as helping to account for a more rapid return of natural forest vegetation, that there had been no importation of the exotic tropical weeds which now so rapidly occupy open ground and give no chance to the natives to resume their position.

The vegetation of the region was described as very monotonous, and the chief species of trees were enumerated. The plants of this dry region were shown to be essentially those of the Carnatic and Coromandel coast, and so far as the flora is concerned one would judge the separation of Ceylon from India to be recent. The lecturer concluded as follows:—

I might continue this sketch of Ceylon botany further to give some account of the flora of of the river—banks and the great ruined tanks of the seashore, the coconut groves, and the mangrove swamps, but I have already been led into too much technical detail. Besides, there is little of special significance in these aspects of vegetation concerning Ceylon. The floras of tropical seashores are remarkably similar everywhere; doubtless many seeds are imported directly by the waves and currents, and possibly this may have been the case in Ceylon with the coconut itself, the original home of which noble palm still remains one of the unsolved problems of geographical botany. I will therefore not enter into this or other of the special points of interest which suggest themselves. I have endeavoured in this address rather to awake your interest by briefly calling attention to some of the larger questions which arise when one attempts to understand the present distribution of plants, in even one small island; and if I have succeeded in doing so, I shall feel that this rather technical lecture is justified.

On the conclusion of the lecture the chairman called upon Dr. Cleghorn to speak, which that gentleman did briefly being followed by Mr. D. Morris, who at some length dwelt upon the more remarkable features of the vegetation of Ceylon, and stated that the two sights which made most impression on himself were the talipot trees in blossom along the Kandy railway line and the gigantic rhododendrons in blossom on the Nuwara Eliya patanas. He passed a eulogium on the work which Dr. Thwaites and Messrs. Geo. Wall and Wm. Ferguson had done in connection with the botany of Ceylon, and spoke in the highest terms of praise of the energy which the Ceylon planters had displayed in introducing new products when old ones failed. Dr. Carruthers, President of the Linnean Society, then spoke, and expressed the hope that in the dry regions of Ceylon, irrigation might effect such a change as had taken place at Salt Lake City, which from being a barren region had become a most productive one. Mr. J. H. Barber then spoke briefly as representing the planters of Ceylon, and a vote of thanks to the lecturer proposed by the Chairman and another to Sir William for presiding, proposed by Mr. Geo. Wall and seconded by Mr. Barber, brought the meeting to a close.

THE EXTENT OF CINCHONA CULTURE IN JAVA.

The Dimbula Planters' Association took a sensible course in asking the Colonial Government to obtain from the British Consul in Batavia, reliable statistics of the cultivation of cinchonas in Java, but perhaps the reason why no acknowledgement of the letter addressed by Mr. Beck to the Colonial Secretary has been received, is due to the fact that the letter was not sent, as it ought to have been, through the Central (Kandy) Association. Due courtesy to that Association was not shown in the course pursued, and how the interests of the general body of planters was consulted by Mr. Beck first and the Association afterwards, in keeping to themselves information so important, *if true*, as that communicated by Mr. Mundt, perhaps they will explain.

We have no hesitation in saying, that, if what Mr. Mundt stated to Mr. Beck has been correctly repeated by the latter, to the effect that there are 175,000 acres of five years old cinchonas in Java the whole or the greater part *Ledgerianas*, then the Dutch Colonist most grossly exaggerated,—from want of careful collection and weighing of facts, we presume, for, be it observed, he said he never saw the vast area of cinchonas the existence of which he so confidently asserted! The senior editor of this paper was in Java in the closing period of 1881, that is less than five years ago, with the advantage of the guidance through the cinchona region of the Preanger Regency of Mr. J. B. Moens, the Director of the Government plantations, who most readily supplied all available information regarding the character and extent of the cultivation. The distinct impression left on our mind was that in Western Java, where the cultivation was originated and to which it was mainly confined, the number of estates, apart from the Government plantations, could then be counted on a man's fingers, some being merely in the course of formation. The Government Gardens themselves, though carefully cultivated, were really of limited extent, while the valuable *Ledgers* like many other rare and valuable plants, were chary in yielding seed: some seasons scarcely any was gathered; and even when good seasons occurred, the seed harvested was sold at high upset prices. Subsequently to the period of which we have spoken, Mr. Moens visited the eastern part of Java and stated that he had found *Cinchona officinalis* flourishing on some estates there, after a different fashion to the spindly plants of that species which he showed us in the mountains around Bandong. But although the plants were represented as good, there was no indication that the extent under them was other than limited. Mr. Moens since then has, from his residence,

while on leave, in Holland, issued several papers on the cinchona enterprise, its position and prospects. We may rely on it that he kept himself well informed of the progress of private culture of the fever trees in Java, and he has never represented the extent of this private culture as a specially important factor in estimates of the total production of the world. It was not until 1882 and 1883, in reality, that Ledger seed was available and disposed of in any quantity by the Batavian Government. Then, no doubt, considerable areas of nursery ground were prepared and sown, but we have no hesitation in saying that the requisite labour for planting 175,000 acres, or half, or quarter that area, was not and is not now forthcoming. If there are at this moment 20,000 acres of cinchonas in all stages of growth, in Java, that we confidently believe is the very maximum. A reference by our Government to the British Consul in Batavia, will no doubt result in approximate figures being produced; but, if Mr. Macneil, the present Consul indicates that Mr. Mundt's figures are other than the wildest exaggerations, we shall be much astonished. For neither in Mr. Macneil's latest report nor in those by his predecessor Mr. Cameron, any more than in Mr. Moens' well-considered papers, have we ever seen the slightest hint given that the private culture of cinchonas had progressed in Java at the utterly incredible rate stated by Mr. Mundt.

The silence of both authorities is only negative evidence, to be sure, but under the circumstances such evidence is very significant. Those who have not visited Java, and carefully investigated its systems of tenures, culture and compulsory service, can have little idea of the "labour difficulty" in that magnificent island of twenty millions of a population. There are plenty of people, but very few willing to work, or at liberty to work away from the rice fields and other lands which they hold on condition of rendering service to Government, or to estate-owners, who are also the feudal lords of villages connected with their estates. The reason why sugar cultivation made such enormous progress in Java, was, that a parentally despotic and benevolent Government supplied European or other planters, whom they favoured with land, the labour attached to the land and actually, through the co-operation of the Java Trading Company, with capital! The system has been materially altered of late years, the proportion of labour exacted by Government itself having been lessened, and no such interference (now being gradually withdrawn,) as took place in favour of sugar planters, has been repeated or will be repeated in favour of private cultivators of coffee, tea or cinchona. Some years ago Mr. Pretorious, a member of the Java Civil Service and Private Secretary to the then Governor-General, was deputed to Ceylon specially to inquire into our system of road construction and upkeep by means of the Thoroughfares Ordinance. He fully discussed the question with us and when we stated, as we correctly did at that period, that practically all the inhabitants of this island liable under the Ordinance, paid a money commutation for the six days per annum of labour required from them, the real work on the roads being performed by a class of immigrant labourers, who worked for wages, the Dutch Civilian's countenance fell, and he said "such a system would be impossible in Java, where service is already exacted from the people and where there is no immigrant class to fall back upon." There is, as a matter of fact, no class of absolutely free labourers in Java, except it be the Chinese, and beyond the precincts of the great towns we never saw "John Chinaman" at work, unless as an artizan or labourer on railway construction, or as a contractor to supply manure to estates. The Javanese agriculturists are not strictly slaves, but they hold their lands not "in free and common soccage" as the highly favoured Sinhalese and Tamil yeomen do here; but on condition of yielding certain service to the lord of the soil, whether Government or proprietors to whom Government has sold or leased its rights. No doubt of many the cultivators of the rich rice-lands of Java have time at their disposal, over and above that exacted by the tenures on which they hold their lands and the exigencies of their own cultivation and harvesting, but the Malays have as little liking for steady work as the Sinhalese have, and it was quite an exception for Mr. Moens to issue a Report in which complaint was not made of the paucity of labour on the Government cinchona plantations. If, then, Government experienced this difficulty when dealing with forest lands outside the boundaries of settled population, we leave our readers to judge how much greater the difficulties of the private planter must be under similar circumstances. It was equally a rarity for Mr. Moens to issue a Report in which the ravages of *Helopeltis* were not recorded; and if canker is not quite so great an evil in Java as it has proved to be in Ceylon, we suspect there is ample compensation of disadvantages in the damage done to the bark as well as the leaves by the insidious sucking insect. For all the reasons stated, we entirely distrust, as wild and unreliable, the statement made by Mr. Mundt to Mr. Beck of 175,000 acres of 5-year old cinchonas in Java, which will be fit for shaving two years hence, the bark so gathered in quantity and quality casting Ceylon into the shade. There can be no question that Java with its rich volcanic soil and its suitability for the culture of the rich *Ledgeriana*,* is destined ultimately, to be a formidable competitor with Ceylon in the cinchona markets of the world, and a debade hence it may really supply the world from something like 100,000 acres of mature trees. But up to the end of 1890, at least, we suspect the most formidable competitors with Ceylon cinchona planters will be their fellow-planters.

Since writing the above we have referred to what Mr. Mundt said to our reporter in March. He did not specify any acreage in cinchona: merely asserted vaguely and generally that a very large extent of ground was planted with really good cinchona yielding 10 to 11 per cent sulphate of quinine. Mr. Mundt also regretted the absence of roads and railways in Java "which prevented *millions* of acres of good tea and cinchona land being planted up." Now, in the first place large as Java is, it is densely peopled and the best lands are either under culture, or, after exhaustion abandoned to the everywhere prevaelnt *alang alang* (illook) and *lantana*. In the Preanger Regency we saw valleys of ten square miles in extent occpuied by *alang alang* and *lantana*. A large portion of the untouched forest, again, is on the tops and sides of volcanic mountains, elevated and steep, and therefore not available. There are not *millions* of acres in Java suitable for cinchona and tea, and if there were and railways were running through them, the labour difficulty on which we have dwelt, would render the clearing and planting of such land a slow process, not to speak of the deterring influence of markets which would be utterly swamped by the produce of half or even a

* Mr. Mundt's 10 to 12 per cent quinine in the bark, is as wild as his other statements regarding 175,000 acres in the south of Java, which he had never seen. Bark with 5 to 8 per cent will be very good for an average. A return of 12 per cent is extreme and such as Mr. Moens got only from a few specially choice old trees.

quarter of a million acres of each.—We may mention that before Mr. Beck's letter appeared, we had taken steps to procure information from reliable correspondents in Java on the subject of Cinchona Cultivation. In our last Handbook, after carefully considering the Reports from Messrs. Moens and de Romunde and different Consuls, we put down 11,000 acres and 15,000,000 trees for Java. This may be below the mark, but we shall want good evidence before we credit anything over 20,000 acres to our South-eastern rival.

TEAS AND THE TEA MARKET.

That China teas can be turned out of the fines quality both for flavour and make, we had practical demonstration some two years ago in the coast ports of the Far East. A Canton merchant in showing us over his store, brought out from his bins, samples of some of the finest teas exported from China—teas which realized fancy prices and the supply of which he intimated could easily be increased, if only there were sufficient encouragement in demand at a remunerative price. There can be little doubt that under the stimulus of Sir Robert Hart's remonstrances with the mandarins, "John Chinaman" in his tea districts generally this past season, set himself to pluck fine and manufacture more carefully than usual. Here is what Messrs. Rucker and Bencraft in their circular of the 1st instant say on the subject of the new season's China Teas:—

"The opinion we formed of the quality of the Crop has been confirmed, and it cannot be found fault with except for a certain lightness in liquor. The leaf is of remarkably fine quality, and we do not think has been equalled since 1865. We learn that results have been disappointing to the Chinamen who have been urged to manufacture Tea of higher quality, and who were encouraged by last year's prices to expect better results this season. Seldom has a fine First Crop come to a more apathetic market on this side, and we doubt whether the Elections can stand as much of the blame as last time."

The question of profit therefore will not encourage the Chinese to continue a large supply of fine teas.

As regards Ceylon teas, before the 'new Season's China' came into competition, there seemed to be an inclination to bear hardly on our shipments and as some believed, to endeavour to get 'Ceylon' graded permanently as inferior to 'India' and very little above 'Java' kinds. We have received information from several responsible Ceylon planters which points to determinedly prejudiced, rather than equitable criticism, and we are promised a selection from the reports of London brokers and buyers extending over some time past, to show the inconsistency and unreliablity of much of the testimony against our teas which finds its way from "the city" eastwards. Here is an extract placed at our service from the private letter of a gentle man who knows what good tea is and who has followed the development of our Ceylon industry. He writes from London under date 1st July to a friend in Ceylon as follows:—

"It is not the truth that the Ceylon teas have gone off in quality. Every planter could not have begun manufacturing bad teas. The fact is, our buyers see and know that a large lot of tea will be produced in Ceylon, and they are determined to lower the price. These buyers are banded together in a way and are, I fear, seconded by others—men who buy in teas for grocers. The question is: why do some of our selling brokers value the Ceylon teas so low, and some selling brokers write in their reports that the Ceylon teas have deteriorated? It seems to me as if some of them were playing into the hands of the buyers. I heard that at one sale the brokers who had described the Ceylon teas as 'deteriorated' were cheered in a way. Other markets will be found for Ceylon teas, and everyone who can must be his own selling merchant. The merchant who sells the tea to the grocer does not let the latter have the tea any cheaper, although he pays so much less for it now."

Leaving the question of alleged deterioration of Ceylon teas on one side, there can be no doubt that the "budget scare" of April 1885, is a good deal to answer for the disorganisation of the tea market during the present year. The "Produce Markets Review" discusses this subject fully and shows that the fact of the stocks in the public warehouses of the United Kingdom at the end of June being 21,000,000 lb. greater than in 1885 is due to the disturbance in the regular course of deliveries last year by the fear of an increase of duty. The same authority anticipates a steady improvement now, because not only are prices unprecedentedly low, but the stocks in the hands of the grocers "are undoubtedly smaller than they have ever been in proportion to the weight consumed." This is cheering news to our planters, apart from the evidence afforded that there has been a tendency to persistently unfair criticism in reference to our Ceylon teas and their alleged deterioration.

One matter however must be specially guarded against or Ceylon teas and planters must continue to fall in the estimation of buyers. We have before us documentary evidence to prove that in a purchase of a parcel of teas through Messrs. Wilson & Co., brokers, of Colombo in April last, the whole aggregating some 450 lb., there has been close on 20 per cent loss through *short weight*, after making all the usual allowances. These teas bore a recognised estate mark, and the buyers say that in Calcutta, their claim for the value of 76 lb. short weight would be at once recognised; but in Colombo, the Brokers find such claim is ignored. This is a matter which ought to be looked into at once by all the Brokers and the Chamber of Commerce; for the evidence that "short weight" is an experience attaching to teas bought in Colombo far more than to teas bought in Calcutta, is overwhelming. Planters must see to the fault being rectified, or exposure of the careless, will have to follow in the interests of the community.

LIFE ON A TEA PLANTATION.

The following interesting letter we have received from Mr. D. Slimmon who is engaged on a large tea plantation at Cinnamara, Jorehaut. Our correspondent was for some time before his present appointment in the sale rooms of Messrs. Gow, Wilson and Co., of Rood-lane, E C., tea merchants and planters. The writer says:—The Assamese about our district and northern Assam are of a white sun-burnt complexion, with a decided resemblance to the Mongols in their features; some may be seen almost as white as Europeans. In habits, they are a very lazy, easy going people, displaying very little intellectual power, and however anxious the Government may be to employ them in public offices, the majority of the best posts are filled by Bengalese. In the working of our estates, very little local labour can be obtained, and even the little we have is very uncertain: five to six hours is a good day's work for an Assamee, and then you don't get him every day. The only work they care for is pruning, basket making, or other light work; hoeing and such other manual labour is out of the question. As a rule they live in villages, scattered all over the country, each jât, or caste, having separate townships; for seldom do people of different jâts live in the same village. A zigzag path (East Indians could not make a straight one), a clump of bamboos, and a grove of Pân Tamel trees is a sure sign of a village or what was once the site of a "Gâôn." These

deserted Gáons are very numerous in Assam, partly caused by the ravages of the Burmese, when they conquered the country, killing or carrying away the inhabitants as slaves, and partly from the superstitious ideas of the people. For instance, if fever, smallpox, cholera or some other deadly disease attacks the village, the inhabitants immediately say that the place is haunted, and in many cases they leave it *en masse*, and settle elsewhere. The Assamee at home rents a parcel of land from Government, at a small yearly sum. In April he plants his dhan (rice), and quite contentedly waits until it grows, reaping it about October. Low-lying land adjoining a jan (shallow wide river) as a rule grows the best dhan, the reason being that the dhan requires a great deal of moisture. The only agricultural implements used are a rude wooden plough, consisting of one upright pole, and a wooden socket projecting from the bottom; this is drawn by a couple of bullocks or a buffalo; for harrows, a bunch of prickly bushes tied together is used; for reaping, the usual implement is a billhooked knife, about nine inches long; for threshing, the old plan is adopted of treading out the corn by bullocks; for winnowing the dhan they use is a sort of plated tray, and they shake it up and down something like what was done in England long ago. When all is gathered in, the native sells part of his grain to the Bengalee coolie for about three rupees per maund (80 lb.), the remainder he keeps for himself and family, and as their food almost wholly consists of curried bhat, pigeons, fish, goat's flesh, &c., they live quite happily and contented. Such food as beef, mutton, fowls, and the much hated Gáhori (pig) are forbidden by all their religions save in a few cases where the jât is of the lowest description. The native houses are built of bamboos, plastered over with a mixture of clay, &c., and the long jungle grass serves as an excellent roof. There are no windows, chimney, or wooden floor; the earth rubbed over with water soon hardens and assumes a glossy appearance, and as there are no nails in any of the inmates' boots it never gets loose. In religion the natives are very mixed, but the greater portion are Hindoos and Brahmins. They have two great feasts yearly, one in April called Bor Behu, and another in December named Soot Behu. The principal parts consist of killing a few goats as sacrifices, feasting, music (such as it is), and dancing for several days, Intoxicating liquors are prohibited by their religions, but the natives are fond of smoking hookahs and chewing cân tamel, a kind of hard berry about the size of a marble, and growing on a kind of palm tree.* Chewing cân tamel seems worse than the obnoxious habit of chewing tobacco, it makes both the lips and teeth quite red. The Assamese, like other Orientals, marry very young, First of all a bargain is made between the father of the young man and the father of the girl. The matter being talked over the young man's father agrees to pay the girl's father a certain sum. This is called the betrothal, and to confirm the contract a feast is given to the friends of the girl by the father of the young man. When the boy reaches the age of 14 or 15 the marriage takes place; friends of both parties are invited, and a great feast is given, lasting several days, at the close of which the bride and bridegroom are carried to their house shoulder high. In clothing, the Assamese differ very little from Bengalese as far as style is concerned, but their tastes just lie in opposite directions, the Bengalese liking showy dress, such as red, yellow and green, while the Assamese wear spotless white, very often native silk. In Lower Assam the natives are called Kacharese, being a much finer class of men then those met with in Upper Assam. They travel about a good deal, and play much the same part as Irishmen do at harvest time in England and Scotland, coming up here to work on the estates while their dhan is growing, getting together a few rupees and then returning to their homes. They are fair workers with the hoe, but are often very troublesome customers to deal with; a manager who will employ more than 100 of them at once is thought a bold man. Besides Kacharese, we have similar visitors from the hills called Kiâ às. These people can handle an axe or a knife with much adeptness, and they are generally employed cutting jungle. While at work they keep time to every stroke with their war cry, which sounds something like hae hoe, and when walking along the road in single file you will often hear the same hae hoe to every step. They are a very dirty lot of people. Nothing makes a better feast for them, than a roast dog stuffed with rice, or an old Gharry bullock. They seldom even wash their faces. They are very warlike people, some tribes are quite independent, and many are the feuds between the different tribes; sometimes 100 will be killed at once. The real labouring classes of Assam, so to speak, are the imported Bêngalese. These coolies are imported by owners of estates, all their expenses are paid in consideration of their giving an agreement for a period of years, at a certain wage per month, at the expiration of which agreement they are free to go where they please. In most cases they remain there all their life or at least 10 or 15 years; when they reach a certain age, they are called dependents and receive a pension, so that they are better off than some people think. Those who leave after serving a number of years generally take up a piece of land, build a house and setttle down, having saved enough money to keep them the remainder of their lives. In this way Assam is being rapidly colonized by Bengalese and the Assamese in their turn are dying out. Their houses are built much in the same style as those of the Assamese, but all are together; the village, so to speak, is generally known as the lines. In religion there are all sorts. Two general festivals are held annually, one in March called the Fugwa, and the other in September called the Doorga Pooja. The Fugwa consists of a great feast at which everybody puts on his showiest clothes. Music and dancing and painting each other's faces with a kind of red powder called "Fakwoogooie" are among the things indulged in, and at the end of it all drink is used to excess. The Doorga Pooja is the greatest festival of the year. The ceremonies differ according to the particular part of the country. The chief office consists in sacrificing goats, pigeons, &c., to the god Kali. If the first stroke of the axe kills the goat that signifies that it is accepted, but if it should require two strokes, it is counted as a bad omen. After the animal is killed the blood is daubed on a long bamboo with the tips of the four right hand fingers. A piece of cloth to serve as a flag is afterwards fastened on the end of the bamboo and placed upright in the ground to commemorate the event. Another part of the business consists of an image of Kali being thrown into the river, and if it sinks that is taken as signifying a good season, but should it float, it is regarded as the omen of a bad season. There are many other ceremonies some performed by elephants, &c., the conclusion being much like the Fugwa, and Ting Ting heads are rather fashionable when work is resumed. The favourite Bengalee liquor is lau pani, a kind of intoxicant made from fermented rice—I mean favourite because they cannot afford to pay for European liquors, though whisky or beer seems to be liked uncommonly well when the Sahib gives them any. In clothing nothing is "too loud for the natives. They are also very fond of jewellery. Bracelets are worn on the arms and ankles; rings in their ears, noses, toes and fingers. A little casket is hung round their necks from infancy to keep away the evil spirits. In regard to tea planting a few particulars may be of interest. The seed for the tea resembles black marbles. We plant about January in a piece of good land, about four inches apart. These plants soon appear above ground, and in about nine months' time they are about two feet high. In December they are removed into the new clearance prepared for them, and planted at intervals of 6 feet by 5 feet. It takes two years more before they yield any leaf, and then for the two succeeding years they yield but very sparing quantities. Plucking generally commences about the end of March, and is carried on all through the year until December. The leaves after being plucked are spread on trays to wither them; this operation in fair

* The arekanut is, of course, referred to.—ED.

weather takes about twelve hours. Afterwards the leaves are rolled and fired by machinery: then they are picked, sifted and finally fired before being packed. From December to March the bushes are pruned, clearances made, building and sundry other operations are carried on. Hoeing and cultivation, of course, is done all the year round. This is absolutely necessary, owing to the rapid growth of jungle. The principal beasts of burden are the elephant, buffalo, and bullock. Horses are foreign to the Assamese, and are only used by Sahibs for riding and driving purposes. The climate for about four months of the year resembles July in England, only there is little or no rain. The remaining eight months are not quite so nice, heavy rains and a hot sun causing a moist heat. English people here as in other foreign countries, are very sociable with each other, and many are the pleasant days and evenings spent at tennis, polo, and cricket. English flowers and vegetables grow splendidly out here; nearly every resident has a garden worth looking at. Orchids and geraniums are to be found as common as any other kind of jungle; any tree with good shade is almost sure to have an orchis somewhere about it. There is plenty of shooting to be had from the tiger down to the snipe. Jackal hunting is greatly resorted to now, and many fine runs are made over the "Pitars."—*Grocers' Chronicle.*

TEA PREPARATION IN JAPAN.

(From the *Indian Tea Gazette.*)

Like everything else with this painstaking people the greatest attention is paid to detail. Commencing with the growth of the plant, and its incessant manuring, the utmost care is bestowed in protecting the bushes alike from frost in winter or from undue sun in summer. This is done, where necessary, by the use of mat covers raised on poles about 8 feet high; and when riding across the Tea lands in June the time when the young leaves are fully developed the whole cultivation is seen under matting. The tea plant, as with us, is raised from seed, although the Chinese propagate extensively by cuttings. The first plucking commences in the fourth year, at the commencement of the summer. Only the youngest leaves are then taken. A month later a second gathering takes place, and sometimes, at a like interval, a third light plucking follows. It will thus be seen that succulent leaf is always ensured. Prior to 1,570, we learn, it was the custom to immerse the leaf in boiling water immediately after plucking, and, after drying in the sun, to make the leaf into powder; but in the year 1700 the system of "panning" was introduced. Strange to say, powdered tea, both then as now, is the most esteemed by the Japanese for their own drinking, but, owing to its more laborious preparation, it is an expensive luxury, and its use is confined to the wealthier classes, none being exported. The infusion is drunk without milk or sugar, and is best esteemed when of the colour of pale sherry. During manufacture an incessant "tasting" goes on, and any errors in preparation are thus quickly detected and remedied, with the result that Japan teas are noted for their uniformity in cup. In fact the preparation of good tea is considered by the Japanese almost an art, and none but tried and skilled workmen are employed. The leaves, immediately after being gathered, are taken to the factory. Here the stipules are separated by means of a Bamboo sieve, and all impurities removed. Then follows a process of artificial withering, which is effected by "steaming" the leaf, over water heated to 200° F. in a covered pan. After this, the leaf is uncovered and turned and aired by means of fans made of a frame of split bamboo covered with paper. When perfectly cooled, the leaf is taken to the dessicating box, underneath which is placed the fuel. When the fire is quite bright a sufficient quantity of straw is burnt to obtain a layer of ashes in order to prevent the too direct action of the radiating heat. During the process of firing, the leaves are continually rolled between the hands until they commence shrivelling and are nearly dry, when they are transferred to another firing box for complete dessication: when this has been effected, the leaf, assorted into three qualities or sizes, is placed in sieves of copper wire, and gently rubbed between the palms of the hands to further equalize the make. Sifting then takes place through bamboo sieves of six different degrees of fineness, and this sifting, for the higher qualities of tea, is repeated several times,—the powdered tea even as often as ten times, which expenditure of time and labour renders this kind of tea extremely dear. The temperature of the room in which the firing-box is placed is very high, and doors and windows are kept closed. After final sifting into varieties, all faulty leaf is carefully picked out by pincers. Before packing, the Tea is again heated, and trodden down into the chest by coolies with bare feet.

Adulteration is almost unknown in Japan, and Government inspectors have to pass all Tea before shipment. From the first stage of growth with the careful manuring of the plant, to the final manufacture and packing, the most minute attention to detail is given. The chests themselves are models of strength and neatness, and the marking is very carefully attended to. Owing, also, to the uniformity of the wood used, the weight of the contents of each package is also uniform, and is accepted as per invoice, invariably, in America. We might do worse than follow more closely the painstaking system of the Japanese.

It is not likely that Ceylon will take to withering their leaf by hot steam any more than in this warm climate to protecting the bushes by mats. But there seems to be some philosophy in the expedient of modifying strong heat by means of ashes, and the idea is worthy the attention of those who use "chulas".—ED.]

JAPANESE TEA BOXES (AND ADULTERATION OF TEA IN JAPAN.)

Kintyre Estate, Ceylon, 8th June 1886.

Sir,—I was somewhat astonished when reading your article on "Tea preparation in Japan" (which appeared in your issue of 1st May), to read that "Tea adulteration is almost unknown in Japan;" together with general advice to Indian Tea Planters to follow the painstaking system of the Japanese. Last year I had the pleasure of visiting Japan, and during a stay of some 7 to 8 weeks I saw a great deal of the Japanese Tea Industry, and the conclusion I arrived at was that at least three-fourths of the tea that leaves Japan is beyond doubt adulterated; and in four large godowns—two of which were at Kobe and two at Yokohama—I had the opportunity of seeing the adulterating process carried out openly with no effort at concealment. The Tea, as prepared by the Japanese, is certainly pure, and your description, in your article which I am now referring to, is a fair one, though perhaps it would lead readers to conclude that it was carried out in large factories similar to the "Indian" ones. As a general rule, however, the tea belongs to peasants, who prepare their few pounds a day over a single pan in their dwelling-houses and then sell the prepared leaf to dealers who then mix their various purchases together, sort them and send them to the Treaty Ports for sale. It is there bought by Europeans, and then commences the clever and systematic adulteration and final preparation for shipment. The Tea, when it enters the European godowns, is of good quality, looks more like quills than Tea the appearance, however, of course varies according to quality; in colour it resembles dead twigs, being a green-brown colour, more brown than green. In this state it is put into iron pans measuring 21 inches by 13 inches deep, of which in most factories there are some hundreds built into brickwork chulas with charcoal fires underneath. As the pans get hot the Tea, which before this operation was only three parts fired, begins to get soft; at a given signal by the head manager, generally a Chinaman, a spoonful of a mixture of gypsum, soap stone, and Prussian blue is poured into the pan (which bye-the-bye contains 5 lb. Tea), and this mixture is rolled and rubbed by hand into the Tea. As the heat increases the moisture all evaporates and the Tea takes its twist again and comes

out of the pan hard and crisp, of the pale blueygreen colour common to all green Teas. So thorough is the mixing of the colour that, unless an expert, one would be unable to tell by the infusion, or by looking at the infused leaves, which was the "faced" and which the unfaced Tea. The reason given me for this adulteration was, that, owing to the Tea being made in small quantities here and there, and at uncertain times, and only three parts fired by the natives, it was found that as a rule, if merely refiring was resorted to, the Tea turned a dirty brown colour and lost its appearance, and it was therefore necessary to resort to artificial means. I noticed myself that some of the worst class Teas after being coloured looked much on a par in colour with the first class Teas, and this no doubt has also something to do with the system. I maintain therefore that until this practice of adulteration is put an end to, which will not be before the country is thrown open to foreigners, we have little to fear from competition with the Japanese.

As regards their neat packing and packages to which you refer, we have no doubt something to learn, and in Ceylon the business in importing momè and cedar wood boxes from Japan is assuming large proportions, as Ceylon planters find they get a good box of even weight, light, free from injurious smell and cheap. At present these have been kept from the Indian planter owing probably to *vested* interests and proposed commissions of the Calcutta merchants not being considered good enough. As my sole aim has been to keep down prices and give a really good box (and as you know, Mr. Editor, I have *no* pecuniary interest in the concern) Messrs. J. Murray Robertson & Co. of Colombo at present can give full information and price lists, and they are about to arrange, if possible, for a large agency at Calcutta. They fully recognise the fact that small profits and quick returns are what is wanted to ensure success, and they now undersell, slightly, all local made boxes—while to suit Ceylon and Indian planters they have pursuaded their Japanese friends to add new dove-tailing machinery to their plant, and all boxes now made for these markets have one inch dove-tails. The momé wood boxes have no sort of smell, and are about perfection. In this respect, therefore, I would point out to brother planters independent of agents, that they have a chance of learning something from the Japanese; and these packages once used will probably never be discontinued.—Yours truly, dear Sir,

H. DRUMMOND DEANE.

—*Indian Tea Gazette.*

CRYPTOMERIA JAPONICA BARK SHINGLES.—In notes on the International Forestry Exhibition, we find it stated:—

There were specimens of the bark of *Cryptomeria japonica* used for roof shingles; these shingles are usually employed under some other roofing substance, when they are said to last 40 to 50 years; if used alone, they last half that period only.

This is the tree from which the tea boxes we receive from Japan are chiefly manufactured. The tree is likely to do well at and near Nuwara Eliya.

CEYLON TEAS AND THE FUTURE OF MARKETS.—There is much in the letter of Mr. H. L. Forbes deserving the careful consideration of all interested in our tea industry—and who is not locally? Following on our remarks of yesterday on the alleged deterioration of Ceylon teas, we may say that if such a scheme as Mr. Forbes proposes is seriously taken up, Mr. J. L. Shand would be just the man to further it on the British side. *If* our teas have at all deteriorated, the only cause, we suspect is atmospheric, a cause operating in India also, for Indian teas are proportionately down. Political troubles have, no doubt, depressed the market, and the enormously increased exports in the early part of the season from China, must have influenced prices seriously. As happened with Ceylon coffee, so will it be with Ceylon tea. It was after a commercial crisis and low prices, admitting of very general and increased consumption that Ceylon coffee took first place in the markets. So, we believe, it will be with Ceylon tea:—

"Though we fell, we aye got up again,
And sae will we yet."

CHICAGO AS A TEA MARKET.—The following from *Bradstreet's* is commended to the attention of the future Ceylon Tea Syndidate:—A new departure was made in the tea business last week in Chicago which it is confidently claimed will cause considerable changes in the marketing of teas in this country. The idea carried into execution was that of auctioning off teas at lower prices than can now be made at the eastern seaboard. The teas,* owing to the completion of the Northern Pacific Railroad, can now be brought direct to Chicago from the Pacific coast, and it is claimed at fully ¾c. less per pound for freight alone than it would cost to bring it via the Suez canal and New York. The first sale was well attended, and buyers were present from as far east as Rochester, N. Y. The prices obtained were lower than were anticipated, but the company managing the scheme is reported to be amply satisfied with the first experiment.

THE TALLEST ACCURATELY MEASURED SEQUOIA (WELLINGTONIA) standing in the Calaveras Grove, California, measures 325 feet, and there is no positive evidence that any trees of this genus ever exceeded that height. Of late years, explorations in Gippsland, Victoria, have brought to light some marvellous specimens of Eucalyptus, and the State Surveyor of Forests measured a fallen tree on the banks of the Watts River, and found it to be 435 ft. from the roots to the top of the trunk. The crest of this tree was broken off, but the trunk at the fracture was 9 ft. in circumference, and the height of the tree when growing was estimated to have been more than 500 ft. The tree, however, was dead, though there is no doubt that it was far loftier than the tallest Sequoia. Near Fernshaw, in the Dandenong district, Victoria, there has recently been discovered a specimen of the Almond Leaf Gum (Eucalyptus amygdalina) measuring 380 ft. from the ground to the first branch, and 450 feet to the topmost twig. This tree would over-top the tallest living Sequoia by 125 ft. Its girth is 80 ft., which is less than that of many Sequoias, but, as far as height is concerned, it must be considered the tallest living tree in the world.—*Scientific American.*

THE COFFEE AND CARDAMOM CROPS OF COORG FOR 1884-85 are thus noticed in the Administration Report:—

The coffee crop of the past year is returned at about 4,007 tons, and though it fell short of previous expectations, the outturn can hardly be deemed an unfavourable one, being less by a little over 1,000 tons than that of the preceding year, but exceeding the crop of 1881-82 by nearly the same quantity. Of the whole quantity about 75 per cent was sent to the Western coast for shipment. These figures as to outturn and export are, it may be stated, approximate only. They were obtained from the returns of the Toll-gates which are placed on all the roads leading out of Coorg. Allusion was made in last year's report to the rapid fall in the price of coffee after the year's crop had been exported, owing to the over stocked condition of the Home Market. The local price, (which is affected by the Home Market rates) had fallen to R31 per cwt. in 1883-84, and dropped further to R26¼ per cwt. during the past year. The effect has been to a very general extent, a disastrous one upon coffee industry, and the evidence of it is seen in the large outstandings of coffee assessment remaining uncollected this year. The Commercial and Agricultural depression has also seriously affected the market for cardamoms. The price of cardamoms fell from R300 per cwt. in 1883-84 to R141—8—0, and so, although the crop has been a large one, the growers have not profited by it to the extent anticipated.

*That is Japan and China teas.

Correspondence.

To the Editor of the "Ceylon Observer."

MR. AGAR ON THE ALLEGED DETERIORATION OF CEYLON TEA: REMEDIES SUGGESTED.

SIR,—There is a great deal in what "Experientia Docet" says in his letter to the local "Times" as to "deterioration" of our teas, and no doubt one of the principal causes for want of strength in liquor is want of strength in our tea bushes. Some may remember the cry out there was made years ago about cinchona bark when the drop took place. The Colombo merchants took the planters to task for sending down stuff taken from 18 months old trees!

What are we doing now? Just the very same, only harvesting tea leaves instead of cinchona bark! *Maturity is everything*, coupled with a *judicious selection* of the *seasons*, for *pruning* and *plucking*.

While on the subject of deterioration, and the very poor prices realised lately in the local market for our teas, I would suggest some alterations:

1st.—Allow "breaks" to be put up at auction *as a whole*, or in grades, to suit *the seller* as well as the buyer.

2nd.—Fix a day *once in the month* for *tea sales*. My argument for the former is, that the owner of a "break" objects to its being pulled to pieces and peradventure, the "tit-bits" taken out. This lands him with a "ragged lot," which is not by any means desirable. For the latter I maintain that weekly sales contribute but *small* parcels, which have no attraction for Calcutta, or outside buyers, who might otherwise be represented.

If we could catalogue something like 300,000 to 500,000 lb. *monthly*, a "fillip," may be given to the *trade* which it sadly needs at present.—I am, sir, yours faithfully, SHELTON AGAR.

MR. BECK AND THE FUTURE OF THE CINCHONA MARKET.

SIR,—With reference to a leading article in your issue of the 18th instant, and which treats of the improbability of Java sending forward such quantities of bark as to materially affect prices, I quote from a letter which was written by me on May 30th, and read at the last Committee meeting of the Dimbula Planters' Association on the 3rd instant:—

"Mr. G. Mundt, President of the Java Planters' Association, stated to me that, within two years from now, Java will practically supply the demand of the world with high-class cinchona bark; that the area under cultivation is equal to 175,000 of our acres, and is planted with ledgers averaging from 10 per cent to 12 per cent; that 1,500 trees are planted to the acre, and that the age of the youngest planting of this vast acreage is five years, the oldest six years; that the weight of what Java can supply has never yet been felt because these enormous plantations have not been operated upon, as no tree in Java is shaved until its seventh year, and canker is almost unknown; that in his (Mr. Mundt's) opinion, when Java sent in its vast contribution, say in two years from now, our three per cent barks would not fetch much more than branch now fetches." Mr. Mundt said that he had no interest in the Companies, who are almost the sole proprietors of the acreages he named, his interest in cinchona comprizing only 70 acres of high class *ledger*, and that he had never personally visited these great cinchona fields, as they lie remote from him on the Southern side of Java. Since Mr. Mundt left Ceylon we have heard of canker shewing in Java, but this, if true, cannot benefit us, as it would serve only to precipitate the harvesting of bark, which under ordinary conditions, would not have been exported for another two years.

I proposed to the Association that a subscription should be immediately started to enable those interested in the future of cinchona to send one of our number to visit Java with the same object in view which doubtless brought Mr. Mundt here, but the Association did not think this desirable, and proposed that the Colonial Secretary should be communicated with and requested to obtain through the British Consul at Batavia the required information. I append a copy of the letter I wrote to the Colonial Secretary on the subject, and to which, up to date, I have had no reply.

GEO. BECK.

(*True Copy.*)

To HIS HONOR, THE COLONIAL SECRETARY.

Sir,—I have the honor to inform you that, at a Committee meeting of the Dimbula Planters' Association, held at Dimbula Hall on Saturday, the 3rd instant, a letter was read by me in which I pointed out the great desirability of finding out what acreage of land in Java is planted with cinchona, its variety, and the probable quantity of bark which will be exported from Java during the next two years; as this quantity, if ascertained, would greatly influence operations on cinchona in Ceylon. I had received certain communications from Mr. G. Mundt, President of the Java Planters' Association, which led me to believe that within the time mentioned, viz., two years, Java would export so enormously that the enterprize in Ceylon would be rendered almost unprofitable, as Java possesses trees yielding bark of such superior value to any grown in Ceylon. Mr. G. Mundt said that he had made no personal inspection of the part of Java where the great fields of cinchona exist, but he had every reason to believe that the acreage under that cultivation is enormous.

A resolution was passed requesting me to communicate with you, and ask you to communicate with the British Consul at Batavia, and through him to obtain, if possible, thoroughly reliable information on the subject, which is one of vital importance to the generality of the planting community of Ceylon.—I have, &c. GEO. BECK, Hony. Secy.

Henfold, Lindula, July 7th, 1886.—Local "Times."

INDIAN COFFEE: ITS USE AND ADULTERATION.

North Mysore Planters' Association,
Koppa, 16th July 1886.

DEAR SIR,—The enclosed pamphlet drawn up by the Indian Coffee Planters' Committee comprising representatives from Mysore, Wynaad, Coorg, Neilgherries and Travancore, is now being largely distributed at the Indian and Colonial Exhibition. I should feel much obliged if you could find space for it in one of your valuable papers.—I am, dear sir, yours faithfully, ROBERT BUCHANAN,
Hon. Secretary.

[We have already given the contents of the very useful and timely 4-page pamphlet.—ED.]

CARDAMOMS IN CEYLON AND SOUTHERN INDIA.

Mysore, 16th July 1886.

DEAR SIR,—As many Ceylon men greatly wished to compare their prices with the two premier brands of Southern India, I would draw their attention to page 4 of "Ceylon Produce Sales List" at the end of the July number of the *T. A.*, where by an oversight certain sales of the celebrated M. M. M. (Munjanpulla) and C. C. C. (Cadamoney) have found a place among Ceylon sales.* I have often wished to give you a fair comparison and the opportunity has just occurred. Two and sixpence is equal to seven shillings a few years ago, and this shows the drop, the irrecoverable fall that has occurred in the cardamom market.

* We mean to include India in future.—ED.

It may be good news to your readers to hear that the fancy bleaching has, as I foretold, been found out to be but a superficial excellence. It caught the broker's fancy for many years in the case of the brands above-mentioned as being unique and apparently superior; but it is one of the tricks of trade—just as boiling pepper on the same properties—which have but a limited existence. Now, you ought to invent a dodge to add to the aroma of your already highly-flavoured tea. I hope to hear that salaries have reached more respectable figures, and that commissions on profits have become general. "Muzzle not the ox that treadeth out the corn."—Yours truly, ABERDONENSIS.

[Our correspondent promised to tell us something more particular, about cardamom preparation in India.—ED. C. O.]

ENEMIES OF CROTON-OIL PLANTS.

Wattegama, 24th July 1886.

DEAR SIR,—By this post I send you some beetles and caterpillars taken off Croton oil trees. I find they eat flowers, leaves, tender branches, skin of the fruit, and even tender fruit.

I may here mention that up to January last (some 9 years since I first planted croton) I never saw any insect attack and injure the croton plant or tree.

I had a small patch ½-acre attacked in January which was soon checked by picking the beetle, throwing ashes over, and then shaking the trees when the caterpillars fell off. I purchased some village fowls who soon picked them up and fattened on them.

I quite agree with Mr. Westland that taken in time the damage will not be much, as the trees soon recover. I have another attack of this pest now.—Yours faithfully, J. HOLLOWAY.

[COLOMBO, 28th July 1886.—The caterpillars I do not know. They are probably the larvæ of some small moth. The other insects are not beetles but bugs belonging to the family Scutelleridæ. Length half-an-inch, breadth three-tenths of an inch ground color metallic green, which in some positions has a coppery tinge; three oblong blue-black spots in a line across thorax close to head; three large ones beneath them, with two smaller ones on each side of the row; six large spots on Scutellum in two longitudinal rows with a black pear-shaped line between the four upper spots. The immature insect is of a more rounded form and the black markings are rather differently arranged. They vary in size according to their age. These insects appear to have a wide distribution and are sometimes common in Colombo.—*Entomologist, Asst. Feree*—ED.]

DETERIORATION IN THE QUALITY OF CEYLON TEAS.

26th July 1886.

DEAR SIR,—Many opinions of late have been given as the causes to which can be ascribed the deterioration in the qualities of our Ceylon teas. Many of them are mere conjectures, and, if our teas have actually fallen in rank, from the first teas in the world to a mere average, too many opinions cannot be obtained, if in the end, *one* can be given and proved to be correct.

My own idea is, that far too much is made of this supposed deterioration.

That it may exist to a small extent is perfectly possible, and I think if it does, it is solely and alone due to the vast quantity of leaf now manufactured from immature bushes. But, that it does exist to the extent home dealers would wish us tounderstand, I do not for one moment believe. Dealers in tea are no more exempt from the "customs of the trade," than dealers in other products; and my firm belief is, tea-tasters often, and many of them invariably, suit their palates to the "requirements of the trade."

I never did much believe in tea-tasting; my own little personal experience of London tea-tasters being that on *three* opinions on *one* sample, I had values ranging from 10d to 1s 4d; one reporting "poor thin liquor," and another "rich, etc.," and "considerably above the usual run of Ceylon teas," and all these from supposed competent men.

Tea-tasters' mouths, like other folk's, vary according to state of liver!

To find the reasons for the deterioration of our Ceylon teas, I think we have to look to home. Till within the last twelve months our exports were not much felt in the London market. Our teas were reckoned as "fancy teas" of a high quality and fetched, not fancy, but *real* values. Why are not these *real* values obtained now? I think the reasons are obvious. I repudiate the idea that there is any appreciable change in quality. High-class manufacturers in the island are turning out their teas as before, many of them have no leaf from young bushes to affect them, they manure as they did before, pluck in the same way, and bar that their bushes may be a year older, and their factories fitted up with more approved machinery, no reason, atmospheric or otherwise, can be ascribed to London reports on quality, without going into the "secrets of the trade." It is an extraordinary and significant fact, that the observer of the various marks and prices of our various estate teas cannot help having of late remarked, that while sundry marks have fallen from 2d to 3d per lb., others have hardly altered at all; if not, why not? I fear we are being duped. As a rule, London dealers in Ceylon teas, have been and are dealers in Indian and China teas for years, have vast interests directly and indirectly in the advancement, or at any rate keeping together, of these latter countries and their teas. They find Ceylon imports have increased and are increasing to an alarming extent, and what is natural, they begin to think which business will pay or does pay them best. The advancement of the one must mean the keeping back of the other, and in the equalising of the value they keep the whole business together, *and they keep back Ceylon Teas.* They cannot serve all masters, and so endeavour to make all equal. I think Ceylon teas and India teas may now be said to be very nearly about equal value in Mincing Lane; any way they are fast approaching that end. Are they in reality? Certainly not. Prices for the same article for some time proved this.

Retail dealers have likewise damaged our character; they cannot afford to sell our teas pure and simple; profit on such would not be sufficient, and the means lost of disposing of the cheaper and more paying descriptions. So long therefore as the above goes on I see no prospect of improvement. As Ceylon exports increase we may see a rise in prices, as then it may pay the dealers to give up the one and take to the other, but as business is being done at present our teas, I do not think, will ever again rise to their *real* value. Political disturbances in Great Britain may account for a general depression in all trades but not to the equalising of articles unequal in value.

My firm impression is gathered from facts, and from some commercial experience in E. C. in years gone by. There exists a ring to keep Ceylon teas back, that the said deterioration in quality is a mere humbug and excuse, and that by the few in Ceylon who are in a position to do so, a firm and

determined stand must and will be made to break this monopoly, not only for their own benefit, but for the general good of the planting and commercial interests of Ceylon.

Toward the Tea Syndicate, when I am in a position to do so, I shall certainly give my strongest support. I heartily believe in its proposed schemes, but of its success I am sceptical, simply that so few, not *will not*, but *cannot* support it. I have read several of the papers going the round for signature, and these at once show up in vivid clearness the sad position seven-eighths of the Ceylon tea estates are in. It is what was to be expected. The tea industry has commenced where the coffee ended, viz., in the one word—*involved*. How many good and worthy men must have seen these papers and inwardly thought "I wish I could sign it," —not only planters, but our Colombo merchants. Therein I fear will be the failure of the Tea Syndicate. "Willing to support to the utmost but cannot," must be the reply of quite seven-eighths of our tea estates. No one knows this better than he who advances the necessary and in return demands his necessity. Commissions must be got, the middleman has always lived, and must live, and the public must not be supplied with a pure and unadulterated article to the detriment of an adulterated one. The London merchant will not support a Syndicate to take business out of his own hands; he cannot allow his Colombo agent to support such, and therefore the Colombo agent through no fault of his, cannot allow his constituents to sign away his produce.

What therefore can the one-eighth left do towards supporting a Syndicate which must, if success be looked for, be on a large scale? A *sample* Syndicate will not do, it must be a *stock* Syndicate: can these few, therefore, "Freemen" as I may call them, support solely and alone this new enter prize? Will their entire produce be alone sufficient to stock the proposed experimental new markets? And will they be willing for the good of themselves, and the Ceylon community at large, to risk their all in a new venture? I doubt it. I sincerely trust I may be very much in error as regards the signing of the Tea Syndicate paper by many Colombo friends, and that many in the Fort may be in a position to support so worthy an undertaking. Many of us wait anxiously for the result.

Of the various products shipped from Ceylon, tea is the only one which can pass direct from the producer's chest, packed on the estate to the consumer's bag, across the counter. Could the few Freemen in Ceylon arrange to carry out so worthy and honest a business, I fancy we should hear no more of deterioration in quality of tea. To carry out business of this kind, the few must be prepared for a desperate struggle against desperate odds, but the end must be victory. Various institutions of the kind have been formed, and I suppose their results have been as small and various as their capital and the mixtures they sell.

The sales of pure Ceylon tea at the Exhibition must now come to an end and the more's the pity. If no effort is made to keep up such a laudable trade, results must be disastrous in the extreme. Vile mixtures again throughout Great Britain be sold to the public, and if such were not marked "Ceylon Tea" it would be allright. But they will be labelled as such, and purchasers of Exhibition Tea will come to the conclusion that after all there is something in deterioration of Ceylon Tea. What can be done? I only see one way, the result of a conversation I had with one of our largest and I doubt not free-est Tea producers in the island:—

'Endeavour to form a Company. Capital £20,000 to £30,000. Establish shops throughout the United Kingdom (thank God it is still likely to be united!) From these shops, dispose of only one grade of Tea. Supply such Tea marts direct from the Ceylon Agent or Manager, and supply the consumer direct from the chestbulked in Ceylon.'

All Ceylon planters who can, will support with their entire crops paying a concern. Their Teas must be sent to Colombo, to be valued, accepted or rejected, and bulked there. They can draw on the Company's capital against their invoices, and receive payment in proportion to value put upon their Teas by the disinterested manager and taster, in Colombo. The profits on sales need only be half the profits made by the home grocer, and with no sucking middleman. I fancy to 1s 6d would be a fair price to reckon for their *whole* season's crop, and if they were also shareholders, 15 per cent to 20 per cent would be a safe estimate for their invested capital. Could such a Company be floated under able management in London to begin with, and then in the chief towns of Great Britain and Ireland, and in Colombo, I doubt not every share would be taken up by *outsiders* within a couple of days of the Prospectus appearing before the public. The result would be, I doubt not, similar to the various Co-operative Associations of which so much was written *against*, when they were first established. Purchases could also be made on highly remunerative terms in the local market if supporters' teas were insufficient to meet the demand.

If you consider these ideas worthy of publication I should be glad of their appearing also in your Overland issue*, as through our worthy Planters' Commissioner something might come of them.—

Yours truly,

H. L. FORBES.

CALCUTTA BOTANIC GARDENS, are among the finest of the kind in the world, considerable success has attended the growth of mahogany plants, of which there are 20,000 seedlings. In the Madras Gardens also these seedlings are pushing forward with immence strides. The paper mulberry tree finds a congenial soil in Bengal. It supplies the material from which the *Tappa* cloth of Polynesia and the bulk of the paper in China and Japan are manufactured; and its bark is considered to be among the best of paper fibres. The expenditure on the Calcutta Gardens last year amounted to R69,870.—*Madras Mail.*

COFFEE.—The statistics of coffee cultivation on the Nilgiris usually furnished are stultified by the inclusion in the figures of Waste land, not cultivated, but forming part of every holding. On the Nilgiris, the Government Assessment is charged on the entire area of the estate, including forest and land retained exclusively for purposes of grazing and this introduces the factor of error in all the returns. We have been at some little pains to eliminate the waste from the figures and to give only the actual area covered with full grown coffee. Immature coffee is not deserving of consideration as for some years, owing to adverse influences and low prices, no extensions have taken place. The following will be found as nearly correct as possible:—

			Acres.
Todanaad	...	...	1,720
Parunganad	...	...	5,115
Mekanaad	...	...	2,965
Kundahs	...	...	500
		Total...	10,300

This makes ample allowance for recent abandonments which may be reckoned at 2,000 acres if not more.—*Nilgiri Express.*

* Also in *Tropical Agriculturist*.—ED.

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

PARIS, June 12th.—

Scour in calves has been rather general of late in France and Belgium. An agriculturist writes, that he rears 30 calves yearly, and never yet lost one from diarrhœa; nor has any one who adopted his remedy, viz., when the first symptoms of the disease set in, he makes the calf drink one or two quarts of cold water after it has suckled; if very young, one quart will suffice. Continue this during eight days till the diarrhœa has stopped.

What is the value of the residue-roots and stubble, left behind in the soil after the crop has been reaped? The materials taken from the air and the soil during the development of the plant, are not all exported with the harvest. There remain in the soil some quantities, very variable in chemical richness and amount, following the nature of the crop, and calculated to enrich the layer of arable earth. Phosphoric acid, nitrogen, lime, magnesia and potash are the chief plant-food ingredients left behind. Those crops whose residue contains most mineral or nitrogenous substances, will proportionably be the most valuable. Taking some luzerne, red clover, sain-foin, rye, colza, oats, wheat and barley, and carefully removing all foreign substances from the roots and remnant stems, an acre of luzerne, and red clover will leave of such residue 4½ tons; rye and sainfoin, 2½ tons; wheat 26 cwt., oats, 28 cwt., and barley, 18 cwt. In mineral richness, clover, rye, oats and luzerne respectively, are the best, and barley the worst; while in point of nitrogen, the order is: clover, luzerne, sainfoin, rye, colza, oats, wheat and barley. In both cases, clover is at the top and barley at the bottom of the comparisons. Further; clover and barley leave behind in the soil, the following proportions in pounds per acre, of—lime, 257 and 38; magnesia 48 and 3; potash, 81 and 10; phosphoric acid, 74 and 12.

Hence, the quantities of nitrogenous and mineral matters thus left behind in the form of stubble and roots, is not unimportant, and to be remembered when manuring for succeeding crops. But it must not be forgotten at the same time, these food ingredients cannot be utilized, till the residue has been destroyed and transformed, under the influence of the microbes of the soil and chemical action.

The late M. Bouley, head veterinary inspector, laid down, that the shoeing of horses, was intimately connected with the prosperity of a realm. He classed the "farriers," among the useful arts. It is difficult in any case to conceive, how the "noble animal" could be utilized in civilised countries, on paved or macadamized roads, without an iron-protected hoof. Over natural roads, hard or rugged though they may be, the ordinary growth of the horny shield of the hoof, is ample protection. Should the wear and tear be excessive, why, the animal must be allowed, as with the Boers, to lie by till the horn grows. A footsore horse soon becomes lame, unless in the absence of a farrier, rice straw boots be resorted to, which was the custom in old Japan. Even the Arabs, though their horses have but sandy tracts to patter over, esteem a shod horse, of greater value than one left to nature. In modern horse-shoeing, France has much leeway to make up, and so it is not surprising that a society is to be formed for promoting improvements in farriery. This ought not to be, as the Gauls shod their horses before they were conquered by the Romans, just as do their descendants in modern France today. And it was William the Conqueror who introduced farriery into England. The shoe is the fulcrum, the motive power of the horse. The horny part of the foot grows all the same, whether shod or free; but if the former, it has to be periodically pared to keep it in shape, in harmony with its plate armour. Hence, for working horses especially, the necessity of periodically changing the shoes. The hoof would become disproportionately long, and the grip, the motive power, or sustained balance of the horse, would be deranged. If it be essential not to wear away the hoof quicker than it grows, it is also important to not permit it so to develop, as to waste the animal's power of draught. The hoof is only the covering, the shell or case, over a very sensitive organ. Too often the principle was to rasp the hoof so as to make it fit the shoe. Nature was compelled to be subservient to man's errors. All the art of shoeing consists in making it not a fetter, but a buffer or shield, against extra wear, over artificial surfaces. There are farriers who forget that the fore foot, which is round, is of the same importance as the hinder ones which are oval. French farriers ought to pare less and trust more to the rasp-save for the front of the foot, than the knife. to secure equality of level on both sides. Shoes ought not to be either too heavy or too light; neither too small nor too large. There is also something to be effected in nails and nailing on, and a greater readiness to try new models, no matter whether they be shoes from America or England.

THE COL-IND EXHIBITION.

CYPRUS.—The exhibits from this recent addition to the British possessions are not numerous, but they are nevertheless of very great interest, particularly from an antiquarian point of view. There are, however, comparatively few vegetable products, and these include sections of the principle timber trees, and collections of fruits and seeds, none of which call for any remark except, perhaps, some fine pods of the Carob bean, St. John's Bread or Locust (Ceratonia siliqua), and a sample of a coarse kind of molasses or honey, extracted from them. These dark brown or blackish beans are well known in most towns, and are usually to be seen in small shops in poor neighbourhoods, being sold to children who eat them for the sake of the sugar they contain. About 30,000 tons of these beans are annually shipped from Cyprus, the average price being about £3 per ton. They are principally used for making the patent cattle foods now so much advertised. At one time Locust pods had a reputation for clearing the voice, and were used for that purpose by singers.

An object of especial attention from Cyprus is the native cart, such as has been in use for over 2,000 years, and is still used in the island. Its construction is of the roughest character, the wood being simply hewn with an axe, and the whole put together without the use of a nail.

QUEENSLAND.—This court is contiguous to Canada, and the first things that strike us on entering it are two magnificent trunks of Australian Cedar (Cedrela toona); one of these measures 20 feet 5 inches in girth, and the other 18 feet 8 inches; each trunk is about 14 or 15 feet high, they are said to weigh 5 tons each and are the largest logs in the whole exhibition; they are certainly most noble specimens. A piece of each is cut out in front, and polished to show the grain, which is even, of a beautiful deep red colour, easily worked, and takes a good polish; the wood is very generally used by cabinet-makers in Queensland and New South Wales, as well as in India and Burma, where the tree also grows. The trunks in question were grown on the Blackall Range in the Moreton district. Woods are particularly well shown in the Queensland court; the collection is very complete; they are all carefully selected and are well cut, polished, and labelled, and amongst them are some or more than usual interest, especially amongst the Liliaceæ, Palms, and Filices, such, for instance, as Dracæna angustifolia, Ptychospermia Normanbyi Licuala Muelleri, Dicksonia Youngii, &c. These, of course, are more of scientific than commercial interest, but there are a very large number that should attract the attention of the cabinet-maker. An excellent descriptive catalogue of these woods has been prepared by Mr. F. N. Bailey, F. L. S. (Colonial Botanist), which consists of eighty-six pages, and treats of 427 woods arranged under their natural orders and genera.

NEW SOUTH WALES.—Though the collection from this colony is very extensive, and there are

some fine sections of timber, the vegetable products on the whole are not striking, nevertheless there are some interesting exhibits, for instance, a large quantity of a wooly substance like fur is labelled "Pulse from base of stalks of Macrozamia spiralis," a new product, it would seem, from a Cycadeous plant, used we suppose, for stuffing cushions. A curious and interesing ethnological collection is shown from New Guinea, amongst them several singular wooden drums ornamented with festoons of the hard seed shells of Pangium edule, which are probably used for the rattling sound they would give when shaken, as well as for their ornamentation. One case is filled with the celebrated Cabbage tree hats made from the split and plaited leaves of Livistona australis. They are labelled as being made of "grass grown and plaited by natives;" the price of a single hat varies from 15*s.* to 20 guineas.

WESTERN AUSTRALIA.—The most remarkable exhibits in this court are the marvellously fine specimens and blocks of Jarrah wood (Eucalyptus marginata). A portion of one enormous trunk lies on its side, the cross section of the base of which is highly polished, showing to great advantage the beautiful deep red colour of the wood. A magnificent specimen of curly Jarrah, which has dark, wavy, transverse markings is also shown. It is called a counter top—much too beautiful, however, for such a use—and measures probably 14 or 15 feet long, by some 2 feet or 2 feet 9 inches wide. The woods shown in this court, like those from Queensland, are exceptionally well prepared and polished. Jarrah wood is well known to be the most desirable of all woods for moist or damp situations, indeed it may be said for any situation, as it bears not only changes of temperature without injury, but it also resists the attacks of Teredo, white ant, or any similar destructive agency. As proof of its durability a specimen is shown that has been lying on the beach at Bunbury for a period of thirty-six years, where it has experienced the action of the waves, sun, wind and sand without any apparent injury. Several other interesting wood are to be seen in this court and one notable object is a Black Boy trunk (Xanthorrhœa) 20 feet high—a remarkable specimen, beside which is a fine specimen of Kingia australis in flower.

VICTORIA.—Here, as in the other Australian courts, the products of the genus Eucalyptus are very prominent. Mr. Joseph Bosisto, the President of the Victorian Commission, who has been so long and so well known for his work in the development of the oils and resins of the Eucalypti, is a prominent exhibitor of these products, amongst which are essential oils of Eucalyptus amygdalina, E. globulus, E. oleosa, E. dumosa, E. citriodora, E. obliqua, &c. These oils have antiseptic and disinfectant properties, and that of E. globulus is tonic and stimulant. Here also are cigarettes of the leaves of Eucalyptus globulus, recommended for bronchial and asthmatic affections; Eucalyptus disinfectant pastiles, the fumes of which are said to be of great service in diseases of the respiratory organs, and to have the effect of driving mosquitos out of the room. The resin of the Black Boy or Grass-tree of Australia (Xanthorrhœa australis) is also shown. It is soluble in spirit, producing a deep amber colour, employed in staining wood to imitate Cedar and Oak. It is stated that in Mr. Bosisto's factory in Western Gippsland 12,000 lb. of Eucalyptus oil are annually produced, and as many as six tons of Eucalyptus leaves are manipulated daily. There is a remarkably good collection of Victorian woods, each specimen having a representation of the plant yielding it painted upon it: a slab of Eucalyptus rostrata measures some 10 feet by 3 feet. An excellent catalogue of Victorian exhibits is published by authority in which are many useful notes on the woods and other vegetable products.—*Gardeners' Chronicle.*

CEMENT FOR AQUARIA.—The *Polytechnisches Notizblatt* gives two recipes for a cement for joining glass, wood and metal. The first consists of a mixture of equal parts of shellac and powdered pumice-stone, to be used while warm; the second is obtained by melting ordinary brimstone in a ladle, and adding an equal proportion of powdered pumice-stone. The pumice-stone in both cases must be thoroughly dried before mixing, as it is apt to absorb moisture from the air.—C. W. QUIN.—*Indian Gardener.*

DEWS.—Mr. George Dines, who has made extensive experiments and observations on the formation of dew, finds that the depth of deposit in England in an evening rarely exceeds a hundredth part of an inch, and that the average annual depth of the dew deposited upon the surface of the earth does not exceed an inch-and-a-half.—*Ibid.*

THE WILD POTATO.—The last word has not been said yet, and to all appearance it will take long in the saying. We have before us a communication from Mr. Alphonse de Candolle, in which he contends for the specific identity of Solanum tuberosum and S. Maglia. M. de Candolle finally admits—1. Solanum Bridgesii, to which he refers Baker's S. tuberosum (partly); and 2, S. tuberosum of Linnæus, under which he includes as varieties, *a*, *chiloense*, from the island of Chiloe, and which he considers the nearest to the cultivated potato; *b*, *cultum*, the cultivated variety (as a whole including numerous variations); *c*, *Sabini*, the tuberosum of Sabine in *Trans. Hort. Soc.*, the S. Maglia of Hook. fil., *Bot. Mag.*, t. 6756; *d*, *Maglia* of Baker and others, a Chilian maritime plant. 3. S. Mandoni, a species from the mountains of Bolivia. We shall revert to this interesting communication on another occasion.—*Gardeners' Chronicle.*

RED RUST ON ROSE LEAVES.—Could you tell me the cause of the rust attacking the Rose so early in the season? I have known the rust very often to appear in the month of August, but it is quite new to me so early. Some people say it is cow manure that will breed it, and top-dressing will breed it—we have it just the same, top dressing or not. I attribute the cause of red rust to extreme climatic changes. *F. N. O.* [It is impossible for cow manure or top-dressing to "breed" this or any other fungus. All funguses grow from spores just as flowering plants grow from seeds. Over-manuring may in some instances predispose certain plants to fall before the attacks of fungi, and top-dressing, if it contains dead Rose leaves with the resting-spores (Phragmidium) of red rust, may start the disease in spring. The botanical name of red rust is Coleosporium pingue; it should be looked for in its early state, and hand-picked and burnt. The fungus is unusually common and early this season. Fungi vary in their time of growth, according to the season, just as flowering plants vary. *W. G. S.*]—*Ibid.*

FLORAL DECORATIONS.—The *Indian Gardener*, in an article on this subject writes:—"Amongst our flowering shrubs also we may find much variety; take for instance the many forms of Hibiscus, Ixora, Gardenia, Barleria, Eranthemums, &c. Climbing plants also furnish much useful material, amongst which may be mentioned the Passifloras, Allamandas, Begonias, Petrea, and Beaumontia grandiflora, one of the most beautiful of all climbing plants, and last, but not least, the Antigonons. Ascending yet a step higher we possess a wealth of material in many of our gorgeous flowering trees; take for instance the Indian Laburnum (*Cassia fistula*), Bauhinias, Lagerstörmias and the gorgeous Poincianas. Poinciana regia has been so extensively employed in street planting and in the decoration of public and private gardens in Calcutta and many other parts of India as to have caused many people to become thoroughly prejudiced against it, and it must be admitted that the dense sheet of vivid crimson which a well flowered specimen presents during the months of April and May, has anything but a soothing effect, under the influence of a punkah and the many other luxuries of indoor life this prejudice may be laid aside, and we would strongly recommend those who have never tried the experiment, to employ the flowers from any well coloured specimen, judiciously blended with Gardenia or any other choice white subject using the leaves of the Poinciana for garniture; if judiciously arranged this has a most pleasing effect."

CEYLON exhibits some fine specimens of cinchona bark at the Colonial and Indian Exhibition. Although the best days of this cultivation in Ceylon are now past, it will long be remembered that great energy was given to it not long since, when their supplies flooded the market and brought down prices. At the present time cinchona cultivation by itself does not pay, though it is an important auxiliary. The Ceylon planter also gives much attention to cardamoms. *Burgoyne, &c., Prices Current.*

The MEDICINAL USES OF LEMONS AND ORANGES have often been pointed out and dwelt upon. Some time ago, writing to a leading horticultural London journal, Dr. Bonavia referred to the remarkable uses of some species of citrus in cases of intermittent or malarial fever. For this disease the Italians use freshly-gathered lemons; and the good effects have been confirmed by English doctors in Rome and elsewhere. Dr. Bonavia had tried the lemon in North-west India, both on a considerable scale and with beneficial results. He had stated that for simple intermittent fever, without any other complication, a decoction of lemon was equal to quinine in its effects. Speaking of the depressed state of the lemon trade in Sicily, he had suggested that in the place of allowing the fruit to rot, chemists should endeavour to extract the active principle, and turn it to account. All things considered, its uses being so varied and beneficial, the cultivation of the lemon should be carried on wherever the fruit would grow.—*New Zealand Paper.*

SUCCESSFUL PEACH GROWING.—I am pretty safe in saying that fruit growing is carried on more extensively in Earl Fortescue's gardens at Castle Hill than at any other Devonshire garden, the Pine-apples, Grapes, Peaches and Nectarines, and Figs commanding most attention there. One of the orchard-houses is 325 feet in length. But it is of the earliest Peach-house I wish to speak. This house is a lean-to building, about 30 feet in length by 15 feet in width, and contains four trees, the back wall being clothed with a Dr. Hogg and an Early Alfred Peach, and the roof is almost covered with the growths of two dwarf standards of that good old variety, Royal George, which represent the perfection of training I did not count the fruits on the back wall; suffice it to say there were abundance; but I had the curiosity to record those under the roof, and they numbered just 300, and fast ripening; I enclose one herein, together with some of the finest and healthiest Peach leaves I have ever seen.—W. NAPPER, Alphington Cross. [A very fine fruit. ED.]—*Gardeners' Chronicle.*

A VERY SIMPLE MEANS of rendering all kinds of fabrics which are starched uninflammable, is to add a little sal ammoniac and plaster of Paris to the starch, or to dissolve borax 12 parts, and Epsom salts 9 parts in 80 parts of warm water. The tissues to be prepared are dipped in the solution until thoroughly saturated, then starched in the ordinary way. They are then wrong out, pressed, wrapped in a cloth and passed through the mangle, after which the articles are ironed while still damp, or the necessary quantity of starch can be stirred into the saline solution. Vogt recommends sublimed sal ammoniac, 2 parts; sulphate of zinc, 1 part; water, 15 or 20 parts; and the starch to be mixed with this solution. Siebrath says, good results may be obtained by steeping the dresses in a solution of 5 per cent. alum, and 5 per cent. phosphate of ammonia. Nicol advises a bath composed of alum, 6 parts; borax, 2 parts; tungstate of soda, 1 part; dextrine, dissolved in soap lye, 1 part. The following have appeared in a German journal:—Sulphate of ammon., 8 parts; carbonate of ammon., 2½ parts; boric acid, 2 parts; borax, 1¾ parts; starch 2 parts; water, 100 parts. The fabric to be passed through this mixture boiling hot. Another recipe is:—Boric acid, 5 parts; sal ammoniac, 15 parts; potash felspar, 5 parts; gelatine, 1½ parts; starch paste, 50 parts; water, 1,000 parts. This solution to be applied with a brush.—*Burgoyne, &c., Prices Current.*

WHETHER COWS ARE IN CALF.—"Enquirer" on this subject may try the following, given on the authority of the *American Dairyman*:—"Let a drop of fresh milk fall into a glass of pure water. If the milk promptly disseminates itself through the water, the cow that yielded that milk is not with calf; but if it sinks to the bottom of the glass as it falls upon the water, and does not produce but little of a milky cloud, the cow is pregnant. The specific gravity and viscidity of the albuminous milk being heavier than water, thus retains the drop of milk and causes it to sink." To find if a cow is in calf, the usual method is to thrust the points of the fingers or thumb against the right flank of the cow, when, if the calf is about six months old, a hard lump will be felt bounding against the abdomen; but Youatt strongly objects to the punches that are frequently given by way of trying if a cow has a calf in her—punches which, he had no doubt, were sometimes the cause of difficult or fatal parturition.—*New Zealand Paper.*

TUBEROSES.—The Colonies just now are in the ascendant, and we Britons are about as proud and self-conscious as any old hen and her chicks—and we have reason to be. In these days demonstration is everything. It does not do to read of the battle of Waterloo, that may have been true or not, but we did not see it. Captain Cook may have discovered that part of Australia known as Botany Bay, but we were not there to see him do it. Nevertheless the exhibits at South Kensington furnish proof sufficient even for an examiner, and so we trust the illustration we now give of Tuberose growing in Natal such may afford satisfactory evidence, even to those who have not been there, that there is a colony as Natal, and that the Tuberose is grown there pretty extensively, furnishing employment to Europeans and to natives, and thus contributing not only to the luxuries of the "classes" at home, but supplying also a potent factor in the spread of civilization among the masses, black as well as white. Messrs. Edwards & Bell, of Pietermaritzburg—to whom we are indebted for the photograph whence our illustration was taken—tell us that they have under cultivation more than 12 acres of the "double South African Tuberose," and which is grown chiefly for the London and the Paris markets. Polianthes tuberosa was first mentioned by L'Escluse (Clusius) in 1594, and was probably originally introduced from Mexico. The name of Polianthes is derived from *polios*, white, and *anthos*, flower, and must not be confounded with Polyanthus—from *polus*, many, and *anthos*, flower—a term applied to umbellate Primroses.—*Gardeners' Chronicle.*

ILLIPE OIL FROM MAURITIUS, as shown at the Exhibition is thus noticed by the *Pharmaceutical Journal*.—"Specimens of a white solid fat prepared from the seeds of *Bassia latifolia* (*Sapotaceæ*) are exhibited by M. C. Lienard under the name of illipe oil. This is used in the island as a substitute for lard for cooking purposes. It would probably form a valuable oil for soap manufacture. several of the Sapotaceous trees yielding, like the Shea butter tree, a fat containing a small quantity of a substance resembling gutta-percha, the presence of which prevents the rapid wasting away of soap made with it that is characteristic of the soaps made with coconut oil. In India it has long been used in preparing common country soap. It contains stearic and oleic acids, and another acid said to have the formula $C_{16}H_{20}O_2$. According to Cooke's "Report on the Oils and Oil Seeds of India," it was stated in 1843, by the Director of Price's Patent Candle Company, that illipe oil was worth £8 less per ton than St. Petersburg tallow for the manufacture of candles, but that large quantities could be used in this country if it could be supplied at £35 per ton. The value of the oil in Bombay is about 8s. for the Surat maund of 37½ lbs. The seeds yield about 33 per cent of oil, which after saponification yields 40 per cent. of inodorous translucent stearic acid. The oleine obtained by training, *i. e.*, melting and cooling to a temperature which allows the stearine to crystallize out, is very pure and resembles olive oil in appearance and properties." There follows this statement:—"The curious statement is made under cinnamon wood that the roots yield an excellent yellow dye." Camphor candles as made from a substance obtained from cinnamon roots we have heard, but the yellow dye is new to us.

AGRICULTURAL CHEMISTRY.

The following is the simple result of a comparison of a large number of analyses of soils—good and bad—and plants grown on different soils, to determine what was necessary for ordinary field crops.

All the fertile soils contain the following :—

First—Silica or sand.

Second—Alumina or clay.

Third—One oxide, either of iron or of magnesia.

Fourth—One alkaline earth, either lime or magnesia.

Fifth—One alkali, either potash or soda.

Sixth—One mineral acid, either muriatic or sulphuric, or phosphoric.

Seventh—Vegetable acid, or decomposed vegetable matter.

And in all fertile soils, the fourth and fifth were in such quantities as to neutralize the sixth and seventh. The poor soils either wanted some of the necessary ingredients, or had an excess of acid or alkali. And in all such cases there was an excess of acid, except in one soil there was an excess of soda.—*Nilgiri Express.*

AGRICULTURAL NOTES IN THE CEYLON LOWCOUNTRY.

You correctly interpreted my feelings when announcing that the worthy Director of Public Instruction had anticipated my suggestion that Agricultural instruction be imparted to the villagers. I was very glad at the announcement, and hereby presume, on behalf of the poor *goiyas*, to tender to Mr. Green my best thanks for the interest he takes in a body of men in whom his brother officials in the Revenue line interest themselves only to exact taxes in good and bad years alike. If all officials take as great an interest in the natives of this country as Mr. Green, it will be a happy day for Ceylon.

I would humbly suggest to him that his scheme can be made more comprehensive without any extra expenditure. An Agricultural Instructor will have his time haug very heavy on his hands in directing the cultivation of four acres of land in any one spot. Besides, the *efficient* cultivation of four acres of land by the senior boys of any school will be a task that it will not be wise to attempt, for failure will have a very pernicious effect on a people so conservative as the *goiyas* admittedly are, and who cling so tenaciously to time-honoured customs. My suggestion is that three schools be selected round each centre, and within, say, a day's reach of it, and that to each school be attached about one acre of land. An acre of land will be within the resources of any one village school to cultivate with its senior boys, while the junior boys can be detailed to do the weediug—a very necessary operation in the successful cultivation of paddy. The Instructor can move about from school to school with his Agricultural implements, and impart the necessary practical instruction. If it be not possible to cultivate all four plots in one season, two can be cultivated for the Yalla and two for the Maha crop. By this system Mr. Green will be able to impart the blessings of the proper cultivation of the soil more speedily through the island than by selecting only six schools at a time. I hope Mr. Green will see fit to consider this suggestion.

Any information we may want as to the mechanical improvement of our soils, or the use of suitable manure to add to their fertility can be more cheaply and readily purchased of an Agricultural Chemist. Agriculture in Europe and Agriculture in this Island are widely different. The main branch of Agriculture there is the cultivation of cereals; here perennials. In Europe all the available plant food in the soil is taken up in turns by a rotation of crops; no such thing is possible here. The rearing of stock for breeding and for the butcher, and for dairy purposes is one of the principal sources of income for the British farmer. There is no market for it here. The acquirement of all knowledge is ennobling and useful, but in this utilitarian age, when a money value is placed on it, one may fairly ask whether any branch of knowledge that does not yield adequate results is not dearly bought.—Local "Examiner."

DRUGS AND DRUG SALES.

Whatever may be the results of the Colonial and Indian Exhibition in developing the natural resources of the British possessions, the fact of such resources being brought under the very eyes of the English public must result in some good. In scanning over the trade reports of the London drug sales this is brought forcibly to our mind, when we perchance read that a certain drug is scarce in the market, and all the time we know that the plant furnishing it is very abundant in many of our colonies, and we cannot for the life of us see why such and such a drug should be scarce. Take, for instance, the article *Cassia Fistula* which was reported in the middle of May to be of "somewhat lean quality," and "very scarce," when only a few days previously we had seen quantities of the finest, fattest pods imaginable in almost every West Indian Colony at the "Colinderies," and moreover, there are few trees having a wider range of distribution over the tropics, either naturally or by cultivation than the *Cassia Fistula*, for on account of its handsome appearance, and its freedom in flowering, it is much grown as an ornamental plant. Bentley and Trimen, in their "Medicinal Plants," say of this tree that "it is truly indigenous as well as much planted in many parts of Peninsular India, Ceylon, Java, and the Philippines, growing especially on the lower hills, and ascending to 4,000 feet. In tropical and sub-tropicle Africa it is now found apparently wild in many places, and is possibly indigenous, though usually a planted tree; it is frequent under such circumstances in Egypt. In the New World it has no doubt been introduced, and the beauty and fragrance of its flowers has caused it to be a favourite tree for planting in the West Indian Islands, especially Jamaica, in Central America, and Brazil. The showy flowers appear in May and June, and the large pods are ripe in the following February or March." Considering all this, and considering the ease with which the pods can be shipped, there should be no scarcity of such an article. Again, under Anatto we read that there was at the same drug sales as that quoted above, a fair supply of Ceylon seeds and paste, but that the latter had an "odour anything but fresh, which would not render its use in cheese and butter-making advisable." There was, however, at the sale a quantity of good bright West Indian seed of new import. Here again the exhibits at South Kensington, especially in the West Indian Court, are for the most part remarkably fine and bright, and if it be possible to send such samples for exhibition, it should not only be possible, but planters should consider it a necessity for their own reputation, as well as for that of commerce generally, not forgetting consumers in this country, to cultivate the very best products, and to prepare and pack them with the utmost care.—*Burgoyne, &c., Prices Current.*

[Ceylon could supply any quantity of *Cassia fistula* pods and *anatto* seeds, were there only a remunerative market. *Cassia fistula* the Indian laburnum, now becoming pretty common in Colombo flourishes on the east side of our island and is particularly abundant on the lower ranges of Haputale running down to the Hambantota terai and on the road from Haldamulla to Bilhool Oya. It is difficult to preserve this tree and *Alstonia scholaris*, as the natives strip the bark off both for medicine.—ED.]

LIVERPOOL imported 4,800 tons of Para rubber in 1885, against 4,610 tons in 1884. The total exports of Para in 1885 to all parts of the world amounted to 12,500 tons. The produce of Manihot Glaziovii impored into Liverpool was only 85 tons of most satisfacttory quality.—*Nilgiri Express.*

PALMS AND THEIR USES.

From an article so headed, in the *Indian Gardener*, we quote as follows:—

COCONUT (*Cocos nucifera*).—A palm, native of the coasts of tropical Africa, India, Malay and Islands of the Indian and Pacific Oceans. It is generally cultivated throughout all tropical countries, but thrives best near the sea, and requires no special care. The tree varies in height from 50 to 100 feet, and has long-winged leaves, the so-called nuts being produced in bunches of 10 to 20 or more together. They are of a triangular form, about a foot long, consisting of a thick coat of fibre, enclosing a hard shell, which, with its contents, is known as the coconut. It is commonly said that the uses of the coconut are as numerous as the days in a year, affording food, drink, domestic utensils and materials for building and thatching. In some parts of India and other countries, the white albumen of the nut forms nearly the entire food of the natives, and the white fluid or milk serves them for drink. It also yields wine and sugar. Coconut-oil is obtained by pressing the albumen. When fresh it is transparent, and is then used in cookery. Large quantities of it are imported into this country under the name of copra; the thicker portion, called Stearine, being used for making candles, while the clear oil is used for burning in lamps. The well-known substance Glycerine is obtained in the process of purifying coconut-oil. Formerly the fibre was used for making coir ropes only, but within the last 30 years it has been manufactured into floor-matting, brushes and brooms, and is used for stuffing cushions, as well as for many other purposes. The hard shell is made into cups and other domestic utensils. The wood is known as porcupine wood.

COCONUT DOUBLE (*Lodoicea seychellarum.*).—This may be considered the largest and most remarkable of palms. It is a native of a small group of islands in the Indian Ocean called the Seychelles. It is said to attain a height of 100 feet, its stem being 1½ to 2 feet in diameter, bearing at the summit a crown of fan-shaped leaves. It is remarkable for growing in a socket of hard woody texture, perforated with holes made by the roots. This curious appendage derives its origin from the cotyledon, which in this palm attains the extraordinary length of 2 feet, growing downwards like a root, having the germ (plumule) seated in its thickened end. When perfect, the thick end opens on one side like a sheath, out of which rise the first succeeding leaves of the plant, roots also being produced, which make their exit by piercing the end of the sheath. In time the nutriment of the nut becomes exhausted, and the part of the cotyledon between it and the young plant withers. The latter, however, retains its placental vital connection with the sheath end of the cotyledon, which is henceforth nourished by the plant, and increases in size with its growth, which thus continues seated in the cradle of its birth through life. This formation appears, however, to be commmon to the palms, but very much more largely developed in the Lodoicea. The fruit is a large oblong nut, covered with a thin rind. After the removal of the outer envelope or rind, the fruit has the appearance of two oblong nuts, firmly united together, and often weighs 30 to 40 lb. They are borne in bunches, each consisting of nine or ten nuts, so that a whole bunch will often weigh 400 lb. It takes ten years to ripen its fruits, the albumen of which is similar to that of the common coconut, but is too hard and horny to serve as food. The shell is converted into many useful articles by the natives, but the most important part is the leaves, which are made into hats, baskets, and the like. The demand has of late years become so great that in order to obtain the leaves the trees are cut down, and as no care is taken to form new plantations, it was at one time feared this palm would eventually become extinct. In 1864 the leading botanists in this country petitioned the Government for its protection. By more recent information, however, it appears that in one island alone there are many thousands of trees.

A FEW HINTS ON MANAGEMENT OF TEA PLANTATIONS IN INDIA.

The following hints were written several years ago and as they contain matter which may be generally useful, it is deemed advisable to reproduce them here:—

Treatment of Coolies.—There is a great deal in this. I do not mean for a moment to say you can always keep your temper with them, but in many instances harsh tones are used when absolutely unnecessary and do no good, but a lot of harm, as you will find when you come to having to renew their agreements. There is an art in the management of coolies which few know, or knowing can put into daily use. The following are a few general hints which I do not say are infallible, but which, in my experience, I have found very successful:—Don't bear a grudge against any cooly. If they mis-behave punish and be done with it and never allude to the offence again. In some instances a glass of grog after punishment is a very good thing, and ask the offender when giving the grog why he, or she, was so foolish as to make you angry, &c. Impudence and impertinence check in the bud, command respect by your actions, treat the sick kindly, obtain the confidence of your people, never fail to fulfil your promise, if possible, or explain the cause of failure, deal fairly with your people, demand obedience, and at once check the slightest disobedience of orders. Insist on your system being carried out to the letter and after a time things will work almost mechanically. Kindness in the most of instances will be found successful.

Muster of the coolies.—Insist on every cooly being present who is able to attend and let the sick attend the dispensary for medicine, &c., thereafter; see that you are at muster yourselves. In a few instances I have noticed the *sahib's* absence.

Compounders.—In almost, in fact I may say, in every instance, too much is left to these people, they are inexperienced and as the most of their books are kept in English, I have to request that the European in charge sign the sick list book daily, the same as the *kamjari* and take more interest in the sick, *i.e.*, seeing them oftener, and seeing that they have every comfort in a moderate degree at any rate.

Lines.—The cleaning of these is somewhat neglected. I would like this done without fail every Sunday the coolies have leave; if they were, there would be little to do and the coolies would be healthier themselves.

Weighing of Leaf.—I particularly wish that in every instance the coolies receive pice for extra leaf immediately the leaf is weighed. The system of after payment I do not approve of, neither do the coolies, for all extra work let *ticca* pice be paid the evening the work is done. *Cacharries* only may be paid as heretofore, and you will find your coolies more ready to do extra work when required. This, as far as practicable, of course, your personal attendance at the weighing and disposing of the leaf I expect, when inconvenient let a trustworthy man give the pice.

Papers.—There is yet vast room for improvement in the filing and keeping of these. Some of you are very careless, and will, I am sure, have to pay for your negligence some day. It is very easily done, if done when it should be, *i.e.* immediately on receipt thereof.

Marriage among Coolies.—Before marriage, or as soon thereafter as ever possible, the usual agreement and marriage contract be signed, and in no instance is any one to allow one man to keep two women without my special permission. Of course this does not apply to the past, but to the future. The two-wife system is bad and in every instance leads to squabbling and annoyance.

Withering and Plucking of Leaf.—I am now more convinced than ever that the two great secrets in making fine strong teas are plucking every seven days and withering the leaf well, followed up by proper fermentation, depend the quality of the teas

manufactured more than on anything else, the forenoon's leaf according to the weather and leaf space should be spread very thinly, and *if possible not touched* again until removed to be rolled, the turned about and trampling the leaf while green bruises the leaf, and causes redness, spread what evening's leaf you can thin and the balance thick, short of beating, but I think that medium system bad, the thickly spread leaf would, of course, require to be spread thinly next morning after the rolling commences, or as soon as there is space for it. It is impossible to over-wither leaf short of redness, and you will kindly all remember that next cold weather a quantity of those "hakes" for salonies will be required, as many as you have space for, in fact you can hardly have too many, and see they are ready *before* they are required for next season, things *must* be ready for manufacturing in good time, let anything else be behind rather than firing and withering arrangements. Seven days I do not think a bit too soon for plucking, as the season draws to a close it may be.

Live Stock.—A little more care might, with advantage, be bestowed on the bullocks by feeding them at some place where you can see they are getting what they are supposed to get, and by applying regularly medicines to any sores they may have from time to time.

Manure.—A great deal might be done to collect a quantity of this by throwing in old thatch, jungle, &c., &c., to the cowhouse, this should be done immediately where practicable, as too much time has already been lost this season and there will always be use for it in the cold weather for applying to sickly plants, &c. More attention must be paid to this in the future, as we all know what good manure does to the tea-plant.

Nurseries.—Land for this purpose should be selected without delay, as I want the jungle on the land cut in September next, and the seed put in all nurseries before the end of the year if at all practicable. A good nursery should be put in yearly whether necessary or not; it will always prove useful.

Rice Bags.—Hitherto these have not been looked after as they should have been; no bag of rice should be given from the godown before first obtaining a bag, those who have not a bag must buy one; the bags when empty should be dispatched to the rice supplier to be so filled, with the least possible delay, carefully sewn up in bags or boundles of 30 to 50 each, *i.e.*, in such number as will make a convenient parcel.

Packing and Weighing of Tea.—See the tea weighed yourself personally and immediately enter in a scroll book for the purpose the weights; see the boxes are properly soldered before the tea is put in and the tops of the boxes before the lids are nailed on; there is room for improvement in this too much confidence in the *mohories* often.

Sorting of Tea.—At no stage allow the tea to be rubbed through the salonies; if the tea be damp put it over the *dhools* if necessary, or put it in the sun till dry; when the tea will not go through the salonies freely collect in the hands and give a sharp squeeze and let go at once, repeating this as often as necessary until all is passed through; when any class of tea is uneven you will find putting it twice through the last sieve equalise it considerably *waste* in the picking and sorting which might be avoided by having sufficient cloth and more care in the spreading, those who have not enough of cloth had better get enough at once, it is no loss a few rupees spent for this purpose, it can be the means of saving if properly used.

Recruiters.—I have not yet made up my mind about them quite, but will not send them away before the end of September or beginning of October, and think that other arrangements than those hitherto in force must be made in the way of their remuneration, which may result in our not getting the men to go we would like, but doubtless we will have plenty to pick from, the more time-expired men who go the better, I think, is we are certain of the new and by no means certain of the old. I think a plan somewhat like the following would suit: their expenses, of course, and R3 per head commission for every working cooly they bring and return within 6 months, if not back within six months no pay at all; it is ridiculous their staying away nine months and a year, &c.

Fermentation.—Where there are rolling machines the rolled leaf should be put over the *dhools* immediately the rolled leaf comes out of the machine, and I think by the time the tea is made the fermentation will be found sufficient. When rolling is done by the hand the balls should be the colour of a new copper coin before being broken up and put on the *dhools*.

Rice Account.—See that this account is properly kept you are responsible for this as much as for the cash you get, any loss should be pointed out to me on my visits to the garden, when I will give the necessary orders about it.

Implements.—Great carelessness with regard to these is displayed. I doubt if at any one garden there is a proper account of these kept. I must now ask you to send me an implement account monthly with your accounts deducting any lost or useless monthly. I feel sure that lots of these are stolen and lost and no notice taken of them; coolies or others losing implements must pay for them.

Casualties among Coolies.—These should be notified at once as they occur, this will save no end of bother in making up the cooly returns, &c.

Suggestions.—You would all greatly oblige by carrying out mine when given and I would suggest a note book for that and other purposes; once I tell you a thing I dismiss the subject from my mind, but am often disappointed in finding things left undone which ought to have been done. I do not think for a moment that anything of the kind is done intentionally, but simply from forgetfulness and you would all relieve my somewhat heavy burden *if you would just do what you are told to do;* you can hardly expect me to remind you of every little thing all of you, although I daresay you think that I am pretty ready with my whips !!!! Never mind, shoulder to shoulder is the way to get on with our work and you will all admit that the "whips" are often required long before the question is put.

In conclusion.—Be careful of your health; the most of you when wet might change a little sooner and when not feeling very well take medicine to prevent illness—prevention is better than cure. Wishing you all well, nothing would please me better than to see you all prosperous and with all the "whips" believe that you have a friend in the undersigned,—THE OLD BOSS.—*Indian Planters' Gazette.*

THE TEA ENTERPRIZE IN NATAL

is thus noticed in the London letter of the *Indian Planters' Gazette*:—

This week I am in a position to add to my remarks of last week upon Natal tea, the following information obtained at the Natal Court of the Colonial and Indian Exhibition, through the courtesy of the gentlemen in charge of the exhibits of that Court, Mr. Morton Green, who took great pains in supplying me with the necessary details. It appears that tea-planting has made greater progress in Natal than might be supposed from my last letter, though it is still in a very tentative condition with the exception of Mr. Hulett's venture. Roughly speaking, tea-seed was first obtained some ten years or so ago, by a Mr. J. Brickhill, an old resident, much interested in trying various experiments. This seed he planted in his garden and for years confined himself to the cultivation on merely a garden scale, making sufficient produce to supply his own domestic requirements. Having the reputation of being a theorist, his little experiment attracted but little attention at the time. Gradually, however, as his guests became assured that the tea he drank and offered them was really of his own growing, the idea dawned upon one or two

other residents in search of the great desideratum of Natal—a good export article—that this might after all be found in tea. Mr. J. L. Hulett, M. L. C., of the Kearsney Estate, Natal, was one of the first, is not the first, to take the matter up seriously. Mr. Green informed me that Mr. Hulett is most enthusiastic as to the future of the industry, also that though Mr. Hulett is anxious not to allow it to be inferred that he has any idea of parting with his property, or even with an interest in his plantation, he his ready and most willing to give every information and reasonable assistance to any one who may feel disposed to try tea-planting in the colony. It appears that there are no practical tea-planters employed in Natal and therefore the reason for remarks last week, *re* want of technical skill in sorting, as evidenced by the samples on show, is not far to seek.

The estates are all apparently too small as yet to pay for a skilled planter's supervision of the manufacture, seeing that local science is fully equal to the mere requirements of planting and cultivation. So far as these are concerned, the numerous photographs on view at the Exhibition speak very favourably, both as to the method adopted and the state of cultivation. In the manufacture, however, there is much to learn. Need I say more on this point than that a considerable number of samples were sent over in brown paper packets—not by Mr. Hulett—and as if this were not enough to make a planter's blood run cold, without a particle of inner lead or foil lining!! Tea has been tumbled into, and the lessons of experience are all being acquired at first hand. The marvel is that the estates should present the remarkably neat and technically excellent appearance they do. The Natal planters are decidedly men of independent judgment and it is a trifle amusing to note one or two evidences of this, as showing how little beholden they are to Indian experience and how completely they ignore trade prejudices. One tea garden's proprietors, Messrs. Clayton and Ashwell, of the Island Farm, Stanger, Natal, have a printed circular for distribution at the Exhibition. I enclose a copy for your own verification of the following quotations. This circular is signed by the "London Agent" of Messrs. Clayton and Ashwell, his name being, "E. J. Clayton, Cobb's Court, Carter Lane, London, E.C." This gentleman's name not being familiar to me in the tea market here, nor his address that of a Lane neighbourhood, I was puzzling over the matter when my attention was attracted to the imprint on the back of the circular, which reads, "E. J. Clayton, *Printer*, Cobb's Court, Carter Lane, London, E.C." Experience and trade prejudices (may I assume from this) are deemed as of little importance at the London as at the Natal end of the string. My assumption will be justified in planters' minds by the following quotation from this interesting circular:—

"In order to secure an independent *status* for their teas with the home consumers, Clayton & Ashwell have resolved to dispense with the process of sifting, and to pack but one quality, which will thus combine the delicate flavour and aroma of the finest Pekoes manufactured, with the stronger (sic!!) and colouring qualities of the Souchongs"(!!) Can't one picture an Assam *Chabungalow-sahib* singing, Oh! Happy land! from all percentage free! The idea is not original, and for small quantities may pay, but for large quantities the trade requirements as well as prejudices will render the plan impracticable. The scheme is conceived in error and will tell in the long run against Natal, if carried out for some time by outsiders, as it will prevent the tea becoming known in the trade and will deprive it of the trade interest. This result is fatal, in the present state of competition, unless Natal proprietors are prepared to spend huge fortunes in advertising. The next illustration of the independence of judgment to which I have alluded, may be taken from the selection of machinery made by Mr. Hulett for tea-rolling and drying. Instead of acting upon the results of Indian experience he has preferred to start with machinery practically unknown to tea-planters except in the case of one Sirocco. I do not blame him for this, as his reasons may have been good ones, and he appears pleased with his selection, according to my authority *The Natal Mercantile Advertiser* of the 14th April. From an interview published in that paper I cull the following items. The Kearsney Estate, belonging to Mr. J. L. Hulett, is 5 miles beyond Stanger. The massive block of gum trees on the estate, situated on a prominent hill, is a landmark for several miles, and is said to be visible from Amatikula, Zululand. In the upper floor of the tea-house which floor has a superficial area of about 5,000 square feet, the withering is done, assisted by a Greig's withering and drying machine. The tea is rolled in a Greig's roller. The other machinery consists of a Sirocco and sieving machine turning out four qualities. The engine is a horizontal one of 12 H. P., the boiler being multitubular and placed outside the building. The bushes appear to reach an Assam growth. One tree measures 10 feet across its flat top, others are close upon that size. Mr. Hulett has about 130 acres planted out under tea. About one-half of this area "has been plucked," but most of it has been "tipped." Off the estate Mr. Hulett had made at the time of the interview 34,000 lb. and expected to get 41,000 lb., estimating the area of trees over 2 years old at 65 acres, which is the age at which they appear to commence regular plucking! This gives an allround average of 600 lb. per acre for young and old, and leaves 2,000 lb. for the tippings from the under 2-year-old bushes, on 65 acres. Not bad, and if true will take the conceit out of some of the best Assam gardens, age for age. The interviewer, however, somewhat qualifies these figures by adding the note, that they may be corrected by Mr. Hulett, so as yet they must not be accepted as authorised. Round the Kearsney Estate is a complete ring of tea plantations, the proprietors of which own among them some 800 acres of land, not yet, however, all under tea. Mr. Hulett by no means confines his enterprise to tea cultivation and the following quotation from the interview alluded to above, will go towards proving the suitability of the climate for tea. Mr. Hulett grows in orchards, orange trees, lemon, loquot, Brazilian cherry, apple, guavas of all varieties, nectarine, peach, vine, jack-fruit, mangoes (several kinds), roseapple, pineapple, &c., while in the lower orchard are limes, quinces, &c. Oranges and mangoes are produced by hundreds of thousands, pine apples and loquots by tons, and so forth. The preserved fruit industry of Natal is making great progress and some of the guava jelly I have lately tasted is better than any I have tried in India. Chutneys (mango and other) are also well prepared.

The following proprietors are also exhibiting samples of Natal tea. Mr. J. Brickhill, Umbilo Estate; Mr. S. E. Large, Mid-Illovo Estate; Messrs. Lyle and Reynolds, Kirkley Vale; &c., &c.,

I have been promised that three samples of tea from Mr. Hullett's estate shall be packed and soldered down, and handed me on my next visit to send out to you; as I thought it might prove of interest to your readers, were you to get three brokers to taste and report upon these samples, in committee, or independently, as you think best, with the object or publishing their reports. For these samples, as for much of my infomation, I repeat, I have to thank Mr. Green to whose energy and method the chief credit of the excellent arrangement of the Natal exhibits is also due. Natal Exhibitors have certainly every reason to be satisfied with the hearty and intelligent way in which he does all that man can do with the utmost patience, to advance their interest. He gave a glowing account of the climate of Natal, which he described as not excessively hot even in the districts suitable for tea, "and then there are the highlands approachable by railway, as far as Pietermaritzburg, which is already at a considerable elevation, and after that, the post-cart will convey the traveller in search of a spell of temperate climate to the hills themselves where wheat is cultivated, and where frosts are not unknown." He further added that Mr. Hulett is of opinion tha

a small capital will suffice to begin with in tea-planting, as if the young man is worth anything he will soon live off the produce of his land, farm and orchard, whilst waiting two years for his tea bushes to come into remunerative bearing. Two years is, Mr. Green assured me, the age at which tea in Natal commences to be remunerative!

Since writing the above I have, with two brokers, tasted a small envelope sample of the Broken Orange Pekoe I brought with me from the bulk from which I have asked that a sample should be prepared for you. Alas! though crisp and to all appearance sound, it is musty, so, as this involves a further visit to the Exhibition and another trial, I am afraid there will be some delay in sending you out your samples.

Labour averages from 20 to 25 shillings *per mensem* and the labourers are fed off the "meahes" (Indian-corn) &c., produced on the estates. Some acquaintance with the language and habits of the people has to be acquired to start with, in order to arrange for the constant changes which take place, and also to ingratiate oneself into their good opinion, which latter once gained, is productive of faithful service. The natives soon after the newcomer's arrival, bestow a characteristic native name upon him, and this name counts for much; if it has any bearing upon medicine, so much the better for his *prestige* and influence. The native women do not work at present.—PERIPATETIC PLANTER.

MUSHROOM CULTURE.

Is thus noticed in the proceedings of the Horticultural Society of India:—

Some fine mushrooms, exhibited by Mr. H.W. Newton, for which a special prize was given at the Society's annual show, attracted so much attention and enquiry, that Mr. Newton was asked to favour the Society with a few notes as to the culture he adopted, which he very kindly responded to as follows:—

"Directions taken from a short pamphlet on the growth of mushrooms, published by an eminent English Firm (whose mushroom spawn has been celebrated for many years) modified to meet the requirements of growth in lower Bengal.

My method of raising mushrooms is a simple one. I grow them in the open, but a dark cellar is preferable. I make a bed 16 or 18 inches deep, which I fill up with short horse-dung after exposing it to the sun for two or three days to allow the moisture to evaporate. The bed should be well beaten down to retain the heat, and when the temperature is down to 85 or 86, it is fit to spawn. The spawn bricks should be broken to pieces about an inch or an inch-and-a-half in size, and placed in the dung at intervals of say 3 or 4 inches. The bed should then be covered over with 2 inches of fine sifted garden mould and well beaten or trodden down. Generally the mushrooms appear in about 6 weeks to 2 months from time of spawning the bed. If the bed should become very dry, it may be watered, but water should always be sparingly applied. It should never be given in great abundance at one time; still mushrooms like a moist fixed temperature, which may be produced by occassionally damping the walls, floors, &c."

At the meeting, Babu Pratapa Chandra Ghosha made some interesting remarks on the subject, which he was requested to embody in a paper on the subject, to be published with the Proceedings:—

NOTES ON MUSHROOMS.—The delicate appearance of some of the edible fungi has from time immemorial tempted man to use them as articles of food. As it is always difficult to distinguish the poisonous from the edible varieties, the Sastras have enjoined a wholesale prohibition of the use of these ephemeral esculents. Nevertheless the use of Mushrooms as an article of food is as old as Manu, the Lawgiver. It is still used extensively in the dry regions of Bengal, and also in the valley of Kashmir. The varieties known in Bengal are the following:—

1. Phudki-Chhatu (the small and the large); 2. Puwal-Chhatu; 3. Kádán-Chhatú; * 4. Durga-Chhatu 5. Urji-Chhatu; 6. Kud-Kudi-Chhatu; * 7. Kat-Chhatu; * 8. Govar-Chhatu; 9. Indu-Chhatu; 10. Pachan-Chhatu; * 11. Kondka-Chhatu; 12. Gundura-Chhatu.

Of these, those which are marked with an asterisk, *i. e.* No. 4, 7, 8 and 11, are considered unfit for food. None of the above named 12 varieties of truffles and mushrooms are cultivated in Bengal. Indeed, the cultivation of these ephemeral vegetable growths is unknown. Some, however, attempt to raise a few poor specimens of the 2nd variety, Puwal-Chhatu, by allowing waste paddy straw to rot in a heap, and depending on chance for the germination of these fungi. It is not known to the cultivators of Lower Bengal that these esculents may be reproduced by their spawns.

Of all these varieties Urji-Chhatu, is considered as the most delicate in flavour. They are found generally under ant-hills or dhipis as they are called. In the Bankura and Birbhum districts, these are collected by the low-caste-dwellers of the forest known as *Buno*, and sold to the villagers in exchange for rice, tobacco or salt. A kind of *Pelao* is made with these fungi, and I must acknowlege that they are not at all inferior to Pelao made with meat. In the Kashmir Valley the Guchha is much used. This fungus has the closest resemblance to the truffles of Europe. It is sold in the Kashmir shops in a dry state, and the older the article the greater is its value. The Kashmirians seem to be aware of the fact that the objectionable properties of fungi are minimised by keeping. Fungi growing on cow-dung, and those with dark stems are considered as poisonous. The idea of raising truffles and mushrooms on beds of horse-dung or any dung whatever is most repugnant to the feelings of the people of this country. But it is otherwise elsewhere.

The "Dublin Gardner" for 1883 gives a latter of Mr. Barter in which the advantages of mushroom culture are fully set forth. A mushroom bed of less than an acre in area is reported to have supported 4 families, *viz.* the lessee of the ground and 3 familes of workmen, each of whom received wages of £1 a week. The rent for an acre of land being £12 per year, the grower expecting upwards of 5 tons of the esculent vegetable, which sells at the rate of 1 shilling per pound. Reports are also given of the result of sowing a bed 20 yards long by 2½ feet wide with mushroom spawn. In one gathering the yield weighed 160 lb. Another bed 25 yards long and 2½ feet broad yielded at the first gathering, good marketable mushrooms, 76 lb. in weight. In the second gathering the yield attained its maximum of 200 lb. and in the 3rd gathering which was at an interval of a week, the yield was 80 lb. It will thus bee seen that in 3 weeks this small bed yielded 360 pounds of mushroom, or vegetables of the value of £18 sterling. The beds were in all these cases formed of stable refuse evenly spread in a covered place, the temperature of which was preserved at an uniform standard. It is needless for me to note that the cultivation of the edible fungi has proved to be a very profitable and easy business.

The prospects of gain as well as the utilising of subterranean caves which are lost to the world except for the entertainment of the curious, have induced Mr. H. C. Haney to draw the attention of the American authorities to introduce the cultivation of mushrooms in some of the galleries of the Mammoth cave. He recommended for this purpose the avenue known as "Auduleon's Avenue," which is nearly half-a-mile long, and in which the temperature remains even, almost throughout the year; this avenue, together with that portion of the cave which was formerly resorted to by consumptive patients but now abandoned, and which is known as the great Bat-room, is pre-eminently suited for the cultivation of mushrooms. The accumulated guano of bats was considered to form a desirable bed for the nourishment of the spawn.

Thsi proposal was brought to the notice of the public in 1882, and ever since, portion of the cave mentioned above, has been yielding mushrooms by tons. Cultivation of mushrooms in subterraneous caverns is not confined

to America. The caves at Montrouge have 6 or 7 miles run of mushroom beds, and they give a daily yield of 400 pounds of fungi. The cave near Frebilion on favourable days has been seen to yield so much as 3,000 lb. of mushrooms to the Paris markets, and the beds from which this enormous supply is raised, measure nearly 16 miles in length. The cave at Mery belonging to M. Renaudot, in 1869 was reported to have had 21 miles of beds under cultivation. The produce gave occupation to several houses in the neighbourhood, one of which was said to export 14,000 boxes of dried mushrooms to England.

The procedure usually followed in underground cultivation of mushrooms about Paris is as follows:—Long narrow beds of stable refuse (dung) are carefully spread, and all bits of horse-shoes, and broken nails, are carefully picked out. In dry weather a small quantity of water is sprinkled on the beds, and then the spawns are squeezed on them. In a few hours the beds are covered with this excellent vegetable. It has also been observed that the presence of a small bit of iron or old nail seriously interferes with the germination of the fungi. For further particulars on this point the reader is referred to the article on Potato and its Culture, which appeared in the Journal of this Society for 1871, vol. 2, part II, pp. 304 and 305, and also to Mr. Broome's paper on Truffles in the Journal of the Royal Horticultural Society for 1886.

Mushroom cultivation is a simple and profitable business, and the mushrooms, if properly cooked, are considered as one of the daintiest nitrogenous food. But there is always some risk in the promiscuous use of the article. In New Zealand large quantities of mushrooms are grown under the shade of felled trees for exportation. The books give the following as the edible varieties of Mushrooms and Truffles:—

1. Agaricus campestris. This is the ordinary mushroom which is grown in the subterranean beds of Paris. 2. Tuber Æstivum (Truffle); 3. Agaricus proceus; 4 Agaricus ostreatus; 5. Agaricus melleus; 6. Agaricus orcella; 7. Agaricus primulus; 8. Marchella esculenta; 9. Hydnum repondum; 10. Fistula hepatica; 11. Coprinus coneatus; 12. Maramunius oreades; 13. Boletus edulis; 14. Lycoperda giganteum (Young).

But there are others which, to an ordinary observer, appear so very like the above, that they are often mistaken for them, and their use has been seen to be followed by most deplorable results. The last number of the "Scientific American" supplement, January 9th, p. 8357, gives some of the characteristics of this "King of Mushrooms," (Agaricus procerus) and the best mode of preparing the same for the table; for a great deal depends on the kind of treatment which a mushroom receives before it reaches the table. For further details and original information on the point, the reader had better refer to the illustrated article mentioned above.

Some thing ought to be said about the poisonous nature of the great many varieties of mushrooms. M. T. A. Palmer, in the "Moniteur Scientifique" for 1879 says, that there are three ways in which the poisoning takes effect—

1. *a.* It acts as an indigestible matter, which occurs in the case of coriaceous species.
   b. Some of the edible species when decomposing emit sulphuretted hydrogen in such a sufficient quantity in the stomach as to cause vomiting.
2. *a.* Gelatinous.
   b. Acrid.
3. Those which contain a subtle alkaloid, known as or similar to Amanitin. This poison has no antidote. In its action it is at first slow, but in 8 to 15 hours it causes stupefaction, nausea, diarrhœa, delirium and death.

It has been ascertained that mushrooms containing Amanitin impart the poison to better varieties if they are placed in the same vessel.

To cure suspected varieties, Professor Ponfick, of Breslau, recommends repeated washing with cold water, which he says removes, to some extent, the poisonous alkaloid, but boiling, he believes, removes all. The water in which mushrooms have been washed or boiled is poisonous, and should always be thrown away. While on the mushrooms, it would not be out of place to invite attention of members to the phosphorescence of some fungi. Tulsane, who has written a great deal on luminous fungi, describes the following as the most common:—

1. The "Foxfire" Agaricus olarious of South Europe.
2. Agaricus igneus of Amboyna.
3. Agaricus Gardeneri of the province of Gayaz, in Brazil, which appears on dead leaves, and which is known as Flor de coco amongst the people there.
4. Agaricus lampas of Australia.

Dr. Hooker describes this luminosity as common in the Sikkim varieties, and the light emitted by some is so strong, that Mr. J. Drummond, writing from the Swan River, states that he was able to read a few lines of a newspaper by placing on it a specimen of the same. Rev. M. J. Berkley, in *Gardeners' Chronicle* describes an Andaman variety, the Agaricus emerici as giving light at night. The Thelephora phosphora and the Polyporus sufurus are the most luminous amongst the American varieties.

Most Mushrooms while decaying have been seen to emit light, but this is generally accompanied by some chemical change which turns the mushroom blue when its head or stem is broken and exposed to the air On this subject Schoenleen says that the resinous principle of the mushroom does not seem to possess the power of coloring itself, except so long as it is in contact with the parenchyma of the plant. M. Müntz in the "Chemical News" for 1874, states that fungi placed in oxygen evolve or emit carbonic acid gas, but if oxygen is excluded from them, they produce a considerable quantity of hydrogen.

It would not be out of place to mention that the force evolved by a growing mushroom is enormous. The soft and esquilent bulbous vegetable has been observed in its growth to evince such an amount of vigor and energy, as to prenetrate and burst open a flooring of asphalte, and gravel about a foot thick in a few hours. The case is recorded in the *Scientific American* for August 26th 1882, in which the floor of a grain elevator in Buffaloe, N. Y., was burst open by a stem of a mushroom two inches in length.

CITRON CULTURE IN CORSICA.—The Citron seems to be the most important article of trade in Corsica. It is stated to have much improved of late, after some years of stagnation. The 1885 crop was very large. About one-fourth of the annual produce is usually exported to England in brine, to be there manufactured into candied citron. The remainder formerly went to Leghorn, to be manufactured for Holland and America, but two large preserving factories are now at work at Bastia, and the whole of this important manufacture will probably be carried on in the island in future.—*Gardeners' Chronicle.*

CINCHONA CULTURE IN JAVA.—We call attention to Mr. Christie's letter and reassuring information on page 167. Mr. Beck has been telling us that he thinks Mr. Mundt made a blunder in converting his "buows" (1¾ acres each) into acres; but he says truly enough that even 20,000 acres fully stocked with 6 and 7 years old trees yielding bark with 5 to 8 per cent quinine, would tell heavily on the cinchona market as the crops began to come in. There is a report of Java bark yielding up to 10 per cent, having been sold lately by private sale in England.

UTILISATION OF SAWDUST.—It is at times difficult to find any use for sawdust, but the following is a way of deriving advantage from it:—Water is added, up to a degree of plasticity; the mixture of one to three parts of resinous sawdust and one part of washed kaolin is ground and pressed by means of a press. The lumps thus obtained are dried in the air, then placed in a stove, and, lastly, vitrified in the ovens under white-red temperature. These blocks can be sawn, planed, and polished in the shape of incombustible bricks, which are used in America for building houses.

Correspondence.

To the Editor of the "Ceylon Observer."

CINCHONA IN JAVA:

THE EXAGGERATED STATEMENTS REGARDING THE EXTENT OF CINCHONA CULTURE IN JAVA ATTRIBUTED TO MR. MUNDT.

St. Andrew's, Maskeliya, 30th July 1886.

DEAR SIR,—That there has been some great mistake in connection with Mr. Mundt's statement quoted by Mr. Beck, regarding the acreage of cinchona in Java, the annexed extracts show. They are taken from Van Gorkhorn's "Cinchona Culture" published in 1883.—Yours faithfully,

THOS. NORTH CHRISTIE.

(Extracts referred to.)

"The produce of the plantations of the Dutch East Indian Government exceed as yet that from all the private growers together in Java. In the meantime these last are continually extending and within a few years the relation may be reversed, and we believe the exports from Java will exert a certain influence upon the cinchona trade even of the globe. The private speculations are still quite young; a few only, Kramang, Buitenzorg and the Preanger, on the private estates of Pamanochan, Tjasem and Tjiomas, and the baschold estate Maspada, possess important exportable plantations. * * * The culture in Java as regards extent is not to be compared with that of British India or Ceylon. Whilst in the former we reckon plants by the hundred-thousands, in the latter they already reckon them by millions. * * * On the other hand the results of the Government undertaking are attracting more and more the attention of the landowners, and from various quarters there constantly come requests for plants and seeds. In 1874 for the first time, a plot of waste land was requisitioned, specially for cinchona culture. From day to day this occurs in the Preanger, already there are perhaps twenty plots worked with that end in view, besides others still whereon coffee or tea is cultivated as well as cinchona. For five years past, direct encouragement has not been required, rather it may be said that a temporary exaggeration has prevailed, resulting in a feverish hunt for lands. * * * According to the Colonial return of 1879-80, 26 leaseholders are busied with cinchona culture in Java, 9 as the chief concern, 17 as subsidiary. We cannot consider these returns as complete."

ENEMIES OF CROTON-OIL PLANTS.

Watagama, 31st July 1886.

DEAR SIR,—Since sending you the caterpillars and beetles which attack the croton-oil plant, eating the leaves, bark of tender branches, the outside of the fruit pods and even the young fruit, I have reason to alter my opinon in treating them as a small enemy: the attack by this new pest was this time over an entire field of eight acres in different parts. I did all I could at first to destroy them, but their numbers were millions, and I had to let them have their own way; at least I thought it cheapest at this time as crop was about all gathered and I intended to cut down a lot of the trees (as my shade was too thick). After this crop was over in a week's time the whole eight-acre field was under bare poles, not a leaf left on the trees and even the bark eaten off from all small branches. Yesterday I sent you the moth of the croton caterpillar of which there are thousands now flying about, most difficult to catch This is a sure sign the next attack will be worse than the last; so there is nothing for it, but to cut down the trees and keeping them down until next attack is over. The question is will the caterpillar attack any other plants or die for want of food? They did not attack any other plants or trees except keppettiya shrub and trees, which they treated same as the croton-oil plant. From what I can ascertain from the Sinhalese, it appears this caterpillar is an old enemy of the keppettiya tree (the leaves of which is much used to manure betel-vines, and wood for the charcoal used by the gold-smith), and makes its appearance in great force about once in ten years and then after twelve months or so disappears again. It is to be hoped such is really the case: there are other croton fields in this district which have not been attacked as yet. I now send you a moth found with its eggs on a tea leaf (?).—Yours truly, J. HOLLOWAY.

DETERIORATION OF CEYLON TEA.

Watagama, 1st Aug. 1886.

DEAR SIR,—The subject of the deterioration of Ceylon teas has of late given rise to voluminous correspondence, and it has been accounted for by many ingenious theorists. I am amongst the number of those who are profoundly sceptical on the subject, and, therefore, I take the liberty of addressing you. Of the fall in prices for all teas, Indian and Ceylon, we are too well aware; the question is whether, owing to climatic influences, deterioration of soil, or ignorance or carelessness on the part of tea makers, the teas now being sent from Ceylon are of inferior quality to those sent away in previous years. I question this very much indeed, and without some satisfactory proof, the onus of which lies with those who make the assertion, there is reason on the side of those who decline to join the present chorus. A very large amount of tea is now being made from leaf picked off young bushes, and on many old estates the leaf from young land is now being mixed with that gathered from the old fields. Such leaf, as we all know, a large proportion of it frequently bangy, will not make good tea. I have it on the authority of one of our best known tea-makers, who sees a great deal of the country, that by a strange coincidence last year several of the best known estates pruned late and pruned heavily, and as we all know well, whilst the best teas are made before a heavy pruning, the worst teas immediately follow it. Now the chief complaint appears to be of the irregular *fermentation*, the London correspondent of the "Times" stating that "various samples after liquoring showed the leaf of a deep dirty brown instead of the bright copper hue which well-made tea should invariably possess." Now this statement I cannot agree to, leaf from young bushes recently topped, and the early pluckings from heavily pruned tea will not ferment satisfactorily, and no amount of skill or care can get a "copper-coloured infusion" from it. That amongst the numerous new marks appearing in the sale lists everyday, there is much undesirable tea of faulty manufacture I would not deny for one moment, but I question if many experienced tea planters can say that they find that *with the same leaf* they cannot and are not making as good liquoring teas this year as last. It is quite probable that in many places, where firing machines have just been erected, some of the earlier breaks, before manager or coolies have mastered the working of the machines, may show traces of overfiring. It is probable also that this evil is aggravated by an attempt on their part to get the machine to work up to its advertised capacity. Coarse plucking also has in many cases been adopted by those who went into the market with fine teas to make a name for the estate. A few cases of inexperience and change of system apart, I challenge the assertion that under similar conditions equally good teas are not made this year as last. We have had no *proof* whatever to the contrary merely the

ex cathedra statements of certain brokers who may or may not be exaggerating the effects arising from the causes previously indicated. At this juncture, Mr. Gow, a gentleman of many years' experience in Mincing Lane, and previously in Assam I believe, comes amongst us and condemns the whole system of working tea in Ceylon from the plucking to the packing it is said. Those who put faith in such sweeping condemnation of the island industry can hardly remember that up to quite recently, with a few exceptions, the manufacture of Ceylon tea was pronounced perfect or nearly so, whilst the present system of pruning and plucking as generally practised are the outcome of several years' experience of our soil, climate and bushes. That we have all much to learn no one will deny; readiness to avail himself of the knowledge and advice of others is characteristic of the Ceylon planter, but on the other hand we have learnt much and gained great experience since tea was in its infancy, and a stranger should be very diffident in his criticism till he has learnt something of the peculiarities of the object of it. I must apologise for the length of this letter, and will close it with an expression of belief that in a very short time, the tea from mature gardens will be of as high a standard as ever, without any radical change in our methods of working, whilst young gardens will improve as bushes get more fully formed and experience is gained.—Yours faithfully, T. C. OWEN.

II.

Rookwood, Hewaheta, 2nd August 1886.

Dear Sir,—I have been asked to make public my opinions as to the cause of the falling-off in our teas this season, which opinions I have often expressed to friends. I gladly do so and trust they may lead to discussion for the good of all concerned.

I have always admitted there has been a slight falling-off, but I will not admit there has been a serious one, or that we have any cause to fear for the future of our staple :—

1. The article sold has always its share of blame in a falling market, therefore a low market this season is partly to blame for the crying down of our liquor.

2. Some few marks in Ceylon have plucked above their standard, thinking at the time not so much of their nett profit per acre as of obtaining a higher price in the market than their neighbour, and why not? when they were only "playing at Tea." Now with larger acreages and an estate entirely dependent on Tea, the style of plucking which gives the best results per acre in returns is studied, and not the highest market average, if this is beyond their legitimate standard. I years ago stated in the various districts I visit, that as all soils and all climates were not equal, even on estates with a common boundary, so all Teas could not show equal value, if the best was to be made of the estate, and that it was our first duty to endeavor to discover our best paying standard yield with a certain average price, and *to stick to it* allowing our neighbour to get his 1d or 2d more per lb. without regret.

3. *Manufacture* has a little to answer for with some new marks. A little knowledge is a dangerous thing; our novice tries to "get color" when his leaf is not in a fit condition to give it; result, over fermentation, giving a thick dull liquor flavourless and sometimes verging on rottenness.

Over-fired teas, more especially *with choolah firing over charcoal*, or burnt teas.

Our novice generally tries to pack away his teas into bins roasted to a degree, and this is how it happens, working his sirocco at too high a temperture with too little roll on his trays, and not turning his roll often enough. Or with charcoal firing—and this mode of firing is the chief cause of burning with the novice—over-firing his fine teas from not sifting often enough, and lighting the fires in the choolahs themselves, instead of putting in live charcoal, from an *outside* furnace; result of dead charcoal in the choolahs, a smoky flavor, want of briskness in the liquor, and with the greatest heat in the choolah at the most critical time just as the firing is being finished, burnt teas. The choolahs should be charged with red-hot charcoal, and kept at the same temperature throughout the firing. The hand should never enter the tray while it is over the fire or fine tea falls through and smokes that in the tray;—another hint for the novice.

4. *Plucking*—Cruel treatment of the bush early in the season from over anxiety to get in large pluckings when tea bush has not matured sufficiently after pruning, to give the yield asked;—first pluckings after pruning result in poor thin liquor as a matter of course—and by thus pushing the bush prematurely we have unhealthy wood to work on during the rest of the season, and defeat the objects in view, getting neither quantity nor quality. It is a *sine qua non* to get either one or the other, we should have a healthy foundation for our flush—a healthy new shoot—(because allowed to develope) from our topping or pruning, clothed up to a certain point with *new* leaf. The following flushes also allowed to have a healthy leaf or leaves, according to the style of plucking one so often sees which I call "grazing" on the bush. It is sometimes difficult to make the anxious proprietor or superintendent believe that by a few careful rounds—working his bushes on certain fixed rules—he will later in the season benefit by his forbearance at the beginning of it, although for the first three months his neighbour, acting differently, is ahead of him. This is too deep a subject to enter into more fully here, suffice it to say now, extremes either way are bad, too gentle a treatment causing a loss in yield without any advantage to counterbalance it; too harsh treatment causing a loss of yield, and giving poor liquor for the current season, and half the next.

5. *Pruning*.—A heavy pruning, necessary under certain conditions, of the bush results in poor liquor, at from three to six months from the first round of plucking, according to elevation.

The temporary falling-off of the Rookwood liquor so far this season is due to this cause. And I think I am right in placing the temporary falling-off of Loolcondura also, to the same cause.

I have from the first pruned according to a fixed rule, (after trying many experiments on an old plot of tea), and following this rule, I cut too hard wood this season, well knowing what the result would be, but also knowing this treatment was necessary, and I do not think there will be any complaint of poverty of the Rookwood liquor from July for the next 4 years, with the exception of two breaks in each season following the topping. A particular style of pruning then necessary at stated intervals, means *pro-tem* thin liquor.

Including para: 1, add one or other of the above reasons and I think we can account for the deterioration, temporary only, of most of our teas. Good liquor (provided we have good soil and good jât at our back) is to be made from good wood, brought to a stage of development, without respect to the age of our bush, at from 18 months old upwards.—Yours truly,

C. SPEARMAN ARMSTRONG.

MULBERRY BARK AND COCA SEED.

London, 15th July 1886.

Dear Sir,—*Paper Mulberry Bark.*—I have this here now having bought at auction and can get hardly anything for it. I only paid a few shillings for the whole lot. I knew it was valuable but fibre is so plentiful no one cares to work at new things, so they go as "waste."

Coca Seed.—It is very difficult to grow; if a seed is opened carefully, the green leaf may be seen inside and yet it won't grow. I have three parcels here now brought home by collectors of seeds and I was asked one shilling per seed; as I desired proof of the seed being alive, a sample was given me but none germinated.—Yours faithfully, T. CHRISTY.

[We have been favored with practical instructions for coca planters received from South America which will appear shortly.—Ed.]

MR. IRVINE AGAIN WRITES ON UVA TEA.

Madulsima, 28th July 1886.

Dear Sir,—I have from time to time written a good deal on Uva and its prospects as a tea-growing district, and my statements have frequently been called in question by my friends, sometimes as a mere difference of opinion, and frequently on the ground that the district was untried, and that I had been many months absent from it, whilst tea was being planted, also that from my long connection with the district I was prejudiced in favor of it, and that I wished by writing up tea, to advocate the extension of the railway to Badulla town. I will admit that there may have been a small modicum of truth in these statements, but I must utterly deny ever having made a wilful misstatement or stated anything which I did not implicitly believe myself. My knowledge of tea in Uva dates months farther back than most people suppose, for on Kottagodde estate I cultivated for several years a small piece of tea planted by Mr. Bertlin from the same China seed introduced by Mr. Worms on Rothschild estate. No tea was ever made, but the tea was cultivated and regularly pruned and flushed freely. On Pedro estate, which has both the Uva climate and soil, Hybrid Assam tea introduced by Capt. Bayley has been growing and flushing freely for the last 12 years at an elevation of, say, 6,500 feet; besides these there were many isolated patches of tea in Uva, all of which grew freely; but my statement that Uva would produce not only the largest yield per acre but probably the finest tea grown in the island, was a bold assertion to make but I hope soon to see it fulfilled. This statement was based on my knowledge of the soil and climate of the various districts comprising the province of Uva and on the condition and appearance of the tea I had seen growing, as compared with tea in other districts. There are few extremes of heat and cold and the range of the thermometer at any given elevation is less than in most hill districts: the climate is one of continual or alternate sunshine and showers, seldom any long-continued drought and rarely any long continuance of heavy monsoon rains or blustering winds. The tea plant has here found a home more congenial than its native habitat in Northern India and it may be fairly assumed that tea grown under such favourable conditions will produce the finest product of the shrub. As for my advocating railway extension by writing up Uva tea, the question is a very simple one: either my statements have been altogether wrong and exaggerated, or it will take no great array of figures to show that more transport accommodation will be required up and down to carry our tea than ever it did to carry our coffee. I have been some weeks in this district and have seen a large acreage of tea, though I have not been in Haputale yet; and having devoted the greater portion of my time to the tea cultivation of the district, and having also sampled the teas just beginning to be made, I consider myself in a position to have formed not a fancied but a just and real opinion as to the capabilities of Uva as a tea-producing district. The oldest cultivated tea in Madulsima is on Galoola. The field is a small one, two and a half years old, planted at slope. I have seen no finer tea in the island. Younger tea of various ages is equally good. On Uva estate tea 18 months old and cut down to the quick has grown and is flushing splendidly even during what is our dry season. The capability or rather the capacity of Uva tea for flushing has been a much debated question, but anyone who has seen the flush now coming on will have no further doubt on this point. Tea will flush perfectly, and I would place the yield of Galoola under proper treatment at 600 lbs made tea per acre. The Uva estate tea promises quite as well as to the strength and quality of the samples or experimental small lots of tea manufactured, they have mostly proved satisfactory. In the course of a few weeks the Galoola factory will be at work as well as several smaller or temporary factories, and before 1886 has come to a close Uva tea, I fear not, will have proved for itself the superiority I have always claimed for it. I have now written enough on what my friends are pleased to call my latest hobby; let someone else take up the pen.

JAMES IRVINE.

[We hope that Mr. Irvine's rather sanguine expectations may prove correct and that the Uva superintendents and planters will each and all do their duty and prove themselves well forward in the race among champion tea makers, for there is as much in the manufacture as in soil or climtae.—Ed.]

DURIAN FRUITS GROWN IN CEYLON.

31st July 1886.

Dear Sir,—About twenty years ago I read an account in the *Ceylon Observer*, from the pen of "Josias Scadder," of some Durian trees which produced fruit on an estate in Nilambe, and shortly afterwards some one sent me a section of the prickly rind of a fruit grown at Galle, where there are a few trees which I believe bear fruits regularly, and about August 1884 I pointed out to Dr. Trimen the first fruits produced on the old tree in the Royal Gardens, Peradeniya, in the fork of the main drive and the road leading to the old residence occupied by the late Dr. Thwaites. He replied: "Yes, but come and see a tree near the entrance to the Gardens," and sure there it was so loaded with prickly globular fruits about the size of the small jak fruit, called Kuda Heraliya that all the branches had to be supported with props to prevent them from breaking. It is a great pity that Mr. Scowen did not take a photograph of this tree at that time.

A week ago I received a prickly fruit from the Government Agent, Galle, which I put on a table in the dining-room, and at once an odour somewhat different from "the spicy breezes which blow soft o'er Ceylon's Isle" began to pervade the house, and the Durian fruit which left no doubt of its identity was ordered out to the bath-room! Next day I broke up the fruit, and though it appeared to have been pulled before it was ripe, the pulp surrounding the seeds agreed with the graphic description given of it by Wallace, but the odour from it was so strong that it was again ordered out to the bath-room and the door shut on it. I took a section of it into the *Observer* Office for

the editor's inspection, and that of visitors, but when the inmates of that office "*felt the smell*" of the Durian, it was ordered out, and the attenuated odour of it was endured at a distance!

The name of the tree which produces this fruit is Durio zibethinus, Lin. The generic name Durio is derived from Duryon, the name of the fruit in the Malay language, which comes from Dury, a thorn, in the same language, in allusion to the prickly fruit. The fruit is used as a bait to entrap the civet-cat, which is very fond of it: hence the specific name.

The odour from the fruit is so strong and disagreeable that the Dutch ladies in Java decline to see visitors when eating this fruit and the message that they are eating Durians is sufficient explanation for their non-appearance.

It belongs to the section Sterculaceæ, or Bombaceæ of the natural order Malvaceæ, and in the first volume of the Flora of British India, p. 351, published in 1875, other two species are given besides this one, viz., Durio zibethinus, D. C., D. Malaccensis, Planch (perhaps the wild form of the Durian), and D. oxleyanus, Griff. A tall tree of Ceylon and Malacca is so like the Durian in many respects, that the late Dr. Gardner called it Durio Zeylanicus; but the late Dr. Wight had already figured and described it as Cullenia excelsa in honor of the late General Cullen, resident at the Court of Mysore? This is the Katu-hodu of the Sinhalese, and the Wild Durian of Ceylon.

Nearly every author from Rumphius and Dampier, have given full and particular accounts of this fruit, but the extracts appended will suffice.

W. F.

(*From the "Treasury of Botany."*)

The fruit varies in shape, being either globular or oval, and measures as much as ten inches in length; it has a thick hard rind, entirely covered with very strong sharp prickles, and is divided into five cells, each of which contains from one to four seeds, larger than pigeons' eggs, and completely enveloped in a firm luscious-looking cream-coloured pulp, which is the eatable portion of the fruit. This tree is very commonly cultivated throughout the Malayan Peninsula and Islands, where its fruit, during the period it is in season, forms the greatest part of the food of the natives. Considerable diversity of opinion exists among epicures as to the relative merits of several well-known tropical fruits, including the Durian, the mangosteen, the cherimoyer, and the pineapple, any one of which is made to occupy the foremost place, according to individual taste. The flavour of the Durian, however, is said to be perfectly unique, and it is also quite certain that no other fruit, either of tropical or temperate climes, combines in itself such a delicious flavour with such an abominably offensive odour—an odour commonly compared either with putrid animal matter, or with rotten onions. It might be supposed that a fruit possessing such an odour could never become a favourite; but is is said that when once the repugnance has been overcome, the Durian is sure to find favour, and that Europeans invariably become extremely fond of it. Mr. A. Wallace observes that 'a rich custard highly flavoured with almonds gives the best general idea of it, but there are occasional wafts of flavour that call to mind cream-cheese, onion-sauce, sherry wine, and other incongruous dishes. Then there is a rich glutinous smoothness in the pulp which nothing else possesses, but which adds to its delicacy. It is neither acid, nor sweet, nor juicy; yet it wants none of these qualities for it is in itself perfect. It produces no nausea or other bad effect, and the more you eat of it the less you feel inclined to stop. In fact, to eat Durians is a new sensation worth a voyage to the East to experience.' The unripe Durians are cooked as a vegetable, and the pulp of the ripe fruit is salted and preserved in jars; while the seeds are roasted and eaten like chestnuts. [A. S.]

(*From "Cameron's Malayan Peninsula."*)

Entitled, however, to some prominence as being fruits which are indigenous, and in a great measure peculiar to the island, are the mangosteen and durian. The first is the seductive apple of the East, far more delicious and delicate in flavour than its English prototype; by many it is declared, par excellence, the finest fruit in the east, if not in the world. The durian differs essentially in nature as in appearance from the mangosteen; it grows on a very tall, wide-spreading tree, and does not ripen on the extremity of the branches, but like the jack and some other fruits, drops by a short stalk from the trunk, and the thickest of the branches. It is somewhat less than a man's head in size; outside is a thick, prickly husk, in the inside chambers of which lie the sections of the fruit, consisting of a number of seeds of about the size of a walnut, surrounded by a soft, pulpy substance, like custard in appearance, which is the edible part. The taste of the fruit it is impossible to describe, but the smell of it, from which the flavour may be judged, is such that no gentleman in England would care about having one in his house; even in the Straits it is never set upon the table. The Malays and natives generally are passionately fond of it, and will go through any amount of hardship to procure it. A former King of Ava is said to have spent enormous sums to obtain constant supplies; and the present king keeps a steamer in Rangoon awaiting the arrival of supplies there. The fruit as soon as received is sent up the river as speedily as possible, to the capital 500 miles distant. With Europeans the liking for it is, I think, in all cases acquired; the first venture is generally made in bravado, and so singular is the fascination it possesses, that if the new arrival can overcome his repugnance sufficiently to swallow the coating of one or two seeds, he will in probability become strongly attached to it.

I do not think, however, that the most passionate lovers of durian are disposed to acknowledge their taste There is something decidedly unclean about the fruit; a tacit acknowledgment of this is, I think, to be gathered from the fact that it never appears on any gentleman's table, but is devoured in silence and solitude in an out-of-the-way part of the house, and a good bath indulged in afterwards. I cannot forget the exclamation of an old Scotch lady in Batavia, well-known there, when she saw a newly-arrived countryman of her own being sorely tempted to try the strength of his stomach on a full-grown durian.

"Maister Thampson! Maister Thompson! ye ma'na eat that; it'll no' agree wi' ye; and, besides, it's a maist unchaste fruit." The old lady was right and hit the proper expression.

(*Appendix.*)

Doorian—Durio zibethinus.—This fruit is well-known from the descriptions of travellers. Those who have overcome the prejudice excited by the disagreeable fœtid odour of the external shell, reckon it delicious. From experience, I can pronounce it the most luscious and the most fascinating fruit in the universe. The pulp covering the seeds, the only part eaten, excels the finest custards which could be prepared either by Ude or Kitchener. Bontius says it proves laxative, diuretic, and carminative; but when eaten in too great quantities, that it predisposes to inflammatory complaints. The natives consider it to possess aphrodisiac qualities. It is certainly in some measure exciting.

INJURY TO TEA FROM IRON?

2nd August 1886.

DEAR SIRS,—Much writing and controversy has for some time been going on in the local press about an inferior quality of tea now and for some months past being placed on the Colombo and London markets, and various reasons given as to its cause. An idea has struck me as to whether the much increased quantity of iron used in making machines sold recently by manufacturers and importers of rollers, driers, &c., in which iron comes in direct contact with the green and

moist leaf—whether this may not to a very great extent account for this falling-off in quality?

Colonel Money in his Essay on Tea says there is nothing more injurious to tea than iron coming into contact with it in its manufacture.

ENGINEER.

HOW A COOLY IS TO GET IN AN AVERAGE CROP OF TEA?

Ambagamuwa, 2nd Aug. 1886.

SIR,—In answer to your footnote to Mr. Burnett's letter in Saturday's issue, let us take the recognised task of a cooly and see how he is to get in an average crop. Say the cooly works 20 days a month for 9 months in the year at plucking=180 days. By "M. P. A." answer to this questions, made-tea costs 12 cents per lb.; green leaf is 3 cents; and the coolies' task is 12 lb. green leaf average which gives him 36 cents' pay per diem. So we have a cooly getting 3 lb. made-tea for 180 days=540 lb. per acre, an average crop? But then average cost per lb. of made-tea per acre does not exceed 12 cents per lb. when the yield is only 200 lb. per acre. So surely with 540 lb. he would pluck double the quantity of green leaf, say an average of 24 lb.=6 lb. made-tea (at 1½ cents and 6 cents per lb.) and a yield of 1,080 lb. per acre an average crop, Mr. Editor? and if with 540 lb per acre he can pluck 24 lb. how much more, and so on.

INFINITUM AD ABSURDUM.

ALLEGED DETERIORATION OF TEA.

Rookwood, Hewaheta, 3rd Aug. 1886.

DEAR SIR,—To supplement mine of yesterday, a friend lately out from home tells me he was assured, by a City tea expert, that the cause of the deterioration of Ceylon tea was due to the exhaustion of our soil, and to prove it, produced a sample of Rookwood, as one of the old marks—manufacture perfect, yet showing a poorish thin liquor. Now we know it has been stated by some few of the Indian planters that our teas would be but a flash in the pan. We had no soil to work on. "Worn-out and washed-out coffee estates turned into tea gardens, with no future before them," as remarked by the garden manager, then in London, to his directors a few years ago in answer to questions by them, the Lebong Tea Co., I think, but I am open to correction. And again tea existing on a thin covering of surface soil, formed of decomposed vegetable matter, subject to rapid exhaustion, and entire loss from wash on our steep land. Now with regard to the "actual proof" from its liquor, of the exhaustion of the Rookwood soil. How sudden this must have been! Up to the very last invoice before pruning we find its liquor commended, and the usual average price obtained as for that season. Invoice 1 of the new season—*i. e.* after pruning, shows liquor proving exhaustion of soil—how rapid! Poor Ceylon, truly we have no future before us; but how will our City man account for the sudden resuscitation of soil (not manured during the interval), six months after his sage remark, for if with good manufacture, but with persistently thin liquor, in invoice after invoice we have proof of exhaustion of soil, what will sudden improvement in liquor with the same style of plucking and manufacture go to prove?

Exhaustion of soil will take place without manure, but with tea this is so gradual as to be almost imperceptible to our generation. I cannot discover it with tea twenty-one years old, it is not apparent in its luxuriance of growth, and its liquor is as good now as it was ten years ago. Some of our Indian friends (practical Indian planters who have travelled through our various districts know better) think we are dependent on surface soil and worn-out coffee estates. Any real planter knows tea thinks but little of the surface soil, when it has once got hold of the ground; and while admitting that a very few of our worn-out coffee estates have been planted with tea, I do not think the proprietor himself, or the most sanguine of us expect them to last at a paying rate with increased age, and a lower market, whatever they may do at present; but their loss in the future will not affect our exports a decimal point. As for the rest, our coffee estates,—carefully selected land, always well worked, and with but little exhaustion from crops, and that little from the surface that we do not actually require for our tea,—will yet prove some of our best gardens. The very peculiarity of tea is our best safeguard, its taking its nourishment from where coffee never reached: it is, in fact, even in an old coffee estate growing, so far as it is concerned, in virgin soil. Wash we had to guard against with coffee, and if successful then, how much more so can we be with tea, where we can cut our drains closer, as we have not to be so careful of our surface moisture as with coffee. With ordinary care in selection of site, and with ordinary cultivation to follow, I can see an everlasting future before us, now as ever. Some of us, I believe myself among the number, have been accused of bombast, but I do not think we deserve this; all we wish for, I am sure, is, that the truth should be known concerning us, and if, before condemning our soil and prophesying our speedy downfall, those doing so had honestly inspected our various districts, and seen our tea growing, they could not have made the sweeping assertions they did, and publicly too. This letter may seem to apply more directly to my own garden. I do not mean it to do so in any way. It so happened, my own garden was brought forward by an expert in tea to prove exhaustion of our soil was the cause of the falling-off in our teas. I have endeavored to show the folly of this statement, which affects the whole island. I yesterday accounted for the temporary "falling off" in my liquor; add the market to this, the near future will prove I am right; and I would conclude by saying

1. Exhaustion of soil cannot be so sudden or so general as it must have been in Ceylon this year to be the cause of poorer liquor from young and old gardens alike.

2. It would show itself in the general growth of the bush and in yield as well as in liquor.

3. Without cultivation, *i.e.* manuring—and there has been none worth noting—exhaustion would continue, showing worse results as the season works on, and not better.—Yours faithfully,

C. SPEARMAN ARMSTRONG.

COFFEE: SPRING CROP PROSPECTS IN HAPUTALE.

4th August 1886.

SIR,—Your issue of last evening giving late returns of rainfall in Haputale, signifies another disastrously short crop there, *unless* the weather takes up *at once*. 30th July report is as follows:—

"We had a spell of 'fine' dry weather till the 28th when it rained at intervals nearly all day. It has been dry since then, and I hope it will continue so; otherwise I fear we must expect another bad crop." Since then, the reports by telegram (*vide* Post Office list) mention *nothing but rain*, heavy rain!!

The "Ultima Thule" correspondent (*nil desperandum*) who writes so confidently of coffee being yet "King" again, as regards *profits*, must try and explain the change of seasons when he writes

again. How many favourable "dry" seasons have been experienced in the last nine years in Uva. Coffee must have sun in due season or crops will always be disappointing, leaf-disease or no leaf-disease. The seasons have changed and there is no blinking our eyes to the fact: whenever good crops are got in Uva nowadays, it is by a sort of "fluke." As there can be now no dependence placed on our getting favourable blossoming seasons there, so no dependence can now be placed on our getting paying coffee crops. No matter how healthy and vigorous coffee may be, *it must have the sun in due season.* As regards prices, coffee looks grand now: this time next year we may see 'good Ceylon middling' again at

FIVE POUNDS PER CWT.

The Future of the Nilgiris.—The *South of India Observer* remarks:—"This district, we feel sure, has a great future before it. Before long the railway will be brought to Coonoor, if not to Ootacamund, and thus the trade of the place will be immensely increased. The coffee industry may revive; and it may play an important part in the district, and fortunes may be made. Gold may yet produce great results. The capabilities of the district are only just beginning to be discovered," and, finally, our contemporary thinks "the population is sure to be greatly increased when the railway has been established."

Coal in India.—The result of Dr. Warth's explorations in the Salt Range is, that he estimates at least 1,000,000 tons of coal may be obtained from the Dundote plateau, and at a recent conference it was decided to arrange for the practical working of the scheme. The coal is not of the best quality; but it is calculated that it can be delivered on the Punjab Northern section of the North-Western Railway at a cost of R6 per ton, and that its economic value as fuel will be R14 per ton, which will represent a saving on that section of the line amounting to R1,15,000 per annum. The North-Western Railway administration will work the colliery.—*M. Mail.*

Cinchona Plantations, after all, do not seem to be very highly valued in Java to judge by the following extract from the *Straits Times* (translated from a Java paper) received by this mail:—"The times at present are so hard in Java that, daily, estates, formerly valuable indeed, pass under the Auctioneer's hammer at ridiculously low prices. An allotment worth several thousands of guilders could only be disposed of for one hundred. A plantation stocked with superior varieties of Cinchona brought only twelve thousand guilders. So it goes on day after day. These properties mostly pass into the hands of Chinese. The outlook is indeed so gloomy that a general bankruptcy among the planting community is not at all improbable, unless prevented by unforeseen circumstances."

Aluminum Works and Corundum.—The Work of developing power on the creek and putting up the mammoth building for the aluminum manufactory (or aluminium if you want it decidedly English) is now far advanced. Hitherto the process of obtaining aluminum has been very expensive, through a combination of chemical agencies and heat. At the works the corundum will first be subjected to intense heat, then broken and ground to powder, after which it will be fused in hermetically sealed crucibles by the powerful electrical current generated by the employment of the largest dynamos that have ever been constructed. The product is the pure aluminum, of which the yield from the corundum is about 50 per cent. No doubt is entertained of the success of the electrical process, which, although so recent a discovery as not to be described scientifically in works, has been thoroughly tested. Large quantities of the alloy will also be manufactured at the works, requiring it is estimated, from 10 to 20 tons of copper a day when the works get to running to their full capacity. As a very serviceable alloy may be made with only five per cent of aluminum, it is evident that a very large amount of copper will be required.—*Lockport Union.* [As Ceylon is rich in corundum, we may probably see the substance utilized some day for the production of the light white metal.—Ed.]

The Neilgherry Company.—The London correspondent of the *Times of India* gives the following:—"The Neilgherry Company, Limited, has been incorporated with a capital of £100,000 in £1 shares, of which 30,000 are reserved in part payment to the vendor, and the balance has been offered for subscription here this week at par. The Company has been formed for the purpose of acquiring, carrying on, and extending the business of the Neilgherry and Southern India Lands Investment Company, Limited, (which was established in 1878, for the purpose of advancing money on the security of coffee and other estates) and to acquire in addition, under a separate agreement with the Agra Bank, Limited, coffee cleaning works at Coimbatore and Beypore. Also to carry on a general agency business in Southern India, making advances on coffee, tea, cinchona, rhea grass, and other produce, preparing, curing, shipping and forwarding, selling same on commission. The prospectus states that the coffee cleaning works are fully supplied with modern machinery in complete working order. The Coimbatore establishment is represented to be very advantageously situated on the plains at the foot of the Neilgherry hills, adjoining a station on the Madras Railway, and commanding not only the coffee from the Neilgherries, but also from the Kotagherries, Anamalais, Koondahs and Shevaroys. The works at Beypore are situated at the mouth of the Beypore river, whence the produce at Coimbatore and the Wynaad is shipped on board the steamers for the London market. By thus combining the business of the Investment Company with that of coffee cleaning, shipping, and selling on commission, the Directors are satisfied that a safe and profitable business will result. The income of the Company will be derived from the following sources, among others: 1.—Interest on investments on mortgage (9 to 10 per cent is the current rate). 2. Interest on advances against hypothecations of crops. 3. Commission for financing crops. 4. Cleaning, curing, and transporting crops. 5. Commission on sale of crops. The Directors say that a careful consideration of the figures laid before them justifies the expectation of earning a dividend of at least 10 per cent, besides providing for a substantial reserve fund. This was the rate of dividend (free of income-tax), paid by the old Company—whose business was limited by its memorandum and articles of association to advancing money on mortgages of estates only for the years 1881, 1882 and 1883. The head-quarters of the Company in India will be at Coimbatore, and its affairs there will be under the management of Mr. William Cottrell who has had many years' experience in the business contemplated, and who is now on the spot. The directors are:—Mr. D. F. Carmichael, late Senior Member of Council, Madras; Captain P. H. Hiwett; Mr. William Maylor, late of Messrs. Pierce, Leslie & Co., Malabar Coast and London; and (after allotment) Mr. G. R. Briggs of Messrs. Livingston, Briggs & Co., Directors of Neilgherry and Southern India Lands Investment Company Limited. I should mention that among other assets to be acquired are forty-nine mortgages upon properties in Southern India representing a total of £19,035, which the Company is to get for £10,175; and the total price to be paid is £50,000—exclusive, I read, of the price of the coffee curing business of Stanes & Co. to be taken over from the Agra Bank."—*South of India Observer.*

PRACTICAL HINTS ABOUT TEA.

(By an Old Hand.)

HOW TO GERMINATE SEED.—Choose the sunniest slope you can, near water; form beds 2½ or three feet in width; put a margin of boards round the bed, level carefully the surface, making it firm; on this lay a layer of clean river sand two inches deep, on this lay the seed *two seeds deep;* over this another layer of clean sand 1 to 1½ inches; afterwards cover with mana grass to the depth of an inch, water well twice a day; as soon as the seed shows the direction of the root germ, then plant into nursery beds, taking care the seed in no case be put deeper in the soil than one inch; then shade with fern and keep well watered till fairly above ground.

WHEN AND WHAT TEA PLANTS SHOULD BE PLANTED.—A plant of 12 or 14 months old, stumped in the nursery before being removed for planting with every root carefully preserved and put into a hole sufficiently large to receive it without doubling any of the roots, is in my opinion the perfection of a plant. Then, again, a plant well-grown at 6 or 7 months old, when it can be removed with all its roots entire stands a better chance than an older plant, the roots of which will be injured more or less, even with the greatest care, in removal from the nursery. These are the plants which one sees to stand still for six months after planting, many of them losing their leaves owing to evaporation from the plant being greater than its own powder of absorption from the soil: in a word keep your plants till they are ready for stumping, or plant them out of a well-prepared bed entire when six to even months old.

AGRICOLA.

SUGAR IN JAVA.

(Translated for the *Straits Times.*)

There is every prospect of the sugar yield in Java proving a source of heavy loss to growers there this year; prices now for No. 14 have fallen to even 8½ guilders per picul. At this price sugar growing will soon cease to pay, especially now that the burden of taxation on the planting community has been rendered still more grievous by heavier auction dues and enhanced import duties reaching 10 per cent. The power of the people to bear the additional taxation, so says the *Sourabaya Courant* has become so enfeebled that the taxes collected in the first five months of this year show an alarming falling-off. The import duties alone compared with the corresponding period of last year show a decrease estimated at 234,000 guilders. Statistics of piece goods imported show conclusively that articles formerly in demand only find buyers now when of inferior quality.

REVIEW OF THE AUSTRALIAN TEA SEASON OF 1885-1886.

In view of the early opening of the new tea season on this side (probably about the 10th July), we take our usual retrospective glance of the operations in the tea market during the last twelve months ending 30th June 1886.

The total import into all the colonies and from all quarters amounted during the following seasons to, say:—

	lb.
1885-86	23,498,882
1884-85	20,780,816
1883-84	16,350,289
1882-83	22,564,831

The imports for season 1882-83 proved excessive, and were only adjusted by the light imports during 1883-84; and taking the result of the three years' imports from 1882 to 1885, it appears evident that when imports exceed 20,000,000 lb. weight the quantity is in excess of the present colonial requirements, and loss must result to importers, and this proved no exception during the season just closed.

INDIAN TEAS.—Mr. J. Osland Moody reports:—The exports from Calcutta to Australia and New Zealand for the last four years, from 1st May to 30th April stand thus:—

	lb.
1886	1,729,517
1885	1,525,982
1884	340,613
1883	2,723,268

showing a steady increase over the last two years, though not equal in quantity to season 1883.

For the same period the following are the shipments to Great Britain:—

	lb.
1886	65,858,071
1885	61,570,719
1884	58,067,180

showing a large and steady increase, whilst the export from Ceylon alone now reaches 4,500,000 lb., and is advancing by rapid strides to the front as a large producing country and of the highest class of teas.

CEYLON TEAS continue to find their best market in Great Britain, and lead the van in prices. So little comes here they are not worth noticing.

JAPAN TEAS continue to be imported to trifling extent, but show no movement in price quality.—*Melbourne Age*, July 1st.

THE ALLIGATOR-APPLE, ANONA POLUSTRIS, L. PRODUCING RIPE FRUIT IN COLOMBO.

Of the custard apple order (Anonaceæ) we have in Ceylon the large prickly sour sop, Anona muricata, L. The custard apple, or bullock's heart, A. reticulata, L, which tastes like a custard mixed with some gritty matter in it. The sweet sop, called in Ceylon, the custard apple, A. squamosa L., and I understand the cherimoyer, A. Cherimolia, Dun., grows at Peradeniya and Henaratgoda, but I have not heard of their bearing fruit in Ceylon. I now send you a ripe fruit of the alligator apple, Anona polustris, L., grown in the Circular near the Museum. This fruit as you will see is a good deal like the bullock's heart in shape, but much smaller in size, and having a good deal of the fragrance of a ripe apple. It is of a light yellow color, and perfectly smooth like a mango. The small tree or large shrub from which this has been taken has about two dozen more on it. From the "Official Guide to the Museums of Economic Botany, of the Royal Gardens Kew" I take the following short notice of this plant and its fruit:—"A small tree abundant on marshy shores in Jamaica; the fruit said to be narcotic and even poisonous, is eaten by alligators as it drops; the wood known as corkwood, is used for stopping bottles and lining boxess." Mr. Nock no doubt can tell you if it is eaten in Jamaica. The cherimoyer is spontaneous from Peru to Mexico, and has been naturalised in Jamaica, all the others mentioned here are natives of Jamaica and some of the other islands of the West Indies, but none are natives of Ceylon or India.

W. F.

WHITE CASTOR CAKE AS A MANURE FOR TEA AND COFFEE PLANTERS.

Mr. John Hughes, the wellknown Agricultural Chemist, never omits an opportunity of supplying useful information through the *Tropical Agriculturist* to the planters of Ceylon and India. From the following contribution it is evident that equally for tea as for coffee, white castor cake, rich in mitrogen, potash and phosphoric acid, is one of the best manures which can be used:—

79, Mark Lane, London, E. C., 10th July 1886.

During my residence in Colombo in 1878 several analyses of the abovenamed cake were made by

myself on behalf of the Planters' Association, and the results are to be found on page 15 of my official report. These analyses, however, deal only with the organic constituents, and give the proportions of oil, albuminous compounds, mucilage, fibre, &c., and do not afford information respecting the chemical composition of the mineral portion or ash of the cake. I have therefore obtained a fair average sample direct from India and hope the particulars of the analyses may be of interest to the readers of the *T. A.*:—

In 100 parts of white castor cake:—	
Water	7·94
InOrganic matter (containing Nitrogen 7·55)	85·17
Mineral matter*	6·89
	100·00

It will be noticed from these results that while castor cake is very rich in nitrogen, containing indeed twice as much of this valuable constituent as ordinary bone dust, and five times as much as would be found in 100 lb. of parchment coffee; so that the application of 100 lb. of this cake should supply as much nitrogen as could be removed by 500 lb. of parchment coffee. Further, the mineral portion (6·89) is twice as much as I found in well-prepared parchment coffee from the neighbourhood of Badulla (see page 110 of my report) which contained 3·30 per cent of ash or mineral matter; so that as regards these constituents castor should be well adapted to supply a very large portion of the mineral constituents of coffee even supposing the soil did not do so as is usually the case.

Thus, in every 100 parts of cake I find 2·68 of phosphoric acid as against ·26 in 100 parts of the coffee and 1·35 of potash, against 1·34 in coffee (which is practically the same), soda ·67 against ·06, and, lastly, ·50 of lime against ·19 in coffee.

Castor cake yields an ash specially rich in phosphates of potash, lime and soda, and these exist moreover in a form readily available as plant food as fast as the cake becomes decomposed in the soil. For comparison with the leaves of the coffee tree, I may mention that in every 100 parts of partially dried healthy leaves I found by analysis:—

Water	9·75
Organic matter (containing Nitrogen 2·67)	82·65
Mineral matter†	7·60
	100·00

* Consisting of:—

Phosphoric Acid	2·68
Potash	1·35
Soda	·67
Lime	·50
Magnesia	·28
Sulphuric Acid	·12
Chlorine	·07
Oxides of Iron and Alumina	·29
Quartz sand	·93
	6·89

† Consisting of:—

Potash	2·08
Lime	1·69
Magnesia...	·92
Soda	·48
Phosphoric Acid... ...	·35
Sulphuric Acid	·26
Carbonic Acid	·99
Chlorine	·08
Oxides of Iron and Alumina	·10
Quartz sand &c.	·65
	7·09

From these results it will be seen that coffee leaves, are really far more exhausting to the land than the parchment coffee, and if the tree can produce plenty of leaf naturally, no manure should be necessary in order to produce the coffee bean or seed which in this case is certainly not an exhausting crop. Planters know from sad experience the baneful effect of wind and wash which strips off the leaves and hurries them off down to the nearest stream.

It is well however to remember that these leaves if gathered green and made into composts with a little lime, will furnish an excellent natural manure as will readily be seen if the results of the above analysis are compared with those of castor cake. These leaves contained 2·67 of nitrogen or nearly ⅓ of that in castor, while the lime 1·69 and potash 2·08 are both in considerable excess of that found in the cake. In phosphoric acid however the leaves are much poorer, there being only ·35 against 2·08 in white castor which is certainly a most useful cake for supplying phosphates as well as very rich in nitrogen.

In looking out for valuable manuring materials planters should therefore look well to the chemical composition of the several *substitutes* for the grand and universal manure namely *farmyard-dung* which has been the only one employed to any extent in ages past and which, as regards its general character, may be taken as a safe guide to the planter abroad as well as to the farmer at home.

We must examine the composition of the ash or mineral portion as well as the amount of nitrogen yielded by cakes and manures, for, as we have seen in the case of white castor cake, every 100 lb. of the cake supplies 2·68 of phosphoric acid which is equal to 5·85 lb. of phosphate of lime or as much as would be found in 1,000 lb. of parchment coffee. JOHN HUGHES, F.C.S.

THE *T. A.*—I have always looked upon the *Tropical Agriculturist* as a "standard work," and as such it is a book of reference to be placed on the planter's book-shelf.—*Planter.*

NITRIFICATION IN SOILS.—Dr. Taylor, Editor of *Science Gossip*, in writing to the Melbourne *Argus* makes the following remarks on this important subject:—

Among agriculturists possessed of genuine scientific tastes, there are few subjects regarded with more interest than the relation of free nitrogen to soils. The discovery that nitrifictation in soils was due to organisms whose activity can be arrested by chloroform, so that no nitrification takes place when their vitality is thus suspended, has made the inquiry more interesting than ever. The French chemists have always distinguished themselves in researches relating to this subject, as everybody knows who has studied Professor Ville's work on artificial manures. Recently the attention of the French Academy has been directed to it. Messrs. Bertholet and Andre have been at work upon it for many years past. Lately they have been concerned in finding out some means of indicating the proportion of nitrificatory organisms in different soils, and they conclude that some idea of their abundance may be formed by a quantitative analysis of the carbon entering into the constitution of their tissues. It is inferred generally that the analysis of the ammonia present in the soils should be made without any dessication, and that arable land (when watered) tends continually to liberate the ammonia of the ammoniacal salts contained in it.

THE DETERIORATION OF TEA.

SIR.—The question of the causes of deterioration of Ceylon tea must always be a very important one to planters, and one which cannot be investigated too thoroughly. Evidence now appears to be forthcoming to show that it is no mere cry of the London dealer in the usual depreciatory manner of the buyer. I have now been more or less a tea-maker for the past four years, having had varied experience during that time, and think I can account for the falling-off in strength, this being the chief cause of complaint.

To those who have not fully investigated the growth of plants it is usual to believe that the leaves simply act the part of the lungs, and that their various other economies are performed chiefly by other organs, such as the branches, trunk, and roots. Now, the life of a tree is first its leaves, and then its roots. The terminations of the latter, called spongioles, have almost an equal importance, being rather more to a plant than the mouth of an animal, as they have some potent affinity for the nourishment they assimilate. The roots of some plants can penetrate tolerably hard rocks—the olive; for instance—and anyone who has had much experience of manuring with coarse bone-pieces will frequently have observed the facility with which even a coffee-root can pierce through a hard, flat piece of bone.

The leaves are, however, of really more importance; not only do they inhale and exhale, but they elaborate the sap. Thus, besides being lungs, they are the chief digestive organs of the plant. It may be said that whatever good comes out of the tea plant, whether in shoots or seed, is the result of the elaboration of the sap in the leaf cells, and this elaboration progresses more or less perfectly according to the health and vigour of the tree. In a throughly healthy individual, the foliage will be more or less profuse, and, where it is scant or unhealthy, there will also be a corresponding failure of the sap, which naturally will fall off in either quantity, or quality, or both. In this it will be very like a much vexed matter of domestic economy—our milch cow. We all know how difficult it is to get our quantum of good milk, and the sooner we apprehend the position that abundance of milk usually means an abundance of good food, so much sooner do we benefit by carrying out the principle.

The first external indication we have of a tree being unhealthy is its foliage, and immediately afterwards there will always be a corresponding unhealthiness in the roots. Indeed, the injury is felt throughout the whole organism. As with animals, some kind of plants have a greater recuperative power than others. We say of a cat that it has nine lives. Our experience also shews us how difficult weeds are to kill; yet I fancy if we grew a weed as a cultivated plant, and continually deprived it of its leaves and young shoots which have very much the same function as the leaves, it will soon indicate all the delicacy of a cultivated plant, and if we continued our harsh treatment over a period of years it would probably develop a disease injurious to all individuals of its race, and in this manner might become a very delicate plant to grow.

Tea is one of the most robust plants in the vegetable kingdom. It will not die out in scrub and weeds. If cut down, it shoots up with great vigour; its recuperative powers are prodigious. If growing amongst grass, the latter may be fired, and the tea will all shoot out afresh.

It is, however, apparent to all that, after tea bushes have been cut down, the first shoots, when manufactured, produce a very thin infusion, and I would ask whether this may not be owing to scantly foliage. As I have said, the tea plant has a strong, vitality, it bursts out into renewed life with all apparent vigour, but does not this shew that it is abnormal and that something is wanting? Most certainly there must be a great shock to the plant throughout its entire system; sometimes we notice here and there a bush which does not recover.

There is much importance to be attached to what Mr. Rutherford asserted in his letter; that where tea bore well, manuring would be necessary. Of course, where soil is rich with manure applied, the means of rapid recovery are easier for the plant; yet all considered, even allowing the most valuable constituents of the soil to be present in almost any quantity, the foliage of the plant must to an extent be maintained. Leaf-disease shows how absolutely necessary leaves are to coffee; so it is with tea.

I consider, whatever task you put upon a perennial tree or plant, whether it be in yielding seed or leaf-that there must be an adequate foliage to perform the economies necessary for the effectual production of this leaf or seed; that, if the foliage be insufficient, the produce will naturally be wanting, and I believe this has more to do with the falling off of the strength of Ceylon tea than any other cause I know. The Israelites found it hard to make bricks without straw; an animal would not survive being deprived of the whole of its lungs and the greater portion of its organs of digestion; yet we expect a tea plant to live, thrive, and yield us leaf shorn of both of these. The only wonder to me is, why does not strike, work altogether, collapse and die, or cease to be productive, like our coffee. Unless we are more lenient to it this may eventually result.

There is without doubt much in the manure theory, but I believe far more in our treatment of the organism itself, the first consideration. As far as my experience goes, I have never obtained good tea except from good foliaged bushes, and I believe before long we shall see much lighter pruning adopted throughout the island, or, possibly two light instead of one heavy pruning in the twelve months.—W. F. L.—Local "Times."

No. II.

SIR,—With regard to the alleged deterioration of Ceylon teas, allow me, in the spirit that in the multitude of counsellors there is wisdom, to make the following remarks. To say the least of it, it is peculiar that every new field's teas, on introduction, have attracted considerable attention, and produced the highest prices in their early start. Few, however, have been able to retain this favourable position for more than a season. Indian planters remember this was the case with the Dooars gardens, for, when their teas came in limited quantity, buyers seemed to desire nothing else than the strongest liquors for which they are so noted. Planters in Darjeeling, the Terai, Cachar, Sylhet, and, lastly Assam, were furnished with Dooars samples as guides. Every one setting to work to produce the requisite article—some vain enough to imagine they had succeeded—were surprized to find that the success attained in the Dooars only lasted a season, for the following year Darjeelings were required for flavor only. Most then attempted to give their teas Darjeeling character. Few arrived at this happy climax, when, in the next season, Assams were in demand, and their selling price above all others.

The majority of Indian planters now recognize that the market is always capricious. Some usually get good prices, and all, especially at the commencement of the season, strive by the most careful plucking and manufacture to force their mark into position.

Truly, there is every excuse for many Ceylon men believing that this season's teas are so inferior simply because fetching pence below last year's average, and doubtless will attribute it to every cause but the right—prices have gone down. What has been apparent to all outside of the island for so long is a fact, namely, *quite fancy prices were being paid for Ceylon parcels.*

When things settle down at home, probably these teas will regain favor; but that they will speedily reach the enormous figures paid when the supply was uncertain, the large acreage coming into bearing in the near future should forbid the most sanguine to expect.

In the meanwhile, the hints dropped by Mr. Gow regarding the bushes having a browsed and broom-like appearance, and being consequently incapable of putting forth shoots (flushing) suitable for making

superior tea, may or may not be affecting the quality and should commend itself to serious notice.

When the late Mr. Cameron came to this island to find its resources at the lowest ebb, coffee and cinchona almost dying out, with some land under tea doing little or nothing because not properly understood, he started to show what tea would immediately yield—*to show that he could do something with it, and that quickly.* It was indeed a bold stroke and deserved success which dicated such close (the closest possible) picking, *actually taking the half of every leaf the tree put forth in flushing* (*where he had not already taken the whole one*). The outturns procured were in many instances as fabulous as the prices obtained.

Assuredly the end justified the means; the prices would have compensated handsomely, and, what is more, the gardens stood it wonderfully well. Mr. Cameron knew rightly that places in India, with the combined effects of droughts, hailstorms, excessive heat alternating with bitter cold, not to mention blights, could scarcely have lived under such treatment. Certainly, their outturns would never have been what they are. He had here a better climate to work on, but even this advantage may be abused by this kind of treatment.

It becomes now a moot question—how long it may be carried on with impunity (comparatively) here?

When thus put before those interested, many unhesitatingly tell you that they do not cultivate the bushes for appearance, nor yet for posterity; some even go so far as to inquire what posterity has done for them? Met with such reprovals, how difficult Mr. Gow will find it to advocate more gentle treatment of the bushes, more especially when he will be told that the soil here is wanting in depth and quality, as found in other fields. Is not this, though, the strongest possible plea in favor of the more rational treatment of the plant?

The system of picking, which by long teaching finds most followers in India generally, is probably the best, because, costing little, the bushes can, whilst yielding both quality and quantity, do so with the least possible injury to themselves.

Thus, after pruning, the bushes are allowed to run, say, from five to seven leaves and a bud. Some shoots mostly in the centre of the bush, at once outstrip the rest. It becomes necessary to check them, and those that have reached the desired number of leaves may be ripped, taking one leaf and a bud as nearly as possible at the union of stem and leaf; in a week or ten days (providing they are not side shoots) more are ready, and should be taken.

Coolies will not bring in large quantities at this rate. They should not be expected to do so, for the object is to form the bush: thus the most careful picking is required at this stage; that is, when the bush is making what will eventually be pruning wood, upon which depends the season's, as well as the following season's, crop. Any care expended upon it is afterwards amply repaid. After these shoots are more or less uniform in height—that is, each stem having as nearly as possible the same number of leaves, it will be found that, from the two upper leaves of the ripped stems, the primary useful (so to speak flush) comes. These are allowed to run, say, to four or five leaves and a bud. At this time the side shoots will, stand in danger of being broken; so they are taken, and with these two leaves and a bud from the four or five leaves of the primary shoots, when at least two leaves whole (some count the eye as one) should be left. These two leaves will in turn put forth other shoots or flush. In short, for the first ten or twelve rounds the pickers require special attention to prevent them nibbling or picking young undeveloped shoots, which is never overlooked. Later in the season, however, it ceases to be of such importance. Every cooly is paid according to the quantity (with due regard to quality) of the leaf plucked, and then it does not signify so long as one leaf is left.

And now, mark: the picking of half leaves is never encouraged (it is doubtful whether it ever withers or ferments well), there being always in the season a sufficiency of mature leaves ready for the weekly plucking; if not, the number of pluckers is diminished. Should it occasionally happen (through drought or blight) that there is little, or no leaf, there is nothing left but to wait for it. What is put off, or has to be waited for, is not lost. In the same way little notice is taken of bangy bushes or shoots. By leaving them they right themselves in time. If taken off, the second leaf is nearly always hard; any way it is impossible to make good tippy tea with bangy leaf.

The application with some modification (say less whole leaves, but leaving entire leaves and not persistently tearing every leaf in half) of the Indian system, which is the outcome in many cases of dearly-bought experience, is about the only way of preventing the browsed apperance complained of, which must in time materially decrease the outturn in Ceylon, or, it may be, worse—bring some dreadful blight in its train, and make the balance unworkable by killing out half the plants.

The worst that can result from a fair trial of the modified system is that tea thus treated may require more frequent (it may be yearly) light pruning, and possibly let us hope give partial exemption from heavy pruning with a good, if not superior, all round tea at some cents per lb. cheaper.

With a climate perhaps second to none in suitability for tea, proximity and cheap carriage to port of shipment, which give at once cents. per lb. advantage in every lb. manufactured, the only danger in the race for wealth appears to be that of killing or crippling the goose from which all expect the golden eggs.—J. E. L. H.—Local "Times."

July 22, 1886.

[The impression created by this letter is that in India now, half leaves are not plucked. Is that generally the fact, and has the practice of taking only whole leaves extended to Ceylon? Is it beyond doubt that half leaves do not ferment well?—ED.]

1,200 ACRES OF TEA in one proprietor's hands is a good deal, but this is the fortunate case of Mr. Jas. Blackett of Dolosbage who, moreover, has the satisfaction of knowing that his fine-looking fields are all grown from a good jât of tea and all promise luxuriant crops of good leaf.

TEA ROLLING.—A planting correspondent writes:—I have just heard that J. McInnes, Walker & Greig's Manager in Badulla, has finished a hand-roller suitable for small tea estates. He expects it to roll from 80 to 90 lb. of leaf an hour and the probable cost of the machine will be about *R150*, so small is the roller that 2 coolies can carry it.

THE VINE ON OUR MOUTAIN PLATEAUX.—We understand that Mr. Gordon Grinlinton has been successful in growing grapes of a fair quality at Portswood near Nuwara Eliya. This is the first time we have heard of the vine fruiting at so high an elevation in Ceylon. Jaffna and Dumbara are usually the situations associated with grapes, although the climate and soil of Uva in many parts ought to be admirably adapted for vine culture.

CASSIA LIGNEA AND THE CHINAMEN.—According to the report of the Superintendent of the Afforestation Department of Hong Kong for 1885, there is a great difficulty in growing this tree, as the following extract from the report will show:—"The plantations of Cassia Lignea that were made on the hills north of Aberdeen would probably have been in a thriving condition by this time but for the persistence of the Chinese in breaking off the leaves and branches of the plants. They appear to attach some importance to the plant as a medicine, and despite the vigilance of the forest guards, they succeed in keeping the plants in an almost leafless condition. Even in the Botanic Gardens, where the plants are protected by iron tree-guards and wire netting, they have killed several plants by presistently defoliating them and wrenching off the branches."—*Gardeners' Chronicle.*

MORE ABOUT INSECT POWDER.

STOCKTON, Cal., JUNE 4.

TO THE EDITOR OIL, PAINT AND DRUG REPORTER.

In your issue of May 26, you published an article from the *Druggist's Circular* under the caption of "The Truth About Insect Powder," which we have read with interest as it is a fair statement of the qualities of different kinds of insect powder now upon the market.

The writer of the aforesaid article has however failed to explain how that powder manufactured from flowers similar in appearance and condition, may materially vary in strength and power as an insecticide.

Having been engaged for several years in cultivating the plants and manufacturing the powder therefrom, we have ascertained that much depends upon the conditions of the atmosphere during the time the plant is maturing and while the flowers are being dried after they are picked. The value of the powder depends upon the quantity of essential oil contained in the flowers of the plant. This oil is partially soluble in water and when rains or heavy dews fall upon the plant, while the flowers are maturing or while they are being dried, the effect is particularly injurious to the powder. Consequently the dryer the atmosphere during the time the plant is in blossom and afterward while the flowers are being dried for grinding, the stronger and more effective will be the powder produced therefrom. Powder made from flowers that have been grown and cured under favorable conditions, may be kept in cans hermetically sealed for years without losing its insect destroying properties, and consumers of the powder will always find it cheaper and more satisfactory to purchase in cans rather than in bulk, and if but a limited quantity is used they had better purchase in small cans, and there is no reason why the smaller packages should not be kept by all dealers,

BUBACH PRODUCING AND MANF'G CO.

COLLECTING THE ORANGE FLOWER CROP IN FRANCE.*

BY I. CREUSE.

The usual time beginning the collection of the crop on the Mediterranean shore is from April 25 to May 1, and the gathering lasts about one month or five weeks. The quantity gathered, rather small at first, gradually increases, and after May 10 reaches its full proportion.

The orange tree, indigenous in India, is thought to have reached Arabia towards the end of the ninth century, but made its appearance in southern France only during the sixteenth; at least, such is the period at which it began to be mentioned. At any rate, the orange groves of the vicininy of Hyères were in 1556 reported to have the appearance of large forests, and the trees were equally cultivated at St. Chamas, Fréjus, Cannes, Vallauris, Aix, and in Marseilles itself.

At present Vallauris, whose name apparently comes from *Vallum aurantii*, or its Provençal equivalent, is the headquarters of the orange flower industry, and has lately acquired considerable importance. The climate of the place, being a very temperate one, is quite favourable to the cultivation of the orange trees. As no less than fifteen distilleries for making orange flower water and neroli are located in Vallauris, the town may justly claim to be the centre of this sort of manufacture.

The picking of the flowers employs no less than two thousand persons. As the crop usually averages one million kilograms, that is, one thousand tons, its importance, notwithstanding the variations of prices, is easily understood as a source of revenue for the localities where the orange tree is grown for its flowers alone. The variety cultivated is the *bigaradier*, or bitter orange, producing very fragrant blossoms but bitter fruits. From 1880 to 1882 orange flowers sold from thirty to sixty francs a hundred kilos. In 1883, frost having destroyed most of the crop, the prices rose to three hundred and sixty francs; but last year it remained between seventy-five and one hundred francs. The coming crop promises to be fair. Some groves have suffered from frosts, but the evil is not general, and there are good prospects of a fine quality of flowers.

The yield of neroli greatly varies according to the season when the flowers are collected. Those gathered at the beginning barely produce half a gram to the kilo of blooms (one-half of one per thousand), while near the end of May they afford one gram or more. Hence the average yearly yield of essential oil is seventy-five thousand kilos, or about one hundred and sixty-five thousand pounds. To this may be added from twelve to fifteen hundred tons of orange flower water which is produced at the same time as the essential oil.—*Pharmaceutical Journal.*

* From the *Drugists' Circular*, July.

CINCHONA BARK PROSPECTS.

As a general thing, operators in quinine are not disposed to place much faith in bark statistics, but they nevertheless have an influence in directing the market for the alkaloid. The excessive stock of barks in London is said to be a great bearish element, and that the declining tendency of quinine is to be attributed more to that fact than anything else, but the trouble is that figures are accepted as representing the supply and demand without proper investigation. A correspondent takes the Ceylon *Observer* to task for not placing London bark statistics in their true light, and explains that a large proportion of the stock is composed of old importations of Cuprean bark for which there is no demand, presumably on account of poor quality. The large number of packages usually reported as the London stock gives out an erroneous impression when not accompanied by an explanation. The correspondent in question reduces the actual stock at least twelve million pounds by giving the weights of the packages, many of which are serons weighing about one hundred and fifty pounds each, and cases of druggists' quills which do not average as a rule more than one hundred pounds each, and bales of Java bark weighing from one hundred to one hundred and fifty pounds each. The weight of the packages being over-estimated heretofore the stock was made to appear much larger than it really was.

By advices received last Saturday, we learn that operations in the Java field are exciting great interest in Ceylon, and planters in the latter place are seeking information from every channel possible to ascertain the future possibilities of competition. An anxious correspondent writes to the *Straits Times* for information on this point, and adds:—

As the future of the Java field is being watched with interest by quinine manufacturers, as well as planters in Ceylon and elsewhere, we give below an extract from a Java paper called the Sourabaya *Currant*, which gives a gloomy report from that section. Speaking of a disease attacking the roots of cinchona trees, in West Java, it says:

A letter from a Ceylon planter is published in the *Tropical Agriculturist* just to hand, in which he says:—

"Having had occasion to travel in several districts in search of a piece of land for cinchona, I was very much struck at the small area in cinchona chiefly in the olden districts—of course, I mean, compared to what it used to be two years ago. Most certainly Ceylon is not likely to export the quantity of bark that has lately overflowed the market, and so on.

Cinchona planters in Java are not taking kindly to the Amsterdam market, as they find it more to their interest to ship bark to London, owing to quick settlements, a more businesslike method, and higher prices realized for Java bark in the English metropolis. Amsterdam will not likely create a stir as a competitive bark market, for the present at least.

We have attempted in the above remarks to throw some light on a very dark subject, but the half has not been told. A veil of secresy covers the whole cinchona and quinine industries, and it cannot be lifted except by some one in the inner circle. Foreign papers don't seem to realize the importance of thoroughly

investigating the extent and prospects of cinchona planting, and are content to publish the usual board of trade statistics without question. The work will devolve upon an enterprising American paper.—*Oil, Paint and Drug Reporter.*

THE QUININE MARKET.

By the time the Reporter is published, the present anxiety over the probable outcome of the bark sale on Tuesday will either be relieved or deepened. The interest manifested in the developments on that day is unusual, and in some quarters there is a faint hope of a strengthened market, although every indication points directly against it in the shape of alleged immense shipments of bark, loss of confidence and demoralized traders. The bark market especially is characterized by an absence of confidence, which did not emanate so much from the increased supplies as from the manner of conducting business at the sales. Many operators in this market place little or no importance in the wired intelligence from abroad as to prices realized per unit for bark. They had their confidence shaken by evidence of crookedness to blind the unsuspecting public, and do not accept as reliable the tests as announced at the sales. This growing suspicion is confirmed by a correspondent in the current issue of the *Tropical Agriculturist* who calls attention to the wide difference in analysis and value between a test made by a chemist employed by the planter and the analysis and valuation made in London. The difference was twenty-two cents per pound! The first analysis showed a smaller amount and to every appearance was honest, but the second one was artificially increased with the evident intention of swindling the buyer. This experience however is rare; the alleged crookedness is generally the other way, and instead of the planter receiving the benefit, the buyer and commission agent are intrigued against him; for instance, we are informed from London that a seller of barks on commission received a handsome bribe to have his barks analyzed a much lower percentage than actually existed, and by this means they were sold for about one-half or one-third of their real value to a bark speculator.

Under these circumstances the quinine market would be indirectly influenced, and when all confidence is lost in the bark sale reports, their importance will cease as a barometer for quinine values. Not only has faith departed from the bark sales, but it is firmly believed that statistics are also doctored for effect; this belief has become so well grounded in some minds that very little reliance is placed in the periodical announcements of the position of barks. The quinine market, it is thought, will have to stand on its own merits independent of the crude material, but this is hardly possible.

The present situation is not very encouraging for business. Buyers of quinine could have loaded up last week at fifty cents for either spot or July and August shipment, but only a few availed themselves of the opportunity. Outside parties were rather anxious to release spot stocks at that price and cover with deliveries during next two months at same figure, but a halt was called on Saturday and holders were found to be firmer. This was caused by the action of one large holder who prevented a serious break in the market by withdrawing all supplies on Saturday and declining bids of fifty cents, which would have been gladly accepted on the day previous. This had the effect of changing the whole tone of of the market as the lowest figure quoted since then by outside holders was fifty-two cents. A portion of the supplies changing hands at fifty cents last week was on account of American manufacturers. At present writing, American brands are unchanged in price, but a lower range is expected to prevail if the declining tendency in barks is unchecked. In the meantime, three foreign brands are favoring buyers at lower figures than quoted this time last week.

The *Planters' Gazette* of Ceylon* in a recent issue warns barks shippers of the necessity of checking their supplies as much as possible until the market has time to right itself and adds:—"It is unlikely that the present depression in quinine and bark will be of long duration. It has its origin from one or two causes, the result of which will so react on both raw and manufactured articles as to curtail the supply, and so with the increased demand which time is sure to show, we may look for steady and progressive markets later in the year."—*Oil, Paint and Drug Reporter.*

THE COLONIAL EXHIBITION No. VI.

FIJI.—The products of these islands occupy a comparatively small space, and though there is but little of absolute novelty among them there are, nevertheless, some of considerable interest. The coconut and its products, as might be supposed, is fully represented, as well as Candle-nuts (Aleurites moluccanus), the oil of which is used for illuminating purposes; and Dilo-nuts, the kernels of Calophyllum inophyllum, from which an abundance of oil is obtained having a high reputation for the cure of rheumatism. Tapa cloths are also abundant, the entrances to the court being hung with curtains of this material, which, as our readers will know, is the beaten-out bark of the Paper Mulberry (Broussonetia papyrifera). Amongst the many valuable woods that are found in the Fiji islands the "Visa" and the Sandal-wood will attract most notice, for here is shown a canoe cut out of a solid "Vesi" trunk. The tree which furnishes is a leguminous one (Afzelia bijuga), and the wood is heavy, close and even grained, and of an intensely dark brown colour. The natives use it not only for canoes but also for pillars for houses, bowls in which to serve kava, war clubs, &c. The Sandal-wood (Santalum yazi) was, it is said, "at one time plentiful in various parts of Fiji; but in the early stage of settlement its destruction must have been most indiscriminate."

Under the name of Bandina Boxwood some blocks are shown of a remarkably hard wood, which appeared upon examination to be suitable for engraving purposes. It is, however, of a dark brown colour, which, it seems, unfits it for the better kind of work, Upon submitting a sample of this wood to an expert, he reported that the wood has no special claim in consequence of its dark colour. This, he says, considerably reduces the value, as it could only compete with inferior Box, which is at present supplied in sufficient quantity. He explains this objection by saying that "cutting upon wood is like drawing upon paper; if it is tinted, there must be a limit to the density of the tint, or your drawing will be absorbed by the tint upon which it is drawn. An engraver would have difficulty in observing his progress while doing his work." The plant producing this Bandina Boxwood is at present unknown, but it is stated that should it prove useful it could be had in any quantity up to two feet in diameter from Fiji, and the other outlying groups of islands in the Pacific.

Some fine masses of Kava root (Piper methysticum) are shown, also powdered Kava root. This, it will be remembered, is the source from whence the Fijian beverage called kava is made by masticating the root and ejecting and fermenting the saliva. It is known to have diuretic properties, and has latterly attracted some notice for its medicinal value in this country. Quite recently, indeed within the last few weeks, a spirit prepared from Kava root has appeared on sale at the refreshment bars in the Exhibition. It is a colourless liquid and is sold in square white glass, capsuled bottles, with labels fully describing its virtues. It is called Yagona, the finest Kava Schnapps, or aromatic gin, and its value is set forth as follows:—"The active principle of this agreeable and splendid beverage is prepared from the root of the Piper methysticum, a species of Pepper. The root is called Yagona by the natives of Fiji, and from

* *Tropical Agriculturist*, no doubt meant.—ED.]

it they make their national drink, which is diuretic rather than intoxicating. Yagona has been the Royal drink of the Fijian and Samoan chiefs from time immemorial, and it is to its constant use that chiefs and people alike owe their robust health, in spite of the depressing influence of their tropical climate. This premitive and unsophisticated liquor regulates the action of the internal organs; it possesses remarkable soothing properties; it is a health stimulant, an excellent brain-feeder, a wonderful restorer of faded energies and of exhausted nerve-power. It is a preventive to gout and rheumatism. To those engaged in heavy intellectual labour it gives renewed energy. It is a veritable Elixir of Life. As a diuretic it is unrivalled, and it imparts a purity to the blood."

If the general use of the "Yagona" should be the only result of the Exhibition, it will finally have fulfilled a great mission!

A little *Handbook to Fiji and Catalogue of the Exhibits* has been issued under the authority of the Executive Commissioner, the Hon. James E. Mason, M.I.C., and this contains some interesting facts on the culture of the Cocoanut, Cinchona, Coffee, Cotton, Sugar, Tea, Tobacco, &c. Of the latter we are told that though it flourishes in all the islands of Fiji, it is most largely cultivated, and reaches its greatest perfection in the "Colo," or highland provinces of Viti Leon. the largest island of the group. All sorts of Tobacco seed have been grown, including Virginia and Latakia. The natives smoke their tobacco rolled up into "saluka" or cigarettes, the wrapper used being the dry leaf of the Plantain. Connoisseurs are very particular in the choice of their wrappers, and will only use the leaves of certain sorts of Plantains. Tobacco is an important iota of native life. Without it and kava no import-discussion can be conducted.—*Gardeners' Chronicle.*

SOME STATISTICS ON THE QUININE INDUSTRY.

MEMPHIS, Tenn., May 26, 1886.

TO THE EDITOR OIL PAINT AND DRUG REPORTER.

We will esteem it quite a favor if you will answer for us as promptly as possible, the following questions bearing on the quinine trade:

1. What was the price of quinine in the United States when the duty was removed, July 1st, 1879?
2. What was quinine worth in London, Paris, Germany and Italy, July 1st, 1879, or when the duty was removed in the United States?
3. What was the product of cinchona bark in Ceylon, South America and Java, in 1869, 1879 and 1885?
4. What was the price of the bark in London from January 1st, 1877, to January 1st, 1886?
5. What caused the great reduction in the price of the bark?
6. Do American manufacturers get supplies from Ceylon, Java, or South America, or all?
7. What was the duty per ounce on quinine when it was made free?
8. What was the duty on the bark, or raw material?
9. Was there a duty on the bark as well as the quinine, when the duty on the latter was removed?
10. How much quinine has been imported into the United States since the duty was removed, say since July 1st, 1879?
11. How much has been exported since then?
12. Can you give the foreign product per annum of quinine?
13. Also the American, before and since the duty was removed?
14. What is the tariff on imported castor oil?

We no these are quite a long string of questions, but we are anxious for the information and will certainly appreciate any assistance you can render us in the matter. M.

[1. The highest price of quinine in 1879 was $3 60 and lowest, $2 60. When Congress removed the duty in July of that year the price of American quinine was $2 25 per ounce in bulk.

2. Complete information on this point is not to hand. The duty was no sooner removed in the United States than large quantities of foreign quinine were shipped here and with this increased movement, prices advanced abroad. The lowest price in London during 1879 was 9s and the highest 14s.

3. Ceylon is one of the main sources of supply for bark, and it has only been during the past ten years that the shipments from that place reached any appreciable amount. In 1861 the first seeds were received in Ceylon and in 1869 the export of bark was only 28 ounces, but in the season of 1882-3 the exports were 6,925,595 lb. and in the season of 1883-4 the exports were 11,500,000. For many years previously South America supplied all the bark used by quinine manufacturers of the world, but through the active exertions and costly experiments of the British and Dutch Governments, the cinchona plant was introduced from South America into the East Indies, Java and Ceylon, so that large quantities of bark are now obtained from these more recent sources of supply. We are unable to give the actual figures of production. The Java barks are growing in importance while South American are not held in such high favor.

4. The price of bark in London on January 1, 1885 was 8d per unit and same date this year 5d per unit. We have no information as to the market in previous years.

5. While the removal of the duty has been an important factor in the cheapening process of quinine and barks, it has by no means been the only cause. Supply and demand have to a great extent led to the reduction. Quinine is cheap today in England and on the continent of Europe as well as in the U. S., partly because cinchona bark is cheap, and the bark is cheap because of overproduction.

6. Almost exclusively from Ceylon.

7. Twenty per cent ad valorem.

8. In 1861 the duty on bark was ten per cent. until August of that year, when it was increased to 15 per cent. In July of the following year it was changed to 20 per cent and in 1870 cinchona bark was placed on the free list. On June 22, 1874 a discriminating duty was imposed on East Indian bark which was repealed in 1882, the act taking effect Jan. 1, 1883.

9. Answered in preceding paragraph.

10. The total imports of quinine into the United States since 1866 have been has follows:—

	Ounces.
1867	40,675
1868	117,996
1869	35,550
1870	10,861
1871	34,723
1872	7,970
1873	114,814
1874	68,097
1875	12,279
1876	22,746
1877	75,804
1878	17,549
1879	228,348
1880	416,998
1881	408,851
1882	795,495
1883	1,055,764
1884	1,263,732
1885	1,390,126

11. The exportation of quinine has been so light that no record has been kept of the amount. Not long since the stock here of a German brand was shipped back to be recrystalized to give it the appearance of other makes, but outside of this there has been no exporting business if we may except two lots of domestic sent to London last year as an experiment.

12. As we stated in the *Reporter* last March, some parties interested in the quinine market have undertaken the laborious and unfruitful task of figuring up the world's production of quinine, which has been an enigma ever since the industry was

started. From a reliable London source we get the following estimate of production for 1885.

	POUNDS.
United States	70,000
Germany	70,000
England	50,000
France	40,000
Italy	30,000
India (febrifuge)	10,000
Total	270,000

These figures were shown to some members of the trade in this city and it is hardly necessary to state that they were characterized a ridiculous. We were volunteered another estimate as follows:—

	POUNDS.
United States	100,000
Germany	120,000
England	27,000
France	30,000
Italy	35,000
India	10,000
Total	322,000

In August 1884, the *Reporter* published an interview with a gentleman who placed the total production of the world at 4,500,000 ounces, forty per cent. of which was consumed by the United States. The production of the latter at that time was estimated at 1,000,000 ounces, or 500,000 ounces less than before the removal of the duty. From those statements some one may be enabled to strike a happy medium and arrive at a closer estimate of the world's production.

13. Answered in the preceding paragraph.

15. The duty on castor oil is 80 cents per gallon. ED.]

PARING AND BURNING LAND.

This method of clearing land is of very ancient date, and is more generally resorted to by the agriculturist than the gardener, probably for this reason—that in a well kept garden the soil is kept at such a high state of efficiency by continuous manuring and constant cleaning as rarely to require any such radical treatment, for one of the principal advantages of paring and burning is, that in one operation it not only cleans the land but also manures it. In the formation of new gardens, however, and especially where the ground is overrun with noxious weeds and the coarser kinds of grasses, such as *Oo'oo* (Imperata cylindrica) and *Mootho* (Cyperus hexastachyus), this is frequently not only the most effectual but also the cheapest and most expeditious means of clearing the ground.

In carrying out the system of paring and burning, we must first consider what soils are suitable for the work, and our experience teaches us that light, sandy soils are not adapted for it, nor is it so much required for cleaning this kind of land, because these soils work freely, and therefore the grass and weeds are easily separated from the earth, and besides soils of this description rarely become so foul as those of a more tenacious nature. It is also difficult in practice to burn these soils, because when turves or bunches of grass grown upon these soils are cast on the fires they settle down so closely that the air is impeded in its circulation through the heap, consequently the fire burns slowly or goes out entirely. The soils best adapted for paring and burning, in order to obtain the full advantage of the process, are those of a strong calcareous nature, and most other clays, the object being to obtain manure as well as the destruction of weeds. We obtain important results by the residue or ashes of the stronger soils of any description, and especially those yielding a large amount of potash and carbonate of lime, each in varying proportions according to the composition of the soil before burning. In the process of burning, valuable ashes are obtained from the coarse grasses and other weeds the soil may contain. These weeds and grass when left in undisturbed possession of the soil, are the resort of various sorts of insects inimical to almost every kind of produce, and although these insects may be greatly disturbed by the ordinary process of culture, yet their entire destruction is only obtained by the action of smoke and fire in the case of paring and burning. The enemies to crops are really so numerous that it would be simply impossible to enumerate them all, but the chief of them consist of wire-worms, grubs, slugs and snails; all these will be destroyed entirely by paring and burning the land, especially if it is done by turfing and burning with as little disturbance as possible to the turves after being cut. We strongly advise the plan of paring as compared with cultivating before burning which is sometimes adopted, because the latter plan during tillage would so disturb the insects in their haunts and holes that many would escape and again hide themselves in the loose earth before the clods could be placed on the fires, but it is ortherwise when the surface is cut over by paring say to a depth of four to six inches, because in that case they would be but little disturbed in their hiding places before the turves where placed on the fires. This is one of the strongest reasons why the old style of paring and burning is still most advisable. We must now refer to the record of experimental investigations made on the subject by Dr. Voelcker, one of our greatest authorities upon may points and practices in agriculture and scientific farming. He says:—"I am prepared to adduce reasons founded upon analytical evidence and well-established agricultural experience, in support of my conviction, that paring and burning on some kinds of soils is not only a profitable operation, but that it is under certain circumstances by far the most rational plan of cultivation which can be adopted in our present state of knowledge for raising upon some kinds of land the largest amount of produce with the least expenditure of money. In connection with the policy of paring and burning we must expect to meet objections, and to encounter some opposition from both practical men and theorists also, the former through want of experience, and the latter through misapprehension of the teachings of science. Various classes of objectors have arisen from time to time. There have been three principal ones which we shall refer to separately. The first objectors condemn the practice because they say it destroys the organic or vegetable matters in the soil, and that it causes a waste of a most important classes of fertilising constituents. In reply we do not deny that vegetable matters are soil constituents under all circumstances, and prove more or less valuable as fertilisers; in fact well cultivated and productive soils invariably contain much organic matter, which circumstance has led many to suppose that the productiveness of the soil depended upon their relative proportions found therein. Not many years past it was customary for agricultural writers to estimate the relative state of fertility of different soils by determining the amount of humus or decomposed vegetable matters in each. This it must be understood is clearly contrary to reason and well ascertained facts, for there are soils which, like peaty lands, contain a large percentage of vegetable matter and yet are comparatively sterile. On the other hand there are very many fertile clay soils which contain hardly any humus and yet are highly productive, and which for this reason may with much advantage be subjected to the process of burning. The last objection we have to notice is on the ground of expense, and maintaining that it is more profitable to lay out money in the purchase of Guano, Superphosphates or other artificial manures than to spend it in paring and burning. In reply we may observe that the opinions of practical men on this subject furnish most reliable evidence that paring and burning, as practised by the best farmers in England, proves, conclusively that it has been found to be the most economical means of culture for many descriptions of crops."

We quote from Dr. Voelcker's essay on the subject, who observes: that "Numerous personal enquiries lead me to confirm the opinion expressed by Mr. Caird,

who says that the best farmers burn the most, and he rests his opinion on the testimony of several practical men. Amongst others things he mentions a field that had been broken up from its natural state just fifty years ago; it was then pared and burned and so started for the first crop of turnips, which supported the other crops of the course. The same process has since been seven times repeated; no manure of any kind had ever been applied, and yet the crops in each succeeding rotation had shown no signs of decreasing. The soil which lies on the limestone foundation is very thin, but not more so than when first broken up." We have quoted this because it is so much in accordance with our own practice in paring and burning, for, after spreading the ashes resulting from burning, we have never had occasion to apply manure of any kind for a number of years when the soil burned has been of a strong loam or clay nature. In again quoting Dr. Voelcker in respect of the mode of burning, he says:—"A certain degree of heat is necessary to induce a proper chemical action; but, as demonstrated by my former experiments, an excessive heat should be carefully avoided, inasmuch as it has the effect of rendering burnt clay again less soluble. It is no doubt for this reason that practical men recommend stifle burning, * for this prevents the heat of the heaps of burning soil becoming too intense, consequently stifle-burnt clay is always very porous, crumbles readily to powder, and is more easily soluble than clay burnt at a higher temperature." In accounting for the advantages of paring and burning, the changes in the organic matters of the soil must not be overlooked. Soils which are regularly pared and burned often contain much vegetable an organic matter, and afford therein fuel for burning a considerable quantity of the soil itself. It must be understood that the destruction by fire of the organic remains in heavy soils, far from doing any harm, is the most available and economical way of preventing their undue accumulation. The fire, we would observe, also destroys insects, their eggs and larvæ, as well as the seeds of weeds, bits of underground stems which, like those of many species of grasses, are apt to grow again, and which therefore cannot be disposed of so effectually as by burning; in short, nothing cleans land so cheaply and effectually as paring and burning.† We must now observe that the excess of undecomposed vegetable matters are found to be injurious to vegetation. Peaty soils furnish familier examples of this. In conclussion it must be understood that the destruction of vegetable matter in soils adapted for paring and burning is not attended with any evil consequences. Inert vegetable matter is changed by burning into highly effective mineral food for crops. Burning improves materially the mechanical condition of the strong soils by rendering them more porous and more easily cultivated. The ashes produced by paring and burning are especially useful to green crops, because they contain a large portion of phosphates and also potash, constituents which are known to promote in a high degree luxuriant growth.—*Indian Gardener.*

TROPICAL FRUITS.‡

Amongst objects of productive industry receiving attention at presant in our Colonial possessions, tropical fruits are at once the newest and most interesting of all. Many of these fruits are practically unknown in England in a fresh state, and hence before tropical fruits are largely consumed here, it is necessary to diffuse knowledge respecting them, and to render them as familliar to English home people as they are to their Colonial friends.

* Smouldering: pieces of wood, weeds and rubbish slowly burning under a covering of clay. If the fire is too brisk, there will be danger of the clay hardening into the consistence of brick.—ED

† Where fire cannot be applied, a dusting of quick lime will be beneficial.—ED.

‡ Abstract of a Paper read at a Conference held at the Colonial and Indian Exhibition on Tuesday, July 26. Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., in the chair.

At the present Exhibition, owing to the suggestion of the Council of the Royal Horticultural Society, fresh fruits are shown from nearly every part of the British Empire. Thanks to the Colonial Market established in connection with the Exhibition, Oranges Lemons, and Grapes are shown from the Australian Colonies; Oranges of several kinds from Natal, fresh Coconuts from the West Coast of Africa, Pine-apples from Antigua. Bananas from Jamaica, Naseberries (Achras sapota), Avocado Pears, Papaws, Bread-fruit and limes from British Guiana; Melons from Barbados, Prickly Pears and Dates from British India, and most luscious Pine-apples from Singapore.

Although not exclusively a tropical fruit, the Orange is found and flourishes throughout the eastern and western Tropics. Taking this fruit as an example, it is remarkable what a large increase has taken place in the consumption of this fruit in the United Kingdom during the last fifteen years. In 1870 the number of Oranges imported into the United Kingdom was 80,000,000. In 1885 this number had increased to 500,000,000, or at the rate of fourteen per head of population. Dates are consumed to the extent of 5000 tons per annum, while Coconuts are imported by the shipload.

Being the nearest to England, as well as the most productive in the way of tropical fruits, the West Indian Islands naturally supply, and should supply, the English market more readily than any other. At the present day in the West Indian Islands the value of the fruit exported is nearly £400,000 per annum.

In Jamaica alone fruit is annually exported to the value of over a quarter of a million sterling—consisting chiefly of Bananas, Oranges, Pine-apples, and Coconuts. The Bahamas export chiefly Pine-apples, both fresh and canned, to the value of £50,000 per annum. Trinidad grows and exports chiefly Coconuts. British Honduras, connected by a mail route with New Orleans, exports Bananas, Coconuts, and Plantains to the value of £15,000 per annum. Montserrat is chiefly interested in Limes, and exports Limes and lime-juice to the annual value of £11,000. Dominiac exports Limes, Tamarinds, concentrated lime juice to the value of £40,000; while flat and sugary Antigua exports only Pine-apples, but those, though small, of very superior quality. From their geographical position it is only natural to suppose that a large proportion of the fruit of the West Indian islands finds its way to the United States and Canada, where there are nearly fifty millions of people, with all of whom fruit enters largely into their daily food.

The Banana (Musa sapientum) is the cheap fruit at present cultivated in the West Indies, and this fruit is the one which in the future will be more largely offered in the English market than any other. There are numerous varieties of this fruit under cultivation, the Martinique Banana is found the most profitable to grow for export, although a smaller fruit, known as the Fig Banana, is more luscious and more highly esteemed locally as a dessert fruit. Jamaica exports Bananas to the value of nearly £200,000 per anum, and is capable of growing fully three times the quantity now exported without any diminution in the larger staples.

The Pine-apple (Ananas sativa) is no doubt indigenous in Jamaica, where an inferior kind, known as the "Cowboy macca," is still found wild. The Pine-apple is incorporated in the arms of Jamaica, and certainly nowhere, except perhaps at Pernambuco, can Pine-apples of such size and delicacy be grown as in some parts of this island. Antigua is noted for its Pine-apples, the pitch-lake Pine of Trindad has at least a local reputation, but the Bahamas export more Pine-apples in the fresh and cured state than any other part of the world. The chief supply of Pine-apples for the English market at present comes from Madeira, the Canary Islands and the Azores. Should the interesting experiments now being carried on by Messrs. Scutton & Sons, who have fitted up one of their ships with a refrigerating chamber, be successful, we shall before long have large supplies of Pine-apples direct from the West Indies, and at very moderate cost,

The West Indian Lime (Citrus medica, var. acida is a fruit which is not much known in England. It is possibly little grown anywhere else except in the West Indies, where a large industry is arising in connection with the preparation of raw and concentrated) lime-juice for the manufacture of citric acid.

The Mango (Mangifera indica) is the "Apple" of the Tropics, and is a most nutritious and wholesome food as well as a desert fruit. Originally an East Indian tree, the Mango has become thoroughly naturalised in the West Indies, and is forming large groves in waste places in Jamaica, where negros, horses, pigs, and fowls feed upon the fruits for nearly four months of the year. The West has given to the East the Anona fruits, known as Sour-sop (A. muricata), the Custard-apple (A. reticulata), Sweet-sop (A. squamosa), and the Cherimoyer (A. cherimolia), but practically only the second and third appear to have become established in their new home. The Guava fruits (Psidium Guayava) are very common everywhere, and utilised chiefly for making the well known Guava jelly, and for flavouring cordials and syrups. The Litchi, rambutan, and Longan of the East Indies are co-related by the Genip (Genipa americana) of the West Indies. The fruit of the spine-armed Zizyphus jujuba, allied to the "seductive sweet fruit"—the Lotus of the ancient Lotophagi, has become cosmopolitan in its distribution, and will soon finds its way to England from the West as well as from the East. The Passion-fruits are amongst the most delicate and refreshing of tropical fruits, and ome of them have been successfully introduced to England. The most common are the Granadilla (Passiflora quadrangularis) the Pomme d'Or or Water Lemon (P. laurifolia), the Sweet-cup (P. edulis), and the Calabash Sweet-cup (P maliformis).

Of tropical fruits known generally as nuts, we have a long list, some of which are seldom seen in England. The Coconut is too well known to need description. It is computed that over three million acres of land are under cultivation in Coconuts in tropical countries, and the annual export value of nuts, oil, copra, and coir is estimated at nearly two million and a quarter pounds sterling. The Brazil nut (Bertholetia excelsa) is obtained entirely from wild trees which, are of immense size; and the same may be said of the Sapucaya nut (Lecythis sapucajo), and the Souari or butter-nut (Caryoca nuciferum).

India is so badly off for fruit herself that she is not likely to be able to export any to this country; but the wild Apricot of the Himalayas, of the Punjaub and North-west Provinces, is produced in such immense quantities, and so easily cured by simply drying in the sun, that it might be imported at a very low price. It is the Prunus armeniaca of botanists, known in india as the Mish-mush or Moon of the Faithful. This latter appellation it has obtained from the fact that it is sometimes pressed out into sheets of "moons" and kept in that state until required for use. The delicious fruits of Singapore and the Malay peninsula, amongst which the Mangosteen and the Durian are the best known, are not likely to come direct from those countries. The former has, however, been fruited both in Trinidad and Jamaica, and large trees of the latter exist at these islands as well as at Dominica, Grenada, and St. Vincent. Hence West Indian Mangosteens and Durians are objects not impossible to be seen in England during the next decade —D. MORRIS, Assistant DIRECTOR, Royal Gardens, Kew, July 21.—*Gardeners' Chronicle.*

THE POTATO DISEASE.—We take the following from the *Journal of the Pharmaceutical Society*:—"Dr. A. B. Griffiths has lately made some interesting experiments on the effect of sulphate of iron on the Potato disease fungus (*Chemical News*, May 28, p. 256). He found that an aqueous solution of 0. 1. gram of ferrous sulphate in 100 grams of water causes perforations of the cellulose walls of the hyphæ and spores, while it does not attack the cellulose walls of higher forms of plant life, the cellulose of which appears to be of a different character, since it is coloured by reagents which do not affect the cellulose of fungi. He also suggests that potash salts in manures, while valuable for the potato, also stimulate the growth of fungi, since Chevreul has shown that fungi greatly flourish when watered with a solution of potassium nitrate.—*Gardeners' Chronicle.*

PLANTING IN TRAVANCORE.—Mr. Valentine of Travancore has been on a short visit to our Ceylon Tea districts, to note and compare progress. Travancore promises to be a very fine ea-growing district: indeed one report by a Ceylon planter says he has seen as fine tea growing there of its age as any in Ceylon. Very little in Travancore however is of a plucking age, and the extension of planting is not being pressed, but is carefully and gradually being attended to. There is no scarcity of labour, most of the coolies coming from Tinnevelly. As an outlying division of the Ceylon planting districts which we have always regarded South Travancore since the days of poor John Grant and his band of pioneers, we are interested to hear of progress such as Mr. Valentine reports.

A HINT TO CEYLON TANNERS.—A new use for Carbolic Acid has been discovered by an Australian inventor, namely for tanning leather. We had thought that Australia affords more than enough natural tanning material without this invention. In the process the skins, which have been limed in the ordinary manner, also haired and prepared if for the production of sole leather, are placed in a bath consisting of a mixture of 10 gallons of water, in which 200 pounds of soap are dissolved and containing 1 gallon of carbolic acid, the skins being left in the bath until tanning is complete. The process may be considerably accelerated by adding a pint of fresh carbolic acid to the tanning fluid from time to time. For a softer leather the raw, limed, and haired skins are for one or two days placed in a mixture of four parts carbon bisulphide and one of carbolic acid, and then washed.—*Chemist and Druggist.*

COFFEE up to 70s is indeed, good news for long-suffering planters who may have coffee to sell: and we may have the standard rate in the "eighties" before the end of the year. Brazil is rapidly getting into a bad way, witness the following new phase of their labour troubles recorded in the latest Rio paper:—

There is one serious problem in the social organization of Brazil which ought to be studied and solved—and that is: What is to be done with the freedman? Rare indeed is it that a planter is found who thinks that his ex-slaves may be retained upon his lands as paid laborers, and still rarer is it to find a legislator who contemplates the possibility of retaining them as a laboring force. The one great demand is for colonization or immigration, in which is to be found a substitute for slavery. Now, what is to be done with the ex-slave? It is thought by most men that the freedmen will all flock to the cities; but the cities are already overcrowded with them and can neither employ nor support them. Where, then, are they to go? They cannot camp in the highways, nor upon the lands of others. They can not live without food, clothing and shelter of some kind, nor can the charitable begin to provide even a tithe of these things for them. The cities, and even the country places, are already over-run with mendicants of every kind and description, and the number of idlers and vagabond dependents is even now grievously out of all proportion to the actual laborers. Out of a population of, say, twelve millions, there are probably not a quarter of a million of manual laborers outside of the slaves. The number of idle men among the poorer classes—men who actually do less than a week's work in the whole year—is simply incredible.

Correspondence.

To the Editor of the "Ceylon Observer."

SYNTHETICAL MANUFACTURE OF QUININE.

5th August, 1886.

DEAR SIR,—The July number of your valuable *Tropical Agriculturist* contained an article *re* Synthetical Manufacture of Quinine, your correspondent mentioning an advertisement in the *Lancet* according to which a "Syndicate for the above purpose was being formed." Have you not read any more of this interesting scheme? Quinine and quinine alkaloids possess a strong rotatory power, and as it has proved an impossibility as yet synthetically to prepare any substance which has the above property, planters and others concerned may take the medical men's Syndicate easy. Indeed a synthetical manufacture of quinine has to be looked upon as impossible for the presen t.—I am, dear sir, you s faithfully, M P.

We have heard no more of the *Lancet* advertisement.—ED.

ALL ABOUT TEA AND ITS PROSPECTS:

THE ALLEGED "DETERIORATION"; "PLUCKING FINE" *v.* MEDIUM PLUCKING; FINE QUALITIES FALLE; MOST IN PRICE; THE SYNDICATE TO APPLY THE REMEDY; NO "SECRETS" ABOUT TEA-MAKING NOWE THE "OBSERVER"'S FOUR HEADS OF ADVICE RECAPITULATED; THE NEED FOR THE DRAG ON THE COACH; "ECONOMY IN WORKING" REQUIRED; SAFE AVERAGE PROFITS R15 PER ACRE; THE FUTURE OF LABOUR SUPPLY; A WARNING TO PROPRIETORS.

5th August 1886.

DEAR SIR,—Some time ago you asked me to give you my ideas about things in general and especially Tea. I send you a rather hurried sketch for you to do what you like with.—I remain, yours truly.

The most serious question at present is: "Has Ceylon tea reached its lowest price or must we look for a further fall?" At present the fall is arrested, and we hope our produce will soon command better prices. Unless other markets are found besides Mincing Lane, later on, we shall probably see a still more serious and a permanent fall. How we are to meet this outlook is the point we have to consider. The reply of the London Broker is, "Pluck fine and send home superior teas." The Planter's answer, to this is, plucking fine does not pay me so well as medium plucking, which also tries the young bushes less, besides I find the teas specially affected by the late fall are the teas of better quality. To prove that this is correct we have only to refer to the weekly list of tea sales in London. Broken Pekoes and Pekoes formerly worth 1s 9d to 2s. now sell at 1s to 1s 2d, whereas Pekoe Souchongs formerly worth 1s 1d to 1s 2d still realize 10d to 1s: dust and broken teas have fallen very little in value. The complaint that Ceylon tea has fallen off in quality is not generally allowed by planters. One of them discussing this question with me lately said, 'My opinion is, an attempt is being made by London Brokers who are interested in Indian and China teas, to class Ceylon Tea as an inferior article, and rank it with Java produce and he suggested *first*, that for a short time all proprietors should pluck fine and thus compel an acknowledgment that Ceylon tea equally with Ceylon coffee and cinchona is second to none; *second*, that all proprietors should support the new Syndicate and show London Brokers that we can find other outlets for our tea and thus compel them to value our produce fairly.' I would urge the Syndicate not to forget to place Ceylon teas in London and all large towns in the United Kingdom and the United States, where, if proper agents are appointed and good teas (guaranteed by the Syndicate) sold large quantities of our produce will be absorbed and we shall be rendered less dependent on Mincing Lane.

That planters are anxious to know all about and to make as good tea as possible is shown by the way in which information is freely given in lectures, &c., and by the general exchange of opinions that is always going on. Mr. Gow's 'secrets" are the only ones that I know of in Ceylon. I hope they will turn out valuable ones and if he can without plucking finer, raise the price of tea on the estates he visits, he will benefit himself and the Island. I fear it is hardly likely he will divulge them—that is if they are worth having—in his paper to be read in Dimbula.

I believe Ceylon teas will improve as estates get older, and that possibly climatic influences may have caused a slight falling-off in quality; but that every planter has been less careful in manufacture or that the stamina of the tree has been affected I am unwilling to admit.

You have frequently warned planters not to be too sanguine and given them advice. It can do no harm to recapitulate some of your past advice, as even now it may be of use, as land is still being opened for tea, and coffee is being interplanted. It will also be interesting to see if you were correct. Advice No. 1 was, Not to put tea into worn out coffee estates or into land where soil was bad; 2nd not to use seed from young bushes or bushes of an inferior jat; 3rd, Not to rush estates into tea but to do the planting gradually and carefully; 4th, To have belts of gums and other trees to keep off wind and break the expanse planted in one product, thereby probably lessening the spread of disease if hereafter it attacks tea.

Inferior land has, no doubt, been planted by men unwilling to acknowledge that the estate they had sunk their money in and which failed in coffee and cinchona would not grow tea; and by speculators with a view to selling out when the rush comes (but the rush never has come and now prices are down probably never will). That tea from land of this description proves inferior is not surprising. Many have rushed tea into their places and been careless about seed because agents and mortgagees compelled them to plant large acreages at once and now in yield and quality their estates cannot come up to those of their more fortunate neighbours. It may be that advice No. 4, may yet prove to be sound but many belts put in for cinchona have been eradicated of late years showing that the advice is not generally believed in. I cannot believe poor soil will continue to give large crops of good tea without cultivation. cost of which may render keeping up of poor estates unprofitable. It is certain that prices will eventually fall to say, 40 to 50 cent for all round breaks and remain at that price. Only estates where the yield is high and quality good will then pay. If inferior land is abandoned when this occurs, those who have good land will benefit. The produce will be superior and prices less affected as the annual outturn will be less.

Economy in working must be the great aim of the Ceylon planter: the man who gets the highest average is not necessarily the best planter; but those who can combine cheap expenditure and a fair average price for their teas will show the best profits. When the question among planters is what profit did your last break show?

—instead of as at present what was your last average price?—the position of proprietors and the credit of the island will improve. The sooner the desire to raise the average price is coupled with the determination that it shall not be combined with increased expenditure the better. If high averages cannot be obtained without fine plucking, which means increased expenditure and is trying to our tea bushes it is far better to be content with our present rates. Without manuring, tea will cost in most instances not less than cents 30 delivered in Colombo and taking an average price of cents 45 and an average yield of 300 lb. an acre we have a profit of R15 per acre or on a 200 acre estate R9,000 per annum. It certainly cannot be safely calculated higher save in exceptional districts where soil and climate combine to increase yield and give a superior quality of tea. The above figures may be considered low but they are safe. Many estates are giving large returns, but will they continue to do so. After years of working?

Profits may be large now, but when the price of labor goes up, as I believe it will do, when Coast advances increase; and last not least when Superintendents are wanted and their salaries rise, I question whether my calculation of profits is too low. To prevent the cost of labor increasing we require, *first*, to have direct steamer transport for coolies to Tuticorin; *second*, the Paumben Railway; *third*, suitable Government *ambalams* for them at the ports of embarkation and debarkation; *fourth*, a direct service, *i.e.*, through tickets and European agents at each end who will not leave the cooly a prey to native peculation. Lastly, I much question whether the present kangani system could not advantageously be replaced by collecting agents. All who can grow coffee, cinchona and cacao successfully should put in tea only where the other products cannot succeed: this will pay them best in the end and others will benefit by their not increasing the output of tea.

I am of opinion that a large acreage of tea is pruned and plucked (probably in some cases owing to necessity) when very young, damaging the bushes and the future of the estate. It is necessary to warn proprietors that by this course they are not studying their own interests. The day has passed when agents and banks combined to help speculators to buy and sell estates at unremunerative prices. Proprietors must accept the fact that they are no longer birds of passage; they cannot as formerly plant up estates and sell. They must consider the future of their properties, which, if carefully tended from the first will yield them small and steady incomes. They are unlikely to effect a sale except to *bona fide* capitalists who will be careful only to buy the estates at a price that will be remunerative to themselves, that is, unless Limited Companies will help them out. They must remember also that estates, like everything else, after reaching maturity go back; that in many cases they are working on soil where cinchona and coffee have previously been grown: that disease may and probably will, later on attack their trees (for where a large expanse is in one product, disease is generally found). All proprietors should therefore lay aside at least half of their present profits and look on half only as income; then, in later years they will be able to enjoy a well-earned retirement in a temperate climate.

FOURTEEN YEARS A PLANTER.

TEA MACHINERY.

[We were invited by Messrs. John Walker & Co. of Colombo Iron Works, the other day to inspect some new tea machinery at their works, but owing to shortness of staff and a feeling that a practical authority would be able to give a more correct opinion we requested a well-known tea planter of large experience to inspect the machinery for us and we are indebted to him for the following.—Ed.]

Dear Sir,—While in Colombo having had occasion to visit Messrs. John Walker & Co.'s factory, I was enabled through the courtesy of Mr. Walker to see the new Jackson's Tea Sifting Machine put in motion and it seems to leave little if anything to be desired as regards strength, simplicity and general completeness. The machine, which is strongly built and works noiselessly, is about 3 feet by 12 feet. At the top end of the machine is a Cutter which also acts as a feeding-box through which the tea in bulk is passed; it then falls on to a 6, 8 or 10 mesh tray according to method of sifting and all teas that do not pass through this upper mesh go over the bottom end of the machine into another Cutter equalizing itself and forming pekoe souchong or souchong, according to mesh used. What teas go through this upper mesh fall on to a 12 or 14, the broken pekoe passing through these and the pekoe remaining above both discharging themselves at the lower end of the machine through separate hoppers, the different grades of teas being carried through the machine and evenly distributed on to the various meshes, by means of "rippled" metal plates. The teas are easily seen and got at, all the trays with meshes pulling in and out like a chest of drawers. At present there is no means of taking out the dust, but I suggested to Mr. Walker a slight alteration which should easily be made to effect this purpose.

The new "Economic Roller" is also worth a visit and is by far the best-looking machine at the money yet turned out in Ceylon, and I shall expect to find exceed the capabilities expected of it by the manufacturers.

At Messrs. Maitland & Co., I saw Mr. Gilruth's Packer, a recently patented machine, of which the public will hear more in the immediate future, there being no doubt from both local and London broker's reports on the trial shipment of teas packed by this machine that it will be the means of enabling planters to avoid rebulking charges in London. A few great improvements are being effected in this machine, and it may be a month or two before the public will be able to get delivery of it, as Messrs. Maitland & Co., as usual, want to turn out a thoroughly perfect article.—Yours truly,

PLANTER.

TEA MAKING AND THE CEYLON PLANTERS.

Sir,—I've been told by *experienced* Ceylon tea makers that they consider Mr. Gow's utterances anent our island manufacture "insultingly sweeping." No doubt there is *room* for *improvement* in every walk through life, and a friendly word of counsel, from an *authority* should not be discounted too harshly; at the same time, an utter stranger (may I say) to the country might have *paused* before thundering forth such "fiat."

The first question which arises to my mind on hearing that Mr. Gow had condemned the Ceylon mode of tea manipulation is, what experience has he had in this respect? Has Mr. Gow ever made a lb. of tea in his life before his advent to our isle of spice? Does he conscientiously believe that our manufacture of tea is entirely wrong? If so, what does he base his argument on? The recent poor prices no doubt! Supposing that the market went up with a "jump," as I hope it may; would Mr. Gow kindly publish his opinion as to the reason why?

The able and interesting letters which have lately appeared in print,—more particularly Mr. Spearman Armstrong's—give us an insight as to the recent falling-off in quality of our teas. My only objection to

his statements are, that he tells too much!—in fact is too honest towards our traducers. The planters of Ceylon are, as a rule, *quick at learning*, be it coffee, cinchona, cardamom or tea cultivation and manipulation. Mr. Gow's task therefore should not be a difficult one if he *really can* teach us to improve our teas, and enable Ceylon growers to double their present prices in the London market.

I trust I am not too stringent in my remarks, and that Mr. Gow will take them in the spirit in which they are intended; namely, to ventilate a discussion which day by day is growing in importance, and which some day not far off will, in my opinion, form the very foundation upon which Ceylon as an agricultural colony may be known, honored, and respected.—I am, sir, yours faithfully,

SHELTON AGAR.

ENEMY OF CACAO.

10th August 1886.

DEAR SIR,—Enclosed I send you a small piece of wood with chrysalides * attached. Will you kindly tell me what they are? I found them inserted longitudinally in the bark of the trunk of a cacao tree, and, as you will see, they had penetrated the cambium. As they exist in great numbers, I am anxious to know what they are?—I am, sir, yours truly,

A PLANTER.

P. S.—I have often been mystified, on reading the Monthly Market Rates given in your *Tropical Agriculturist* as to how different products are sold. I read this month, for instance: "Vanilla 14s to 24s" Is this per lb. or per kilo? Would you publish once a table of how these different products are sold? [We shall endeavour in future to give the measure opposite to each. Vanilla must be per lb.—ED.]

A BIG TEA LEAF.

Hunugalla, Elkaduwa, 15th Aug. 1886.

DEAR SIR,—What think you of this tea leaf from Elkaduwa? Its size when pulled was 11½ by 4½.—Yours very truly,

A. D. MOIR.

[The leaf is splendid, excelled only by a leaf of indigenous, fully a foot in length, sent to us a couple of years ago from Somerset, Dolosbage.—ED.]

THE RECENT FALL IN PRICE OF CEYLON TEA.

DEAR SIR,—Other eminent men have written about the late fall in value of Ceylon tea. Why should not I? I have planted tea, and I have made tea, and I have sold tea. I am a tea planter. Some say the cause is to be found in the fall of silver. I don't agree with them. It requires silver to make tea, but tea is not made of silver. Take a pound of tea, say B.O.P. for sake of argument. It is worth 60 cents. But you are up to snuff and get one rupee for it in Colombo. Next week the price of silver falls. But your pound of tea is exactly the same value if not exposed to rats and damp. Try to buy it back for less. You can't do it. This proves I am right. Some say it is faulty manipulation. Why manipulate at all? I don't manipulate. Pull your tea about and you get grey dust. Everycne knows that. Sieve it gently through 8 and 12, and blow your dust out. What more do you want? Some say it is over-firing. That 's absurd. Surely we have noses and can smell burnt tea? I can smell burnt tea at 100 yards' distance on the flat. A cooly who burns tea in my factory gets lifted out of it pretty smart. Some men burn their tea. But that does not prove that we all do it. I will give any man one rupee per pound for all the burnt tea he can find in my factory, if he agrees to give me 10 cents per lb. for all he finds not burnt. This will pay for damage done by his pulling my tea about in search of burnt stuff. I don't say I'll give him the tea for 10 cents. You bet I keep the tea! Some say it is young leaf. Ridiculous nonsense. We have not all got young leaf. Some of mine is very old, but it does not fetch higher prices than the young. Some say it is exhausted soil. Bunkum! Has all the tea soil in Ceylon suddenly become exhausted? The man who started that theory is in a bad way. He ought to consult Doctor White. Some say it is bad lead and rotten tea chests. Those men have lead and boxes for sale. Look out. Don't buy them. Some say it is bad stowage on board ship. Shipping with hides and other fragrant conserves. Rubbish! Does tea taste of everything it is shipped with? I hope not. Some say it is a fall in the tea market. Exactly so! I agree with them. An ordinary fall in the common or garden tea market. Nothing else.—Yours sincerely,

WOOLY WAG.

MR. SHELTON AGAR AND MR. GOW.

DEAR SIR,—I think that Mr. Shelton Agar's letter attributing to Mr. Gow, opinions regarding the manufacture of tea in Ceylon, which he never expressed, is not only unfair but written in very bad taste.

Mr. Agar acknowledges that he knows absolutely nothing about Mr. Gow's qualifications or whether he ever made a pound of tea in his life, and assumes at once that Mr. Gow like himself has expressed an opinion on a subject of which he is completely ignorant.

I know Mr. Gow has plenty of commonsense and I am sure that in anything he has said regarding the manufacture of tea here he has not condemned the good with the bad.

Mr. Gow was an Assam planter for seventeen years and manufactured from 150,000 to 200,000 lb. of tea per annum; he was afterwards, for several years, a tea taster and tea expert in London, and after years of study has invented a tea withering machine.

Surely if long practical experience in the cultivation and manufacture of tea, and thorough acquaintance with it after it is made, qualifies a person for endeavouring to correct mistakes which unexperienced planters may have fallen into, Mr. Gow is the man.

Mr. Agar says that his object, in his attack on Mr. Gow, "is to ventilate a discussion which day by day is of growing importance." It is a curious way of attaining his object by trying to shut Mr. Gow's mouth.—Yours truly, A TEA PLANTER.

[It is certainly strange that Mr. Agar should have been unaware of Mr. Gow's experience as a planter, but we fail to see the bad taste of his allusion to Mr. Gow's uncomplimentary opinion of the capacity of Ceylon planters to manufacture tea. If Mr. Gow never said that our planters were wrong from the first process to the last, he is truly unfortunate in his connection with the local "Times" editor, who has attributed such sentiments to him in the most explicit manner, sentiments which Mr. Gow has never personally repudiated. We beg to say that it is not enough that he should do so second-hand, through this correspondent. While the belief remains that Mr. Gow made the statement attributed to him, it is natural that resentment should be felt and expressed.—ED.]

* Eggs, probably of a cricket or locust, or perhaps those of a bug. The ones sent have been injured by pressure.—Our entomological referee.

RAINFALL AND TEA IN MASKELIYA.

Theberton, Maskeliya, 16th August 1886.

DEAR SIR,—As I expect weather reports will be of interest this extremely wet month, so far, I send you it, and also for August 1882, to the same date as that is the heaviest previously for comparison.

Date.	1886.		1882.	
1st ..	2·46	Days rain fell 15.	—	Days rain fell 14.
2nd ..	2·94		5·56	
3rd ..	0·35		2·40	
4th ..	0·85		4·31	
5th ..	1·33		7·21	
6th ..	1·80		0·63	
7th ..	12·42		1·05	
8th ..	3·45		4·42	
9th ..	1·12		1·64	
10th ..	1·32		5·25	
11th ..	1·29		2·83	
12th ..	5·18		0·12	
13th ..	3·32		0·01	
14th ..	1·45		0·35	
15th ..	0·90		2·35	
Total..	40·18		Total	38·13 for 15 days.

I believe Theberton, has the reputation of being the wettest estate in Maskeliya. I feel sure if the rainfall was taken on old Laxapanagalla, it would show an average of ½ to ¼ more per annum, particularly if taken close under the Laxapanagalla cliffs.

I would mention that the average for August for the whole month for 6 years is 37·47; so this year, we are above the average in 15 days.

Tea, this month, you may say, is at a stand-still, and no wonder, after such a fall of rain. The temperature has been low in mean maximum 66° mean minimum 64°. We ought, before long, to be in for a good spell of fine weather, as soon as this burst has blown its self out.—Yours truly,

T. J. GRIGG.

AN EXEMPLARY AGRICULTURAL STUDENT.

DEAR SIR,—You will be glad to learn that the scientific education imparted at the Agricultural School to intelligent boys is just beginning to bear fruit. That Mr. John Gabriel Atapattu of Dehiwala is making a proper use of his education and knowledge of botany is clear to anyone who takes the trouble to visit his vegetable garden in his own property in Dehiwala. Only the other day an English gentleman in high position condescended to visit Mr. Atapattu's garden, and, whilst he kindly promised to supply tomato and other seeds to Mr. Atapattu, at the same time expressed his pleasure at the way in which work is done there. Mr. Atapattu feels the suggestions made by that gentlemen valuable and of great encouragement to him. It is to be hoped that other agricultural students will follow in the wake of Mr. Atapattu and each of them will endeavour to spread a knowledge of improved scientific cultivation among his neighbours.—Yours faithfully,

AGRICULTURIST.

COCA CULTIVATION IN SOUTH AMERICA

SIR,—I should be glad if any of your correspondents through the medium of your paper could give me any information as to "Coca," what sort of soil is the best and at what elevation ought it to be grown because it would be worth trying as an experiment.—Yours truly,

INQUIRER.

To a German friend in Colombo, we are indebted for the following extract from the letter of a South American authority on "Coca":—

"With reference to the manner of raising, drying and preparing coca on the spot, he writes as follows:—Two-thirds of an acre is cleared about each cottage and planted with coca and bananas. During the first two years the workmen are paid regular wages for clearing the land and planting and caring for it, but during the second year only one or two workmen are needed. After the second year the gardens of the workmen begin to yield and no more wages are paid to them; they work three days a week for rent and have the other four days to themselves. The price of 12 pesos (about 3s 4d each) per sesto (? what weight) is as low as coca can be raised with any profit, and there is no probability that it will go beyond this point and remain there for any considerable time. The grade of coca raised on this land is very superior. With reference to handling and drying coca leaves I will state that Mr. C.'s remark concerning it has been anticipated in previous reports. Coca must be dried in the shade; it is impossible in that climate, artificial heat is ruinous. No process is superior to rapid sun-drying for, the reason that it is perfect. You will see from previous correspondence that I obtained same assayed results from a given quantity of fresh leaves, that I did from the same quantity after proper sundrying. The poorest coca assayed, that is the poorest grade of properly dried leaves, yields 8-10ths per cent of cocaine; the best yielded 1¼ per cent."

ED.]

TEA IN JAPAN.—The *Japan Weekly Mail* states:—Transactions in tea continue on a large scale, and a further decline is reported on all kinds of leaf on offer. Again the issue of June 26th, states:—The tea trade has again been extensive, and though prices were easy early in the week, a firmness has characterised later dealings which indicates that sellers have the best of the position at the close. The grades principally dealt in have been medium and below, and of these the shipments, both here and at Kobe, have been heavy. There have been but few complaints about the leaf sent in so far and the season bids fair to be a good one for growers.

BLUE-GUM OIL.—In Mr. Lawson's report on the Nilgiri gardens we find the following paragaph:—During the year 20 lb. of the oil of the leaves of the *Eucalyptus globulus* were sent to the Madras Medical Department. The last consignment was sold at hte rate of R3-3-0—5 shillings per pound being the wholesale English quotation. The processes required for the manufacture of the oil are very simple and inexpensive, and I think it is a pity that those who have large plantations of these trees should not endeavour to utilize them for this purpose as well as for fuel. The way to extract the oil is as follows:—The young shoots, having perfectly matured but not old leaves, are passed through an ordinary chaff-cutter and cut into chips not exceeding one inch in length; the smaller the chips the more readily is the oil extracted from them. These chips are then macerated in water over night and put the next morning into a still, which is kept boiling, till the greater part of the fluid has past over as vapor. This is then shaken up with a little common salt to cause the complete separation of the oil from the water; the oil is then decanted from the water and passed through a sheet of filtering paper, when it is ready for sale. Instead of passing the leaves through a chaff-cutter, it would be better to pass them through some crushing machine, as the object is to smash up the hard cells, which surround the cavities into which the oil is passed by the secreting cells. I do not know of such a machine, but I should think that some modification of the old-fashioned mangle would prove effective. *Eucalyptus obliqua*, *E. siderophloia*, *E. piperita*, and other sweet-smelling varieties, all of which are said to yield valuable oils, grow freely on these Hills; they are much more beautiful in their general aspect and their timber is greatly superior to that of the *E. globulus*.

PLANTING ON CEYLON HILLS.

THE ABNORMAL DISTRIBUTION OF RAINFALL THIS SEASON HITHERTO AFFECTED TEA AND 'FLUSHING' UNFAVORABLY —MINOR ENEMIES: THE GREAT BANDICOOT RAT—ON THE WHOLE, TEA NEVER LOOKING SO WELL AS NOW—ALSO CINCHONA OFFICINALIS.

Upper Lindula, 9th Aug. 1886.

As I telegraphed to you this morning this district seems about to receive compensation for the deficient rainfall of the first half of 1886. It is not so much the absolute deficiency we have had to complain of however, as the abnormal distribution of the rain which did fall in the early months of the year, and which affected so unfavourably tea which had been pruned in the closing months of 1885 and flushing generally. The fearfully rainy year 1882, when 30 inches beyond the average fell, being excluded, the averages for the first four months of the year at Abbotsford for the three years 1883 to 1885 compare thus with the figures for the same months in this year:—

1886.		Average.
January ...	6·07 inches.	2·11 inches.
February ...	0·92 „	3·76 „
March ...	2·27 „	4·04 „
April ...	2·80 „	3·38 „
Total ...	12·06 „	13·29 „

The actual amount of moisture precipitated is this year deficient by not much more than an inch. The defect was in the concentration of so much of the fall in the first month of the year, while February and March, the cold windy months of the year, had scarcely more than three inches amongst them, April also not getting much more than half its usual allowance. Deficient rainfall and cold winds checked tea flushing to a serious extent, but May and June together showed an average rainfall 10·32 + 8·14 = 18·46, bringing the total for the half-year up to 30·52 inches, or 5·46 below the average of the previous three years. July followed with 11·38 inches, less than three inches below the average, while August in its first eight days having shown 7·84 (the average for the whole being 11·99), promises fully to restore the equilibrium. If only a genial temperature accompanies copious rainfall, there can be no question that the collections of leaf in the latter portion of the year will atone for the deficiency in the earlier. In ordinarily favourable weather pruned tea ought to have recovered itself and to be yielding well in 2½ months, fully in 3 months, after the application of the knife. The abnormal drought in February, March and April, delayed the process in the case of our December and January pruned tea, by a month to six weeks, but the rains of May and June corrected the evil and now the bushes which so long hung fire are flushing luxuriantly. Our trouble at present, indeed, what with rain and mist, is to overtake the withering of the leaf which comes pouring in, laden with a good deal of the moisture by which it has been saturated. There is no sign of blossom on the pruned fields now come into full flush, but I suppose it is due to the abnormal season that so much more than we could wish of the fields pruned a year ago have gone off into flower and fruit; not merely China-hybrid, but many of the highest Assam hybrid jât. Some of the best seed is being gathered and after a few more leaf pickings, of course the knife will correct the tendency to produce blossom and fruit instead of leaf. In the case of a few bushes, so few as to be scarcely worth mention, this tendency to free blossoming and the appearance of dark spot on the leaves, have led to the shedding of the entire crop of foliage. Such trees, if pruned, will probably recover, unless, indeed, their roots have touched the fatal *symplocos* with its poisonous fungi. Black, or rather brown bug has been prevalent, in proportion, I think to the abnormal drought of February-April, but it is curious to notice how this blight affects certain fields and never appears on others. As far as my experience and observation go, this is the most serious affection to which tea in Ceylon is liable, for the moth, which comes and goes does little mischief. There have been occasional scares of *helopeltis* and "red spider," but neither of these pests has, as yet, done appreciable harm in Ceylon. The forest rats, which at intervals, made irruptions into our coffee fields and did much apparently wanton damage, in cutting off the primaries close to the stem, with a cut as clean as that of a pruning knife, have not as yet I believe, attacked our tea cultivation. But the gigantic member of the rat family, the bandicoot, has been giving us a little trouble here recently, in the ravine, curiously enough, where the big black *wanderoo* monkeys in former days devoured the tops of our cinchona officinalis plants, standing on their hind hands and pulling down the tops with their forehands. The bandicoots whose habitat is a belt of jungle left near the bungalow, do not seem to care for the fever plants or for the leaves or branches of the tea bushes. But they have discovered that the thick, succulent tap roots of the best jât tea bushes are delicacies and to get at these they have dug up several of our very best bushes. Traps having been set, a young bandicoot was captured and I requested it might be preserved for me to take to Colombo as I know there are many Europeans in Ceylon who have not seen this huge black rat. A carpenter was accordingly asked to construct a box for the safe keeping of the creature. He refused, saying it was contrary to his religion, the religion which teaches that there is no God, but that you must not take the life of any creature, however dangerous or noxious. In this case it was explained to the man that the object was not to take away life, but to preserve it. All in vain, and it is not worth while taking the man to Court for refusing to obey a lawful order. Tea, like every cultivated product has its enemies, but none of those I have named are formidable and on the whole I have seldom seen the great "new product" looking so well. The same may be said of the subsidiary cultivation of cinchonas (*C. Officinalis*, chiefly) amongst the tea. The cinchonas were put down long enough after the tea, to secure the thorough opening up and drainage of the soil by the latter. The result was an unprecedented success with the cinchonas, and now the coppiced plants are even more flourishing than were the original stocks. There is scarcely a coloured leaf to be seen, and the only question is whether the cinchonas will even pay enough for the elements of which they must deprive the tea. It is surely the very irony of fate that when bark is at its lowest, the trees are here and elsewhere at their best.

August 10th.—Since the despatch of my telegram yesterday morning the weather has continued wet and stormy, the south-west monsoon having asserted itself at last. The soughing of the wind last night was wild and the "blowing" continues, with mist and rain. The fall in the 24 hours to 6 this morning was ·33 inch. The most was made of the third of an inch, however, being well spread over the 24 hours.

A GRAND SUNSET AMIDST THE STORM—FIRE, FIREWOOD AND ARTIFICIAL FUEL—MR. GEO. WALL *v.* SIR SAMUEL BAKER ON CEYLON SOILS—THE IMPERIAL DUTY ON TEA—THE NATIVES AND LOCAL TAXATION AND GOVERNMENT—RAINFALL DISTRIBUTION ON THE HILLS OF CEYLON.

Upper Lindula, Aug. 10.

I ought to have mentioned that the storm of Saturday, which, in the shape of wind and drizzle, still continues, was preceded on Friday evening by one of the most glorious possible sunsets. Golden beams of light coming over the summit of Rillagalla, striking on the flanks of Great Western and illuminating the whole valley of Dimbula were set off by a perfect rolling sea of clouds floating over Dikoya and Maskeliya. First snow white and wintry looking, the masses of cloud slowly darkened and then as the sun was sinking, put on an indescribably beautiful cobalt blue. The whole circle of mountains by which we are here enclosed, from Pidurutallagalla round by Totapale, Kirigalpota, Elbedde, Talangkande, with the summit of the Peak, overtopping it, to Great Western, stood clearly revealed. We at first, naturally, anticipated a clearing up of the weather, but there were signs of anger on the horizon of the beautiful sky which too truly predicted what came to pass, the approach of a storm during which, for three days, (this is the fourth,) we have known of the existence of the central orb of our system, only by light struggling through wind-driven drizzle and canopies of dense mist. Better planting weather, barring the evaporating wind, which chills the poor coolies, there could not be. Any one visiting this valley or Nuwara Eliya in such weather would be very apt to go away with a very erroneous impression of the climate, which for a large portion of the year is most enjoyable. Indeed even in such weather as this, although the magnificent scenery may be hidden, healthy exercise can be taken, if only thick-soled boots, good great coats and umbrellas are put in requisition. When once the weather is faced, the discovery is made that both wind and rain sound worse when we are indoors than when in the open air we give them battle. The great point is, on return from a walk or ride in wet weather to obey the Scotch injunction of "change ye're feet," the change being carried further, but the additional injunction of "gang into the fire" being obeyed with some qualification. What a comfort a bright warm fire is; but how rapidly firewood disappears, when the requisitions of "the Factory" are added to those of the hundred-peopled lines and the bungalow. I cannot doubt that ere long artificial fuel will come to our aid in the shape of petroleum and other substances in which the greatest possible amount of caloric is compressed into the smallest possible space. Our forest up in this region is sparse beyond what any external and superficial view would indicate, the redeeming feature as to quality of soil being the dense and luxuriant undergrowth of *nillu*. We have found this all prevalent shrub a true index of fertility, but it is of little value for heating purposes. By the way what is to be said about Mr. George Wall's assertion that our Ceylon mineral soil is generally rich? Most authorities, hitherto, have recognized the paucity of phosphates as a serious defect, Baker attributing to this cause, the disproportionately small antlers of our elk or rather sambur deer, and the fact that, while in South Africa all elephants, females as well as males, bear tusks, in Ceylon only one in sixty of the males and none of the females produce ivory. Surely Mr. Hughes' analyses proved that our soils *were* somewhat deficient in phosphoric acid. Our wet but warm insular climate has been supposed hitherto to compensate for a soil, poor in comparison with the black free earths of India and the decomposed volcanic muds and ashes of Java. Mr. Wall's tendency has ever been to take sanguine views of the capabilities of Ceylon and we know how to the last he refused to believe in the decadence of coffee, although predicted by his friend "dear old Thwaites." Aided by our moist warm meteorological conditions, our soil generally, is excellent for tea, but inevitably, we must ultimately supply phosphoric acid, potash and nitrates to our soil, when exhausted by incessant harvesting of crops of leaves. It is true that those leaves are three-fourths moisture, but the remaining fourth—which leaves the land as dried tea, at the rate of 200 lb. to 500 lb. per acre per annum,—carries away a very appreciable amount of mineral matter. The question is, whether the consumers of tea will consent to pay the producers a price sufficient to enable them to manure their lands when manuring is, as the doctors say, "indicated." The sixpence per pound duty is a very serious consideration, in this light, and perhaps that heaven-born Chancellor of the Exchequer, Lord Randolph Churchill, may surprise and delight us all by a reduction of the impost to one-half its present incidence. As to Mr. Wall being a special sympathizer with the natives, this sympathy took the form of advocating the abolition of one of the very few taxes they pay, that on native-grown and imported grain, a bread-tax and, therefore, objectionable in theory; but, as the *Observer* ever contended and still holds, better a tax on grain (fruit, vegetable and root cultivation, including coconuts, being free), than no revenue wherewith to construct roads, irrigation works and all other improvements, including the extension of elementary education, on which the progress of a country and people, the natives of Ceylon included, depends. It is just as well to recall the fact that Sir Wm. Gregory, who gave Mr. Wall such special credit for sympathy with the natives, not only embodied in his dispatches views identical with those held by the *Observer*, but that he did us the honour to quote from our articles, the tendency of which was, "Better a moderate tax on one staple article, from all previous time a subject of taxation, than an acreage tax which would include every food substance from the sweet-potato and the pumpkin to the coconut and palmyra fruit." The best friends of the natives and of the masses everywhere are not those who tell them, "Base is the rogue who pays"—taxes. Mr. Wall is an able man who has done good work in his day, but we decline to recognize his efforts to sweep away a large portion of the revenue of the island, easily raised and lightly felt, as a service to the natives; while commonsense and expediency are simply outraged when it is contended that a Crown Colony can be governed on the principle that the Queen's representative, who is personally responsible, ought in all cases to allow perfect freedom of vote to the servants of Government who are members of the Legislative Council, even if his policy of necessary revenue, public works, education, &c. is as a consequence overset. Questions of religion and conscience being reserved, we hold that the Governor of a Crown Colony like Ceylon can demand from the servants of the Crown under his rule, the same support which the Prime Minister of the Sovereign has a right to demand from his associates in Government.

But I have wandered far from my subject which is the question of comparative Rainfall in various localities and at different elevations. We had a pretty heavy rainstorm here on Saturday last at an elevation of 5,800 feet and at a distance of

about a score of miles from the "cloud-compelling" Peak and its "rain-capturing" ranges, running down to 1,000 feet above sea level. You have no doubt, ere now, heard from Maskeliya, Dikoya and Ambagamuwa, that at places less than half our elevation, but in the teeth of the south-west monsoon, they have experienced rain deposits surpassing ours by two, three, four times. The rainiest station in the world, in the forefront of the Himalayas, Cheerrapoonjee, is only 4,000 feet above sea level, and the rainfall decreases as thence the vast Himalayas are ascended until at 14,000 or so no rain at all falls. Not giving due weight to this principle, I at one time calculated that if the late Mr. Heelis got an average of 106 inches per annum at 4,600 feet on Langdale, we might calculate on 110 at an elevation 1,200 higher on Abbotsford. I am now perfectly satisfied that the true average rainfall here is better represented by 100 inches (the figure also established for Nuwara Eliya by 16 years observations) than by our old estimate of 110. The truth is that if we commence with Theberton in Maskeliya, there is a descending scale of rainfall against an ascending scale of elevation, until the Nuwara Eliya tableland is reached. My good but thirsty friend Mr. Grigg, is not contented with absorbing less than from 200 to 250 inches of rain per annum. He kindly allows some of the rain clouds to pass on and so they get 150 in Dikoya, 140 in the Kotagaloya Valley, 120 about Talawakelle, 106 at Langdale, and 100 at 5,800 in the face of the south-west on Abbotsford. Nuwara Eliya is 440 feet more elevated and a rampart of mountains shelters it from much of the south-west wind and rain. But it is midway between the two monsoons, receiving an appreciable tribute from each, the result being, with striking inequalities between individual years, an average of 100 inches. This average, both for Abbotsford and Nuwara Eliya, requires the inclusion of the enormously exceptional rainfall of 1882. But the record for that year at Abbotsford being imperfect, (although we have good reason to believe that the rainfall was at least 130 inches,) I have taken the figures for the three years following, during which, of course, there was a reaction from the excessive fall of 1882, while in the case of Nuwara Eliya, so utterly exceptional a year as 1884 gave only 76·42 inches. The averages for the past three years of reaction from the abnormal rainfall of 1882, are considerably below 100, but for any period like 5 or 10 years that is the average, or perhaps 99 for Nuwara Eliya and 102 for Abbotsford. The figures for the 3 years ending 1885, were:—

	1883.	1884.	1885.	Averages
	inches.	*inches.*	*inches.*	*inches.*
Nuwara Eliya..	99·62	76·42	83·68	86·57
Abbotsford	100·10	85·13	89·70	91·64

In both places the rainfall is well-distributed over the year, no month shewing a lower average than 2·11 for January in the case of Abbotsford and 2·46 for the same month at Nuwara Eliya. The highest average figures are 15·15 for June at Abbotsford and 12·78 for July at Nuwara Eliya. But to shew the capriciousness of seasons, which must be calculated on, we need merely mention that while June 1884 gave only 4·88 at Nuwara Eliya and 9 at Abbotsford, the reaction in 1885 was to 23·43 at Nuwara Eliya and 28·54 at Abbotsford. *This* year June went down at both places to 12·49 at Nuwara Eliya and 8·14 at Abbotsford. Allowing for the fact that the north-east monsoon, as might be expected from the position of Nuwara Eliya, gives that place, appreciably more rainfall (3½ inches) in November and December than Abbotsford gets, the bulk of the year's rainfall at both places falls between May and October: about 65 out of 91·64 in the case of Abbotsford and 57·05 out of 86·57 at Nuwara Eliya. For the 3 years, 1883-1885, the Nuwara Eliya average was 5 inches below that of Abbotsford. It is curious to notice how in the first 6 months of this year, an attempt was apparently made to raise the rainfall of Nuwara Eliya and lower that of Abbotsford, so as to equalize the averages. The rainfall of Nuwara Eliya for the first half of this year was 39·09 inches or 6·96 above the average of the past 3 years, which was 32·13. The rainfall at Abbotsford, on the other hand, for the first six months of this year was only 30·52 inches, being 5·46 below the average for 3 years, viz: 35·98. It seems quite probable, therefore, that by the end of 1886, the average for both places will stand about 95 inches, another (the fifth) year bringing the figure for average up to the round 100. In February, March and April this year, (north-east monsoon months), Nuwara Eliya got 8·66 inches of rain, instead of the wretched 5 inches which fell at Abbotsford; Feb. and March getting little more than three inches between them, a quantity not equal to supply the evaporating effects of the north-east winds of those months. We have already noticed that the bulk of the rainfall both at Nuwara Eliya and Abbotsford falls between May and October. If, on the other hand we divide the year into halves, by far the larger portion falls in the second portion of the year. At Nuwara Eliya 32·13 inches only fall on an average between January and June, against 54·44 between July and December. For Abbotsford the similar figures are 35·98 in the first half of the year, against 55·66 in the second half. Of all the years on record, 1884 was probably that most distinguished by deficient rainfall at both stations. In that year the Sanatorium received only 76·42 inches, or very little more than three-fourths of its average supply; the proportion for the first half of the year being actually two decimals below 18 inches, so that the average for each month was only three inches. Abbotsford was better served by 8·71 inches, but the total 85·13 inches was fully two inches below the average of Colombo, while for the first half of the year the fall was only 23·59. The direct distances between the rain gauges at Abbotsford and Nuwara Eliya is less than three miles; but while Abbotsford faces the south-west, Nuwara Eliya is protected from that monsoon by the One Tree Hill and Kikilimaana ranges, is more exposed to the influences of the north-east monsoon, so that while Abbotsford receives somewhat more rain than Nuwara Eliya does in the south-west monsoon months, Nuwara Eliya receives compensation in the north-east monsoon months, which tends to equalize the average figures. As regards mean temperature, that of Nuwara Eliya is 58°, with minima going down to frost, the cold on the plain being intensified by evaporation of moisture and by radiation of heat into space, in the clear weather of the north-east monsoon. This refers to "THE PLAIN" proper, which is undoubtedly the grass-covered bed of an ancient lake. On forest land or land redeemed from forest, on the hills around, the temperature is much warmer, frost on such places being practically unknown. The mean at Langdale, 4,600 feet above sea level in the Dimbula Valley, being 65° against 58° at Nuwara Eliya, the difference is 7°, that being the fall of temperature for a rise in altitude of 1,640 feet. Were the conditions equal, this would mean a fall of 1° for every 235 feet elevation. At this rate the mean temperature at 5,800 on Abbotsford would be 60°. But as the estate has been entirely opened in forest and is surrounded by growing forest, the true figure is probably about 62°. As the lower portion of the estate is 4,600 feet altitude and the higher reaches

6,000 feet, the mean temperature ranges from 65° below to 61° above, the medium being 63°. It is quite probable, too, that a rain-gauge down at 4,600 feet, in the valley of the Dimbuldanda river, would show a few inches more rainfall per annum than occurs at 5,800 to 6,000. On the other hand, the occurrence of mist is rare below 5,300 feet, while there is a good deal at certain seasons of the year above that elevation and will be until more of the forest around is cleared for railway fuel and other purposes. The amount of moisture over the whole estate, therefore, is probably pretty equal for the twelve months. Apologies are doubtless due to the readers of the *Observer* for such large use of data connected with a property in which I am interested. But the data are available and trustworthy, while the meteorological conditions I have indicated apply with very slight qualification to many properties in this district; to Calsay, for instance, with scarcely any qualification at all. So with Mahaeliya, while the figures have a close bearing on Dessford, Clarendon, Edinburgh, Inverness and the whole group down the side of the Great Western. The publication of the figures I have collated may lead to the production of others and of valuable deductions drawn from them, establishing the suitability of exceptionally high altitudes in Ceylon for the culture of tea. Visitors to our Sanatorium in December, January and February, seeing the grassy plains whitened with hoar-frost, might naturally doubt the possibility of tea growing and yielding well at many hundreds of feet of loftier altitudes around. But the temperature of both air and soil on forest land is far warmer than on the damp grassy plain. Then Ceylon is an island and most of the tea estates are less than 7° from the equator. The comparative figures commented on are appended for reference.

August 11th.

Yesterday the wind was stormy, and drizzle and mist prevailed. This morning is calm, but the drizzle and mist continue. The fall for the 24 hours has been ½ inch, so that the rainstorm has evidently worn itself out, up here at least. We have, of course, had a good many earthslips on estates, but none of much consequence. The paths show signs of "wash," but where the drainage is good, the amount of damage from this cause is not great.

Comparative Statement of Rainfall at Nuwara Eliya (6,240 feet above sea-level) and Abbotsford Estate (5,800 feet altitude) for the years 1883, 1884 and 1885, and for the first six months of 1886.

	1883		1884		1885		Averages for 3 years.	
	Nuwara Eliya.	Abbotsford.	Nuwara Eliya	Abbotsford	Nuwara Eliya.	Abbotsford.	Nuwara Eliya.	Abbotsford.
January.....	2·80	4·17	1·49	0·61	3·09	1·57	2·46	2·11
February ...	5·45	8·44	0·24	0·72	0·72	2·11	2·84	3·76
March	3·42	3·78	3·19	6·34	0·93	2·00	2·51	4·04
April	7·72	6·29	3·17	1·12	3·14	2·72	4·68	3·38
May	13·10	11·61	5·01	5·80	5·16	5·20	7·76	7·54
June	7·35	7·93	4·88	9·00	23·43	28·54	11·88	15·15
July	19·86	16·77	7·08	11·19	11·39	14·12	12·78	14·02
August	14·27	15·00	10·64	14·39	3·84	6·58	9·58	11·99
September...	1·06	5·71	6·17	7·85	4·54	4·84	4·92	6·13
October... ...	8·45	7·04	12·61	12·86	9·29	9·19	10·12	9·70
November... ...	7·97	7·36	9·61	8·45	7·59	5·86	8·39	7·23
December ...	5·17	6·00	12·30	6·80	8·45	6·97	8·64	6·59
Totals...	99·62	100·10	76·42	85·13	87·68	89·70	86·57	91·64

	1886. Rainfall for 1st 6 months.		Averages for three years for 1st 6 months of year.	
	N'Eliya.	Abbotsford.	N'Eliya.	Abbotsford.
January...	6·70	6·07	2·46	2·11
February	1·39	·92	2·84	3·76
March ...	2·82	2·27	2 51	4·04
April ...	1·45	2·80	1 68	3·38
May ...	11·21	10·32	7·76	7·54
June ...	12·49	8·11	11·88	15·15
	39·09	30·52	32·13	35·98

	Nuwara Eliya.			Abbotsford.		
	1st 6 months.	2nd 6 months.	Total.	1st 6 months.	2nd 6 months.	Total.
1883...	39 84	59·78	99·62	42·22	57·88	100·10
1884...	17·98	58·41	76·42	23·59	61·54	85·13
1885 ..	38·58	45·10	83·68	42·14	47·56	89 70
1886...	39 09		30·52			

The rainfall at Nuwara Eliya for the 1st 6 months of 1886 is 6·96 inches over the average for the previous 3 years.

The rainfall at Abbotsford for the 1st 6 months of 1886 is 5·16 inches under the average for the previous 3 years.

THE WEATHER—TEA-MAKING AND MR. GOW—NUWARA ELIYA.

Upper Lindula, 12th Aug.

The compensatory process continues. The rainfall in July was 11·38, a total below the average considerably, but well distributed over the month, there having been only two days out of the 31 in which no rain fell. On every one of the 11 days of August concluded at 6 this morning, appreciable rain has fallen; the lowest record on any day being 16 cents. In the 6 days previously to the rainstorm of Saturday the 7th, the aggregate was 2·36 inches. From the 7th onwards the record has been:—

24 hours ended Aug.	8th	1·46 inches
,,	9th	1·00 ,,
,,	10th	0·33 ,,
,,	11th	0·50 ,,
,,	12th	0·82 ,,
Total for the 5 days		7·11 inches
Add for first 6 days		2·36 ,,

Total for 11 days of Aug. 9·47 inches; or close up to the total for July. The rain continues with but slight intermission, so that August promises to make up for the deficiency of June and July, which aggregated only 19·52 inches against an average of over 30. We should gladly hail a break of sunshine, however, to put an end to the present necessity of calling in the aid of artificial heat to further the process of withering. This species of heat is said to be systematically applied to the Loolcondura teas, so that the question arises whether Mr. Armstrong and the rest of us, who have built large stores to provide space at the rate of 6 feet for every pound of green leaf, to be withered by natural atmospheric air, have or have not gone to needless expense? The force of the question is intensified by the terms of Mr. Gow's patent machine for the combined withering and smashing of the leaves under the influence of artificial heat. No doubt the public here will soon have the opportunity of judging of the capabilities of a machine based avowedly on Chinese practice. Meantime the patentee, whom I have regarded as a sensible and courteous gentleman, is to be sympathized with for being represented (misrepresented, doubtless) by the journalist who specially lionizes him, as guilty of the exaggerated and offensive self-conceit, of denouncing the whole mass of tea planters and manufacturers in Ceylon as ignorant of their enterprise, from its alpha to its omega; as erring in every process from the plucking of the flush to the firing of the rolled and fermented leaf! The surprise is that Mr. Gow should not have protested against what must be so gross and injurious a representation of his character. If he *has* made any protest it has not fallen under my notice.

—Under the influence of the chronic damp, doubtless, a pretty emerald green, aquatic or semi-aquatic plant, of very minute foliage, has spread from the streams over the cultivated land to some extent in this district, giving at a distance the idea of moss, which is also beginning to show. The green plant does not seem of any consequence as a weed, but our staple weeds are, in this weather, giving work to the contractors.

A trip to Nuwara Eliya, yesterday, was very enjoyable, although a good deal of what the Scotch call "coorse" weather alternated with glimpses of comparative clear atmosphere. The forests were brightened by the profuse blossoming of white-flowered trees, purple nillus and white balsams, and Lake Gregory was a lively sight when the wind-squalls lashed the water into waves and produced the effect of a mimic sea. All round the plain, the presence of masses of slag here and there gives evidence of the former preparation on a rather extensive scale of metal from the ironstone which abounds. A piece of land near the bund having been cleared, two furnaces were revealed, one of them a well-built and very perfect furnace-pit, with ventilating opening at its base, in which doubtless a good deal of ironstone was formerly roasted. This pit will be preserved and good specimens of the iron stone and slag will be brought to Colombo for the Museum, as representing a native industry all but extinct, from imported iron and steel being obtained at prices so moderate.

PLANTING IN CENTRAL AMERICA: GUATEMALA.

A MODEL COFFEE ESTATE.

(*Extracts from the Letter of an ex-Ceylon Planter in Guatemala.*)

I will try to describe to you the estate of the late President (General Rufino Barrios) which may interest you. The estate is situated about 180 miles from the City (of Guatemala) immediately, next the Mexican boundary. There are about 15,000 acres altogether, situated at an elevation of from 1,000 to 6,000 feet. There are about 2,400 acres planted up with coffee, the oldest being nearly eight years, the rest all younger; so you see it is quite a young estate.

A little over 2,000 *acres* are laid down in grass for the use of cattle, mules, horses, &c. There are 2,500 acres of fine virgin jungle at about 4,000 feet elevation eminently suitable for coffee; the rest of the land is at high elevations, or the opposite, hot and low. There are 30 barbecues for drying the coffee on, 25 yards square, made of brick and cemented over (750 square yards of drying Patios). These barbecues are all very well arranged from the receiving or parchment cisterns; the parchment can be conducted to anyone of the barbecues by water. Eight Gordon Pulpers for pulping the coffee and eight wet parchment cisterns 6 by 8 ft. and 8 by 10 feet. The coffee is washed *by machinery*, two machines of the Guardiole patent, and one of Mason's patent. There is also a very large cistern for receiving the cherry straight from the field. The bottom of this cistern is a little above the level of the tops of the to ters, so that the cherry is conducted by water to he pulpers; then, by water, the parchment is conveyed pulpthe washers *after* fermentation, and from the washers direct to the drying barbacues or patios, as they are called here. So you see there is nothing lost to facilitate operations or save labour. After the parchment is half dried on the patios, it is *i* taken into the store and thoroughly finished by *artficial driers*.

These driers are patented by one Guardiole, a Spaniard, and very intelligent man. They are capable of drying 75 to 100 quintals at a time (one quintal = 100 lb). The drier is a round barrel-shaped machine which revolves very slowly; the heat is generated from a charcoal fire, and the heated air is forced into the machine by blowers of great power. (How would this do for tea drying?) El Porvenir (the name of the estate) has four of these driers. The next process is peeling and sizing the beans. There are *five* of these (one Gordon peeler, three Smoot's and one Mason's peeler?) also a complete set of the latest improved Gordon's sizers.

There are 400 oxen and 65 carts; and 37 mules and 15 carts.

There is also a saw-mill, lathes, and all tools and other implements connected therewith. The power to drive all this consists of one water-wheel 40 feet, one 24 feet, and one 12 feet in diameter. The building which contains all this machinery, also storage room for the coffee, and the selectors of bad beans (the same as is done in Colombo) is formed of two sides of a square, each side being 200 feet by 40 feet. For the accommodation of the extra labour force there are about 150 ranches of various sizes; besides these there are scattered throughout the coffee 18 large open houses 120 ft. by 24 ft.; these houses are for the accommodation of the extra labour required during crop time. There is also a large house for the managers and a *telegraph office*. There are 12 miles of good cartroads0 and two fine bridges to cross rivers

Last year 18,0t0 quintals of coffee were picked,. and from 8,000 or 10,000 quintals were estimated to have been lost fgom want of labcur to pick it; say 25,000 quintals altotther. This year 30,000 quintals were expected, but I suppose they will lose *one-half* at least.

The President, had he lived, would have made one of the finest fincas or estates in the world, but he died shot in battle, and so the place is almost lost for want of labour to pick the crops.

120,000 bushels of parchment is rather a big thing from an estate, the oldest coffee of which is not more than eight years of age. Can you match this in Ceylon or Madras? I guess not. I ought to state that there are 100,000 cinchonas planted along the roads and throughout the coffee: 10,000 Liberian coffee trees planted in the lower portion of the estate; also a small sugar mill and cane and a number of cacao trees, I don't know exactly how many.

The oxen and mules I mentioned are employed solely on the estate, carting cherry to the store and coffee to the railway.

THE CULTIVATION OF IRONWOOD.

Seeds of "the famous *Nahor* trees of Assam" having been lately advertised for sale, it may be well to state that the *na-hor* of Assam is the *na-gaha* of the Sinhalese, the true ironwood. Apart from its value as a timber, especially as posts for telegraphs and like purposes, the living ironwood tree is in every respect so exquisitely beautiful, that we are glad to see facilities afforded for its extended cultivation. The ordinary foliage, a dense covering of thin, green pointed leaves, covering the branches and stems in a pyramidal fashion, is strikingly elegant, while the scarlet hue of the young leaves and the large, white, sweet-scented flowers, with rich orange-coloured stamens, constitute truly "a thing of beauty." Very fine isolated specimens of this tree are to be seen near Buddhist wiharas in the lowcountry and pretty high up in the mountain

ranges of Ceylon. On the road from Awisawella to Ratnapura, and around Ratnapura itself, there are small groves of the tree. From Mr. W. Ferguson's notes on Mendis's list of timber trees of Ceylon, we quote as follows :—

Na-Gaha, Messua ferrea, Lin. Fl. Brit. Ind. I. 277. Under this name this work includes several supposed species of this famous tree. Our Ceylon tree is remarkable as an ornamental flower tree, grown invariably in the vicinity of Buddhist temples, and for having brilliant red leaves when young. The timber of this tree is the Iron-wood par excellence, and must not be confounded with that of Palu, No. 65. It is the best wood in the Island for piles and for the construction of bridges, and is very durable under water. It is straight grained, hard and difficult to work. A cubic foot of it when seasoned weighs about 75-76 lb. The result of trials with 9 pieces 1 inch in diameter, and 12 inches in length gave the following:— Lowest breaking weight 791 lb., highest 1,239 lb,, mean 1,049 lb., deflection ·15. Valuable for all purposes requiring strength and durability. The timber often breaks short and without warning.

Turning to Gamble's Manual of Indian Timber trees, we find amongst the native names, *Nahor*, Assamese ; *Nangal* and *Mallay nangal*, Tamil ; *Naga-kesara*, Telugu ; *Na* and *deya-na*, Sinhalese. Gamble's discription is :—

A large evergreen tree; bark ¼ inch thick, reddish brown, falling off in flat thin flakes, leaving a slightly roughened surface. Heartwood dark red, extremely hard. Pores moderate-sized, often in groups, scanty, often filled with yellow resin. Medullary rays extremely fine, uniform, equidistant, very numerous. Numerous fine, wavy, concentric lines of light-coloured tissue.

Eastern Bengal from the Monas eastward (though traces of its having formerly been found west of that river occur sometimes in the names of places, *e.g.*, Nageshwarbari, or Naksarbari, a town in the Sikkim Terai on the Nepal frontier), Assam, South India, Ceylon, Burma and the Andamans, often cultivated.

The weight and transverse strength have been determined by the following experiments: —

		Weight.		Value of P.
A. Mendis	Ceylon No. 59, with bars 2' × 1" 1"× found	72	lb.	994
Brandis	Burma No. 18, 1862	69	,,	..
Bennett	Andamans No. 4, 1872	70	,,	1053
Smythies	Assam (4 specimens), 1878	67·5	,,	..
	Kanara (1 ,,), ,,	62	,,	..
	Burma (6 ,,), ,,	70	,,	..

Several of our specimens, however, reached 74 to 76 lb., per cubic foot in weight. It is very durable. It has been found to answer for sleepers equally well with *Pynkado*, but the cost of cutting the hard wood, its weight, and the freight from the Tenasserim forests to Calcutta prevent its being much used, as the total cost is scarcely covered by the price (R5) per broad-gauge sleeper. It is used for building, for bridges, gunstocks and tool handles; but its more general use is prevented by its great hardness, weight and the difficulty of working it. In Ceylon an oil is obtained from the nut, and the tree is often planted for the sake of its handsome flowers.

Pynkado, classed above with iron wood, is *Afzelia bijuga*. The heart-wood is close grained, but the weight of the timber does not seem to be more than half that of the true ironwood. It is described as a valuable wood, used in the Andamans for bridge and house building. Mr. Gamble, still talking of this tree as iron wood, has several references to it and its value, in his recent report on the Madras forests. We quote as follows regarding another "iron-wood":—

In this strip the principal tree is the ironwood (*Xylia dolabriformis*), hitherto, so far as I can ascertain, considered of no account. The ironwood tree, better known perhaps under its Burmese name of 'Pynkado' and its Malabar name of 'Irul,' is really a most valuable tree. It has a hard, dark-red, very durable wood, is capable of being used for sleepers, for building, bridges, &c., and is in some localities much employed for telegraph posts. Where the sal forests of the Circar Hills end, there the ironwood begins—a most fortunate circumstance, though we may regret that neither of the trees have hitherto received sufficient attention in this Presidency. To show that the ironwood supply may be utilized as a source of revenue, I would mention that from information afforded by the office of the Inspector-General of Forests at Calcutta, 'Pynkado' or ironwood sleepers from Burma are now being sold in Calcutta, *ex* steamer, at R1-12-0 each for broad, and R1-15-0 for narrow, gauge. One of the most remarkable and valuable characteristics of the ironwood forests of Rekapalle and Rumpa is the abundance of reproduction; seedlings may be seen everywhere under dense shade and in the open, and there can be little doubt that the forests can be treated in a systematic manner more easily than almost any other kind in India except perhaps sal.

Again :

"The Conservator desires to put on record his experience of the wonderful powers of reproduction of the Konda Tangedu *(Xylia dolabriformis)* in the forests of the Upper Godavari and Rumpa. Whether under shade or in the open, seedlings are everywhere most abundant where the grazing is light, and he thinks that except perhaps the sal, he knows of no Indian tree whose new growth can be so easily obtained as that of the ironwood. It would be a thousand pities if the immense and valuable ironwood forests of the Rumpa country were to be carelessly destroyed unless it be for permanent cultivation."

On turning to *Xylia dolabriformis*, in the Manual we find that it is "the ironwood tree of Pegu and Arakan." There is no indication that it exists in Ceylon, but certainly it would seem to be a most desirable acquisition from what is stated about it. The Tamil name is *Irul*. It is described as follows :—

The wood is very durable—a property it doubtless owes in great measure to the resinous substance contained in it. This resin is more abundant in Burmese wood than in wood grown in South India. No. B 1451, which was brought by Dr. Wallich from Tavoy in 1828, is still so full of resin that it is quite sticky on the outside, and the resin may be scraped off with a knife. The substance is partially soluble in hot water, to which it imparts a reddish colour.

The wood is used for boat-building and for agricultural implements in Burma; also for carts and tool handles. In South India it is used for railway sleepers, posts, boat-building and carts. In Burma and Bengal it has been largely used for telegraph posts, for which it has answered well The large forests in Arracan, of which Dr. Schlich in his report on the ironwood forests of Arracan, dated 1st September 1869, says that "a third of the forest vegetation consists of Pynkado," produce large numbers of telegraph poles and railway sleepers. Major Seaton in his report for 1876-77 said that 10,000 such sleepers from Arracan had then lately been sold at Calcutta at R5 each, and Mr. Ribbentrop's Report states that Pynkado pieces and sleepers are brought out from the forests in Pegu. It is likely, however, to be found too hard, heavy and difficult to cut. It is a useful wood for piles and beams of bridges. It exudes a red resin, and the seeds give an oil.

The native name *Pynkado* is evidently applied to the two trees.

Turning to our own ironwood, the *Na-gaha*, we find that Mr. Vincent, in his Report on the Forests of Ceylon, gave figures showing that out of a value for timber exported from Ceylon in 1881 of R342,000, ironwood contributed R78,745, against R15,403 halmilla, R29,796 satinwood, and R135,509 ebony. It is possible, however, indeed pretty certain that palu was included in and perhaps constituted the bulk of the export. Recommending the extended use of Palé (palu) sleepers, Mr. Vincent said that the cutting of Na trees for this purpose should be

stopped. He wrote:—"The supply of na sleepers will, in any case, be small. With so much sapwood in na trees it appears a wasteful way of utilizing the timber, even if its durability is established." Palé sapwood, on the other hand, he said, was as hard as the heart. From Mr. Vincent's report we quote as follows:—

Failure of na sleepers supplied from the Northern Province.—In 1879 a considerable number of na* sleepers were sent to Colombo from the Northern Province. They were cut in a small temple grove in the Mullaittivu District, and having a good deal of sapwood were quite unsuited to the purpose. They were thought so bad that they were laid down only on an unused siding in Colombo, and are now nothing but touchwood. Na trees have always so much sapwood, that it is extremely doubtful whether they would ever give good sleepers; certainly not, if grown in the forest of the dry zone, where they are quite exotics.

Mr. S. E. Peal, of Assam, thus describes the *Nahor* (identical with our *Na-gaha*):—

Nahor, if well grown, is a fine wood; at times it is seen 10 to 12 feet in girth, and straight clean shaft for 45 and 50 feet. As a rule, in the Plains, the straighter ones are young, and the old ones more or less crooked. The forest, if properly studied, often yields information of a peculiar kind: thus, the above gives a clue to the density of population compared to what we see now. These large old and crooked-branching Nahors clearly indicate that, when young, the country (now forest,) was then open. They are often along the sides of old bunds, in dense forest, and evidently planted; and from the seed, the surrounding Nahor forest has sprung up, and it is generally as straight as the old trees are the reverse. As a tree, the Nahor is very ornamental: the young foliage, out in March, is a bright crimson, and the tree, in the open, a cone of foliage; and later in the year, about May, the blossoms, out in profusion, are like large white wild-roses, often in bunches, and perfume the air all around. The immense bunch of stamens in each flower are a deep golden colour, and contrast beautifully with the large white petals. No wonder the tree was a favourite in old times. It was mainly on this account that it was planted about. As a wood, Nahor is hard and cross; it is also fairly heavy, and the "heart" lasts well in the ground as posts, going for 16 to 20 years or so. For indoor and lighter work, Nahor is a very second-rate wood, on account of being comparatively difficult to work: there are so many much better. Its main use is for posts, in tea-estates at least, or where strength is needed.

Our readers will thus see that the chief value of the beautiful ironwood tree is for yielding posts to be put into the ground and for similar purposes. As an ornamental tree it can scarcely be surpassed. Palu or Palé, on the other hand is a specially valuable timber tree.

The Palu is indicated by Mr. Vincent as *Mimusops Indica*, and besides the large export of this wood he shows that railway-sleepers of the timber laid down on the Matale railway were very largely a success. In Mr. W. Ferguson's notes this form of "Iron-wood" is botanically indicated as *Mimusops Hexandra*. The description is as follows:—

This is the Pali of the Tamils, a common and abundant tree in the Eastern and Northern Provinces, and the timber much used for piles in bridges, &c. "The wood is very heavy, weighing 84 to 92 lb., per cubic foot when unseasoned. Its specific gravity is 1·120. It is close and even-grained, hard, compact and durable, of a purplish color when fresh turning to reddish-brown, and susceptible of a very high polish. It is used by natives for oil presses, building and a variety of other purposes; it is excellent for rulers, handles of instruments, and all articles of turnery, and for cabinet purposes." Beddome.

Economically, therefore, the beautiful-foliaged and blossomed *na* tree, is far inferior to the *palu*. The *na*, however, is valuable as posts for telegraph wires and like purposes.

*Owing to a confusion of names these have been called palu, and the latter wood has been needlessly condemned. A Sinhalese carpenter calls any hard-wood which he cannot recognize, palu, and some na logs were recently sold in Colombo as palu.

DETERIORATION OF CEYLON TEAS.

Ceylon tea is beginning to be placed in the Home Market, and already complaints are heard that it is of inferior quality. A distinction is sought to be made between the produce of old and of new estates, and in the case of the former, it is contended that no deterioration is noticeable, but on the contrary that the average quality is maintained, and in instances advanced. The brokers' unfavourable remarks are admitted to apply to young estates and new marks, and the inferiority of the teas is variously accounted for—want of experience, inferior or inadequate machinery, shortness of labor, or all combined. It must be borne in mind that the tea industry of Ceylon is in an incipient stage; the number of years since it grew to be a factor in the trade, can be counted on one's fingers; hence, the planters have all their experience to gain and all their hardships to encounter and surmount. An Indian planter who has been engaged in tea for sometime writes us:—"Tea cultivation and manufacture are not thoroughly grasped in a short time. I have been at it thirteen years, and every day almost, experience teaches something new." The unsatisfactory outturn in the Spicy island, is obviously the work of tyros, full of hope, laboring in the wrong direction. Everything was favorable up to the point of manufacture. Ceylon possesses a happy climate, a sufficient rain fall and suitable elevation, a combination of advantages, which sent up the hopes of the planters, and made them careless about the one thing needful, that is, manipulation and manufacture. The planters of Ceylon are, as a whole, men of energy and application, quick to seize upon points of vantage, indefatigable, and more than all, inured to reverses, and capable of overcoming them. With antecedents so distinguished it will be a surprise if the complaints so loud against the produce of their gardens continue to be made. If the causes of the inferiority of the Ceylon teas, now thrown into the London market are correctly stated, they are remedial, and the enterprising body of men engaged in this cultivation will not permit them to remain operative much longer. But we fear the evil is in another direction, and one not quite within the power of the planter to grapple with. The bulk of the large area under tea is used-up coffee land, land in process of abandonment as unprofitable, and about to be left to the recuperative influences of nature. Many years of constant cropping have deprived it of all the constituents of plant food, and it has consequently ceased to be capable of remunerative cultivation. Upon soil of this description tea has been almost universally planted. The shelter which the standing coffee afforded helped to establish the bush and impart a vigor promising great things. Appearances gave encouragement, and more desireable country was taken up day by day, until Ceylon can boast of a tea tract, twenty times larger than Southern India, brought under cultivation in one-fourth the time. The planter's knowledge and experience have not kept pace with his physical efforts. He has moreover not had time to ascertain the effects of an uncongenial subsoil, into which the roots of the young tea are only now finding their way, with the results we fear that have already been noticed. This same subsoil has done in Ceylon for cinchona and cherry, what it is now perhaps doing for tea. Indian planters of experience who have lately visited Ceylon, are of opinion that much of the land put under tea is quite unsuitable, and that progress is too rapid. Their adverse opinions, it is obligingly suggested are the result of jealousy of rivalry; we hardly think so. The Indian tea planter is flesh and blood of his Ceylon brother, and an Englishman is incapable of feeling animosity against a competitor. Fair play is a jewel

and the wonderful enterprise of Ceylon acts on him rather as an incentive to exertion, than as food to the green-eyed monster. He is justified in gauging the force and resources of his adversary, and assessing them at their true value. He does not believe he is to be overwhelmed in the contest, and perhaps he is correct in his estimate of the drawbacks of Ceylon as an abiding and formidable rival.—*Nilgiri Express.*

[Most of the coffee land planted with tea was not worn out but rather improved by tillage. Such tea as was planted on worn out land has not yet had time to make its influence felt. There is, in truth nothing new in our experience. Effects of pruning, of unseasonable weather and other circumstances have often baffled the best and most experienced tea-makers in in India.—ED.]

CEYLON PLANTERS' ASSOCIATION TEA SYNDICATE:—CIRCULAR.

[The following copy of circular has reached us, from which it will be seen that the Syndicate movement has already met with good support, and is likely to be a success. Even at the risk of some small temporary loss on sales, planters should join in sending supplies of tea to be sold in untried or little tried markets. No doubt the Syndicate will be glad of money subscriptions, but the great object is to introduce Ceylon tea and promote a demand for the article where it is not at present known. —ED.]

It has been decided to establish, under the auspices of the Planters' Association of Ceylon, a Tea Syndicate for the purpose of introducing our teas to, and pushing their sale in, markets other than that of Great Britain. The very favourable opportunity which the Colonial and Indian Exhibition affords the Syndicate of obtaining suitable agents in the Colonies will be availed of, Mr. J. L. Shand, the Planters' Association's Commissioner, has been instructed to take the matter in hand at once, and, with the aid of the various Colonial Commissioners, to obtain introductions to suitable Colonial merchants willing to become Agents for the Syndicate. Agents will be appointed on the Continent, in America, Canada, Australia, New Zealand, and in such South African, West Indian and other Colonies as may be found desirable.

Full information will be obtained as to the class of tea and size of package most suitable, quantity of tea required to open up connections, and the likelihood of success in the various new markets.

It is so manifestly to the interest of growers (however small their outturn may be) to extend the field for the sales of Ceylon teas, that it is hoped all growers will join this Syndicate.

It is by sending considerable quantities (which can only be obtained by every one contributing) that our teas will become known and obtain a firm footing; when that has been achieved, the Syndicate's operations may cease and the further development be left to individual enterprise and the usual course of trade.

The Sub-committee of the Planters' Association entrusted with the scheme proposes the following rules, but the Sub-committee will be glad to receive any suggestions calculated to promote the operations of the Syndicate:—

1. That members supply the Syndicate with such quantities of tea as they deem fit to foster the scheme of introduction into other countries.

2. The Secretary of the Planters' Association will become the Secretary of the Syndicate, receive the teas, arrange for their shipment and pay over proceeds of sale, for which work a charge of 1½ cents per lb. of tea will be made.

3. The Syndicate's Agents will (unless there is some special agreement) be paid by commission on sales.

4. Each member in forwarding tea will state to which country he wishes his teas consigned.

5. Great care should be taken by all members of the Syndicate to ship nothing but really good teas, which, before shipment will be examined, tasted, and reported on by an expert whose fees will be paid by the member shipping the tea.

6. If it be found desirable to bulk teas in Colombo so as to obtain an even tea in quantity, this method will be adopted.

7. The services of two Ceylon Planters, who are leaving the Island, have been offered to the Syndicate. Mr. McCombie Murray is prepared to work New York, and Mr. Hugh Mackenzie would push teas in Australia.

The undernoted quantities of tea have already been promised, and the Sub-committee requests that you will be good enough to intimate on the annexed form what quantity of tea you would be disposed to contribute during the next twelve months:—

		lb.
Dunedin	Avisawella	5000
Mariawatte	Gampola	5000
Sembawatte	Nawalapitiya	5000
Dewalakande	Avisawella	5000
Torwood	Bogawantalawa	1000
Tillyrie	Do	1000
Scrubs	Nuwara Eliya	1000
Wallaha	Lindula	1000
Rogart	Kalutara	1000
St. Andrews	Maskeliya	1000
Corfu	Do	1000
Laxapana	Do	1000
Woodstock	Ambagamuwa	1000
Kanapediwattie	Pussellawa	500
Kandaloya	Nawalapitiya	5000
Strathellie	Do	5000
Orwell	Gampola	1000
Degalla	Avisawella	1000
Kotiagalla	Bogawantalawa	1000
Kanangama	Avisawella	1000
Gneiss Rock	Nawalapitiya	1000
Coolbawn	Do	1000
Penrhos	Do	500
Relugas	Kellebokka	500
Hatale	Do	500
Gomera	Knuckles	500
Mahacoodagalla	Maturata	500
Logan	Avisawella	250
Hattenwella	Laggala	250

Approved for the Ceylon Company's Estates, though I am not at present in a position to promise definite quantities.—(Signed) JOHN H. STAREY.

I approve of the scheme, but at present cannot say more than Mr. Starey.—(Signed) Jas. HILL, Messrs. CARSON & Co.

I desire to join the Syndicate on behalf of Ferndale estate. I would suggest that subscriptions should be received from those estates that prefer.—(Signed) H. W. HORNBY. A. PHILIP, Secretary.

Kandy, August 1886.

INDIAN TEAS this season, are being as severely criticised as those from Ceylon, to judge by the following report in the *Produce Markets Review* of July 10th:—

"The new imports are very disappointing, and the increased supplies show no improvements in quality. The small quantity yet arrived may not truly represent the quality of coming shipments; at the same time the Teas so far placed on the market are decidedly below the standard of the first shipments of some years past. Ceylon Teas have been freely offered, and have sold at steady rates, but Java Teas are less firm."

WEEDS AND WORMS.—A pretty common idea that the existence of weeds on cultivated lands presents insect attacks on the cultivated plants, is thus expressed in the Report on the Administration of Coorg:—

The teak plantations at Kootompolle are doing very well, they measure now 231 acres. An invasion of caterpillars after last monsoon did much damage. They appeared in crowds (8 or 10 different kinds) and devoured not only all the leaves, but the top shoots too in some cases. This plague retarded the growth of the trees somewhat. It is probably attributable to the surface of the soil being too clean of weeds and jungle vegetation, so that there was nothing else but the teak for the caterpillars to eat. This theory is borne out by the fact that the old plantations where the weeds are allowed to grow did not suffer. The cost per acre of teak plantation was R105.

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

PARIS, July 10th.

POULTRY farming at best can never be conducted profitably on an extensive scale. It is the natural work for medium sized or small farms. By common fowl is meant that which is usually kept for rearing and breeding and restricted to the genus *Gallus*—whose origin dates from the jungle fowl. Such fowl comprise several distinct races, but new varieties due to crossings and selections are constantly coming into notice.

The fowls of La Bresse in Burgundy are famous since nearly two centuries; they are short-legged birds having four toes. Their skin is fine, the flesh delicate and savoury. On an average a hen annually lays 170 eggs, and may rear two broods of chickens. For hatching many farmers prefer turkeys: they eat little, become fat while sitting, are ready for the market any day and cover double the number of eggs. There are farmers who breed stock for fattening and colts for rearing; so there are poultry breeders who only rear chickens to fatten off at two months old; or at five months if destined to be a capon or a poularde. All fowl fatteners prefer to buy only those chickens of a pure local breed. Crossings are estimated to diminish their value one-fifth. The next object is to know the rearer who does not hatch more than he requires, keeps young cocks and eschews egg-farming. The fattening season extends from September to March; the birds selected must be from three to five months old; the fattening is generally effected within four weeks. When chicken fattening—a special branch of industry is the object, the chicks are sent to market at two months old; they weigh then about 2 lb. and fetch between 2 and 3 fr. each. A fat cap on will sell from 10 to 15 fr., and a poularde, from 8 to 10 fr. The capon is emasculated with a scissors; the operation induces rapidity in fattening, and greater fineness and delicacy of flesh. If the operation be well performed the comb will augment in volume; if otherwise it will continue to grow. A poularde is a hen flayed. A fat capon weighs from 8 to 10 lb. The La Fleche capons are today in as much favor as they were in the fifteenth century; they are exported to London, Europe and even America, in cases like champagne. The process of fattening is nearly uniform for all breeds. Like mushrooms the development of flesh takes place best in the dark. About 150 are put up at a time to fatten; each bird has its own box sufficient to allow it to move in, but not to circulate. No light is allowed to enter the house where they are boxed, all chinks and crannies are stopped to exclude light, cold and free circulation of air. Some strew the bottom of the boxes with wood ashes, others do nothing at all.

Before being placed in their cells the fowls during eight days are accustomed to a moderately dark house. The diet consists of a paste composed of one-half wheat, one-third barley and one-sixth oat-meal, wetted with fresh milk. The mixture is made into balls about the size of an olive, and the man in charge takes three birds on his lap, ties their legs together, and administers their ration of paste, rubbing their throat if necessary to make it descend more rapidly. This process continues during four or five weeks. A fowl is known to be fat, if on being handled at the upper part of the back between the wings, or just under the wings, and on either side of the tail, it feels plump.

Before killing the bird is kept fasting for twelve hours. It is then held carefully, the mouth open and an incision made in the under side of the tongue with a scissors or a pointed knife, up through the palate into the brain. Or after removing the feathers on the left side of the head an incision is made just beneath the ear. The first spasms over, hang the bird up to allow it to bleed freely, as it is on this as in the case of veal, the whiteness of the flesh depends. Next pluck and wrap up in a piece of cloth kept moist with the milk. The fowl is fed twice a day and the crop ought to be felt to see if it be empty before another meal be allowed. Drink is given twice a day either of water colored with meal or milk. A fowl when plucked and trussed loses 18 to 21 per cent of its weight, and from 28 to 41 per cent more during roasting.

PRODUCTS AT THE COLONIAL EXHIBITION.

FIJI.—The products of these islands occupy a comparatively small space, and though there is but little of absolute novelty among them there are nevertheless, some of considerable interest. The Coco-nut and its products, as might be supposed, is fully represented, as well as Candle-nuts (Aleurites moluccanus), the oil of which is used for illuminating purposes; and Dilo-nuts, the kernels of Calophyllum inophyllum, from which an abundance of oil is obtained having a high reputation for the cure of rheumatism. Tapa cloths are also abundant, the entrances to the court being hung with curtains of this material, which, as our readers will know, is the beaten-out bark of the Paper Mulberry (Broussonetia papyrifera). Amongst the many valuable woods that are found in the Fiji islands the "Visa" and the Sandal-wood will attract most notice, for here is shown a canoe cut out of a solid "Vesi" trunk. The tree which furnishes it is a leguminous one (Afzelia bijuga), and the wood is heavy, close and even grained, and of an intensely dark brown colour. The natives use it not only for canoes but also for pillars for houses, bowls in which to serve kava, war clubs, &c. The Sandal-wood (Santalum yazi) was, it is said, "at one time plentiful in various parts of Fiji; but in the early stage of settlement its destruction must have been most indiscriminate."

Under the name of Bandina Boxwood some blocks are shown of a remarkably hard wood, which appeared upon examination to be suitable for engraving purposes. It is however, of a dark brown colour, which, it seems, unfits it for the better kind of work. Upon submitting a sample of this wood to an expert, he reported that the wood has no special claim in consequence of its dark colour. This, he says, considerably reduces the value, as it could only compete with inferior Box, which is at present supplied in sufficient quantity. He explains this objection by saying that "cutting upon wood is like drawing upon paper; if it is tinted, there must be a limit to the density of the tint, or your drawing will be absorbed by the tint upon which it is drawn. An engraver would have difficulty in observing his progress while doing his work." The plant producing this Bandina Boxwood is at present unknown, but it is stated that should it prove useful it could be had in any quantity up to two feet in diameter from Fiji, and the other outlying groups of islands in the Pacific.*

Some fine masses of Kava root (Piper methysticum) are shown, also powdered Kava root. This, it will be remembered, is the source from whence the Fijian beverage called kava is made by masticating the root and ejecting and fermenting the saliva. It is known to have diuretic properties, and has latterly attracted some notice for its medicinal value in this country. Quite recently, indeed within the last few weeks, a spirit prepared from Kava root has appeared on sale at the refreshment bars in the Exhibition. It is a colourless liquid and is sold in square white glass, capsuled bottles, with labels fully describing its virtues. It is called Yagona, the finest Kava Schnapps, or aromatic gin, and its value is set forth as follows:—"The active principle of this agreeable and splendid beverage is prepared from the root of the Piper methysticum, a species of Pepper. The root is called Yagona by the natives of Fiji, and from it they make their national drink, which is diuretic rather than intoxicating. Yagona has been the Royal drink of the Fijian and Samoan chiefs from time immemorial, and it is to its constant use that chiefs and people alike owe their robust health, in spite of the depressing influence of their tropical climate. This primitive and unsophisticated liquor regulates the action of the internal organs; it possesses remarkable soothing pro-

* Surely the colour could be dispelled by some chemical substance which would leave the texture of the wood uninjured.—ED.

perties; it is a health stimulant, an excellent brain-feeder, a wonderful restorer of faded energies and of exhausted nerve-power. It is a preventive to gout and rheumatism. To those engaged in heavy intellectual labour it gives renewed energy. It is a veritable Elixir of Life. As a diuretic it is unrivalled, and it imparts a purity to the blood."

If the general use of the "Vagona" should be the only result of the Exhibition, it will finally have fulfilled a great mission!

A little *Handbook to Fiji and Catalogue of the Exhibits* has been issued under the authority of the Executive Commissioner, the Hon. James E. Mason, M.L.C., and this contains some interesting facts on the culture of the Coconut, Cinchona, Coffee, Cotton, Sugar, Tea, Tobacco, &c. Of the latter we are told that though it flourishes in all the islands of Fiji, it is most largely cultivated, and reaches its greatest perfection in the "Colo," or highland provinces of Viti Levu, the largest island of the group. All sorts of Tobacco seed have been grown, including Virginia and Latakia. The natives smoke their tobacco rolled up into "saluka" or cigarettes, the wrapper used being the dry leaf of the Plantain. Connoisseurs are very particular in the choice of their wrappers, and will only use the leaves of certain sorts of Plantains. Tobacco is an important iota of native life. Without it and kava no important discussion can be conducted.—*Gardeners' Chronicle.*

DRUGS AT THE COLONIAL AND INDIAN EXHIBITION.

North Borneo.

The collections of articles contributed by British North Borneo are to a certain extent similar to those from the Straits Settlements. The chief products of the colony consist of valuable timbers, gutta-percha, india-rubber, Borneo camphor, edible birds' nests, sago, pepper, gambier and tobacco.

One of the timbers, named "billian," is remarkable, besides its durability and great strength, for being proof against the teredo or sea worm, a property that suggests the desirability of a chemical examination of the wood with a view to determine the nature of the constituent which proves obnoxious to these animals. It is perhaps still more valuable on account of being proof against the ravages of the white ant. Another timber called "kungas" is also not attacked by these insects. A third, known as "lakar" wood is a dark-red marbled and extremely hard wood, which gives off a fragrant odour when burned, and when scraped or rasped is used as an ingredient in incense; it is also employed as an astringent in medicine and for tanning fish nets. According to Professor van Eaden this wood is the produce of *Dalbergia Zollingeriana*, Miq. It is valued in Borneo at 6s. per picul, and in Singapore at 4s. per picul. The bark of the "Russack" tree (*Vatica Russack*), which is added to toddy to make it intoxicating, is one of the few barks exhibited. It is remarkable that a species of the same genus is used in Ceylon for a similar purpose. Under the name of "chindana," probably a corruption of the Hindoo "chandana," a handsome, yellowish, fragrant wood is shown, which might perhaps afford a volatile oil. It does not appear to have been botanically identified. A considerable quantity of mangrove bark forms a conspicuous object of the exhibit and perhaps deserves the prominence given to it, for according to an analysis of the bark made by Mr. W. W. Evans, of Bristol, since the Exhibition has been opened, it affords 41·398 per cent. of tannin.

Some very fine specimens of "dammar mata kuching" and of copal are shown, and several kinds of gutta-percha and india-rubber, including "gutta merah," "gutta hilang," or "elong," "gutta menoun," and "gutta liceak" (india-rubber).

Borneau gutta-percha and india-rubber, like those of Perak, are mixed articles. Thus, Mr. Burbidge states*:—

"That from the Larvas district is formed of the mixed sap of at least five species, the juice of *Ficus* and one or two species of *Artocarpus* being not unfrequently used in addition as adulterants. The Bornean "gutta soosoo" or rubber, again, is mixed sap of three species of *Willoughbeia*, and here also the milk of two or three other plants is added surreptitiously to augment the quality collected."

Mr. Burbidge further remarks that although the demand for caoutchouc from Borneo is a recent one, yet in many districts the supply is practically exhausted. He advises that the *Willoughbeia*, which grows quickly and may be easily and rapidly increased by vegitative as well as seminal modes of propagation, should receive the attention of the Government in India, where the plant might be expected to thrive.

Very little appears to be known concerning the trees which afford the gutta and caoutchouc of North Borneo, and in the 'Kew Report' for 1886 the Director expresses a hope that the North Borneo Company will employ a competent botanist to investigate the subject and to collect good specimens in flower and fruit of every tree yielding a product of commercial value, as it is to the interest of the Company to ascertain definitely the extent of the gutta-percha and india-rubber resources of the island, and how existing supplies may be best developed and husbanded,* since the same wasteful method of collecting gutta-percha that obtains in Perak seems to be followed also in Borneo.

In connection with these remarks it may be well to call attention to a very valuable paper by Mr. Leonard Wray on the great loss of gutta-percha resulting from the wasteful mode of extraction at present employed.† In some experiments made on the bark of a tree of "getah taban simpor" (*Payena Maingayi*) (see p. 5) from which gutta had been extracted, he found that the wet bark which is now allowed to rot in the jungle contains fully 5·7 per cent. of gutta-percha, or 11·4 per cent. when dry, and that by simple pounding or rasping and boiling the bark nearly all this gutta can be extracted. He calculates that, accepting the estimate of the export of gutta from the Straits Settlements and Peninsula as 10,000,000 lb. weight in 1875 the amount of gutta-percha lost to commerce, in the bark of felled trees, must have amounted in that year to no less than 300,000,000 lb., putting the price at 2s. 6d. per lb. to not less than £37,500,000. In other words, for every pound of gutta-percha collected 30 lb. are wasted. The gutta trees are of such slow growth that the tree planted in one generation cannot be expected to yield good gutta until the next, and according to Mr. Wray one-thirtieth of the number of trees that are at present felled could be saved.‡

The minjak (*i.e.*, oil of) tangkawang, a solid fat with a low melting point and which does not readily become rancid, is shown *in situ* in the bamboos in which it is moulded. There are two kinds of these fats, one of which is nearly white and used for culinary purposes, such as frying fish, making cakes, etc., and the other is of a greenish tint and is used for lubricating machinery and for purposes of illumination. The former is said to be derived from large seeds, probably those of *Hopea macrophylla*, and is known as tangkawang lingis. The green fat is prepared from smaller seeds, probably those of another species of *Hopea* and is distinguished as tangkawang mahjor or minjak kerapoh. A fuller account of these fats was given in a former number of this Journal.§

Two products, which also occur in the Straits Settlements' collection, viz, Borneo camphor and edible swallows' nests, can be more appropriately

* 'The Gardens of the Sun,' pp. 75-76.

* Kew Report, 1881, p. 44.

† *Journal of the Straits Branch of the Royal Asiatic Society*, 1884, p. 219.

‡ An attempt was made to carry out a project of this kind, some twenty years ago, in British Guiana. A very large outlay was made for the purpose, but the result was total faliure, the extract obtained consisting chiefly of astringent material with very little gum.

§ See *Pharm. Journ.*, [3], xiv., pp. 401, 481.

noticed here, since they are represented more fully in the North Borneo Court. Of the birds' nests three varieties are shown. The first and best are quite white and are said to be those which have been collected after they have been finished by the birds, but before the eggs are laid; the second quality appears to consist of the nests which have been used but in which young birds have not been raised; and the third contains adhering feathers. The two former are known as white and the last as black birds' nests. These appear to be made by different birds, for, as pointed out by Mr. Lowder, the feathers do not merely adhere but are imbedded in the salivary layers of which the nests are formed; portions of dried seaweed or lichens are also incorporated. The birds inhabit caverns near the sea or sometimes inland, as in Upper Perak, and the limestone caverns of Mount Gormanton, in Borneo, and the sandstone ones at Sandakan head.* They are collected, at great risk to life and limb, twice a year, in various parts of the Eastern Archipelago. There appears to be some doubt as to the exact species which build these nests. *Collocalia Linchi*, Horsf. being given in the Straits Settlements' Catalogue as the species. Mason, however, states that this bird makes a brown nest of moss glued together, while *Collocalia esculenta* makes its nest of repeated layers of glutinous salivary matter alone. The latter bird is called the "lawet" in Java, while the name "linchi" is applied to the smaller species named *Collocalia Linchi*. Possibly the white nests are the product of *C. esculenta* and the black ones of *C. Linchi*. Two other species, however, appear to produce edible nests and these are known respectively as *C. spodopygia* Peale,† and *C. fuciphaga* Horsf.,‡ which occur in the Andaman Islands, the latter also in Tenasserim.

The nests are often brown or discoloured at the parts where they are attached to the rocks, and have to be cleaned for the Penang market. The white nests are used by the wealthy Chines as an ingredient in soups, 120 grams being used for the litre of soup. The dirty nests are said to be employed to make a particular kind of glue. The first quality is valued at 2,500 dollars per picul, the second at 1,500 dollars, and the third at 1,000 dollars. It is calculated that as much as 242,400 lb. of these nests are annually exported to China from the Indian Archipelago. In some parts of China as much as £9 has been paid for a catty (about 1⅓lb.) of these nests. At one time it was supposed that the substance of which they are composed was seaweed collected by the birds, and some discussion has taken place in *Nature* on this subject.§ It appears now to be definitely settled that it consists of a salivary secretion similar to that used by the swallows in this country in binding together the clay of which their nests are made. Like another article highly prized by the Chinese, it appears to be considered a tonic and invigorating remedy, and is also used as a restorative by opium smokers; it is prescribed in consumption, and for convalescents after protracted illness. A detailed and interesting account of the commerce in these nests may be found in Simmond's 'Animal Food Resources,' p. 141.

Borneo camphor does not appear to have received the attention it deserves in this country. So astute a people as the Chinese have doubtless some good reason for their preference of this camphor to that which can be procured at one-twelfth of the price in Formosa and Japan. It does not appear to have been noticed that although the odour of the Borneo camphor is not altogether agreeable, the taste is by no means so disagreeable as that of Formosa camphor. Its physiological properties also cannot be said to have been fairly tested. For this purpose well defined crystals only should be used, since it is probable that the smaller crystals are frequently adulterated with crude Formosa camphor, because the large crystals do not appear to be volatile, while the smaller ones frequently furnish a crystalline sublimate at ordinary temperatures.

The high price of the drug is in part due to the fact that a large number of trees have to be examined before the collector can find one containing the camphor in a crystalline state. Many of the trees yield oil, but very few contain camphor. The presence of the latter is ascertained by making a hole in the tree with a native axe at about 14 or 18 feet from the ground, till near the heart, where a deeper incision with a smaller aperture is made; if the oil is present it gushes out and is received in bamboos or other vessels. Some hundreds of trees may be thus examined before camphor is seen. When a tree containing camphor is found it is felled and cut into pieces about 6 feet long, or less, and these are split open, when the camphor is found in the heart wood occupying a space about the size of a man's fore-arm. The produce of a medium-sized tree, *i.e.*, about 2½ feet in diameter, is about 1¼ pounds, and of a very large one, say 6 feet in diameter, about double that quantity. Camphor found in this way is distinguished as "se aaniong," and that met with in holes of trees that have been previously cut is known as "oogar," the scrapings of the wood being known as "belly and foot."* Trees less than two feet in diameter rarely produce camphor, oil being found in the younger trees, but sometimes a pitchy or resinous looking substance is found in the cavities in the trunk.

Probably on account of the uncertainty of finding camphor in the trees the natives and the Malays have very superstitious ideas regarding its collection. While searching for it they abstain from certain kinds of food, eat a little earth, and use an artificial language called the bássá kápor, *i.e.*, camphor language. It is beleived that if this language be not used great difficulty will be experienced in finding the trees, and when found the camphor will not yield itself.† There are some men who pretend to a special intuition as to the trees which will yield camphor. These are styled Toongoo Nyr Capoor. Fuller details concerning the commercial qualities of this camphor may be found in a former number of this Journal.‡

Some fine specimens of the camphor wood are shown in this Court. The tree is a very large one, and the wood is extensively employed for making boxes, furniture, etc. It is said to be abundant in the island called Pulo Bai, in Sandakan Bay, and in Padas district.

Another exhibit worthy of a brief notice is a kind of guano or manure, consisting of the excrements of swallows and bats. This is found forming a deep layer in caves, especially in East Borneo in the neighbourhood of Gormanton; it forms an important but, as yet, almost untouched store of this valuable material.

Hong Kong.

The Hong Kong Exhibit comprises but few objects of pharmaceutical interest, but these are well worthy of notice. The first object that strikes the eye on entering the Court from the upper end is a small collection of native remedies shown by Messrs. A. S. Watson and Co., but which is not mentioned in the General Catalogue. Several of the articles, such as chaulmugra oil, will be familiar to pharmacists in this country, but a few others, such as cypress seed and cypress oil, oil of coconut shell, bean oil (*Soja hispida*), oil of *Camellia odorifera*, wood oil (*Aleurites cordata*), and oyster oil and oyster cake, left after removal of the oil, strike one as articles hardly known in Europe.

The properties of the Chinese "wood oil"— which is very different from the oleoresin known in English commerce as wood oil or Gurgun balsam—have been

* Burbidge, 'Gardens of the Sun,' p. 237.
† Mason, 'Burmah,' i., p. 358.
‡ *Linn. Trans.*, xiii., p. 142.
§ *Nature*, May 27, p. 86, to June 3, p. 101.

* 'Asiatic Researches,' vol xii., p. 539.
† *Journ. E. I. Archipelago*, 1847, p. 268.
‡ *Pharm. Journ.* [3], vol. xv., pp. 795, 796, 894.

described in a former volume of this Journal,* and to the others there will probably be occasion to refer at a future time. Close to this exhibit may be seen the curious wedge press used in expressing oils from crushed seeds, the principle of which is to exert a gradual lateral pressure by the insertion of a series of wedges between the cake and the end of the press. In the immediate neighbourhood of this press may be seen also a large granite pestle and mortar for pounding rice, which is worked by the simple expedient of a foot lever or treadle. Opium smoking is illustrated by a series of the apparatus employed in preparing the extract, which, and not the crude opium, is used in smoking. The mode of preparation has been well described by Mr. H. McCullum, of Hong Kong (*Pharm Journ*, [3], vol. xi., p. 229). The apparatus used by opium smokers is also illustrated by various specimens, including opium pipes, spirit lamp, iron scrapers for clearing out the bowl of the pipe, and needles for inserting the morsel of opium in the orifice of the pipe, etc.† Specimens of these articles already exist in the Museum of this Society as well as at Kew Museum, and their use is fully explained by Mr. T. Sampson, of Canton, in a previous number of this Journal ([3], vol. xv., p. 22).

The next object to attract attention is an excellent model of a Chinese vermilion manufactory at Hong Kong, showing the complete process of preparation of the pigment from the raw material to the cases packed for export. This model was constructed under the superintendence of Mr. H. McCullum and Mr. H. R. Best, of the Colonial and Civil Service, and was presented to the Commissioner by the guild of vermilion merchants. From the descriptive account attached to the model it appears that 1 part of sulphur is rubbed with 5 parts of mercury, an operation which usually occupies about ten minutes. The mixture is then placed in an iron pan over a furnace, is covered with pieces of broken porcelain or white pottery, over which an iron cover is luted on. After this subliming pan has been subjected to heat for sixteen hours the furnace is allowed to cool, the iron cover removed, and the vermilion scraped off the porcelain. It is then powdered and elutriated with a solution of alum and glue, the coarse particles separated by this process being again powdered and elutriated. The object of the glue and alum is not stated, but the glue is probably to prevent the powder from settling too rapidly, the alum to prevent the decomposition of the glue. The details of the process have already been described by Mr. H. McCullum in the columns of this Journal ([3], vol. xii., p. 497). The first quality of vermillion is estimated at 8 dols. per picul, and the second at 750 dols. per picul.

A collection of raw materials used by the Chinese in the manufacture of the celebrated soy and other sauces is shown also by Mr. M. McCullum. Perhaps the most interesting exhibit to pharmaceutical visitors in this Court will be a very complete and truthful model of a Chinese druggist's shop, which is said to be faithful to real life in the most minute details. The roomy shop appears to be arranged in a most orderly manner, and by no means presents a "beggarly array of empty bottles," nor are there visible any of the disgusting animal remedies that are used in Chinese medicine. At the back of the shop and equally open to view at the other side of the model is the dwelling house, the appointments of which seem eminently comfortable, as might perhaps be imagined from the care with which druggist looks after the money, for in the shop he is represented as weighing the money of a customer to see that it is not short weight. This model is exhibited by Dr. Ho Kai, who has also sent a large collection of over four hundred bottles of Chinese drugs, the names and uses of which are written on the bottles. These consit for the most part of remedies which have already been described by Hanbury, Porter Smith and others, but are evidently highly valued by Dr. Ho Kai, since they have been heavily insured and are to be returned to him.

The only other objects of quasi-pharmaceutic interest are the exhibits of boxes, trunks, etc., made of the camphor wood tree, and a series of the woods of Hong Kong, including a few, such as *Liquidambar sinensis*, *Aquilaria grandiflora*, *Styrax suberifolium*, etc., concerning whose products some information might have proved instructive. Unfortunately, however, no special catalogue had been published at the time of our visit, and Mr. C. Ford, Superintendent of the Palace Garden at Canton, who might probably furnish valuable information concerning them, left this country soon after the exhibition had opened. The *Aquilaria grandiflora* yields, according to Mr. Ford, a kind of lignum aloes used in China as incense.—*Pharmaceutical Journal.*

* *Pharm. Journ.*, [3], xv., p. 636.

† For figure of these see 'Encyclopedia Britannica,' 9th ed., Art. "Opium."

NOTES ON ECONOMIC PLANTS AT THE STRAITS SETTLEMENTS.

Appendix to Report on the Singapore Botanic Gardens, for 1885.

Enquiry was continued during the year into the source and extent of the vegetable supply of the colony, and experiments have been made with various seeds from Europe with a view to increasing and improving the general supply, with results as follows:—

I.—VEGETABLES FOUND IN CULTIVATION.—ORD. CRUCIFERÆ.—*Lobak* (Long Raddish), Raphanus sativus var.:—Native of China, largely cultivated throughout the colony. Supply plentiful. *Water Cress*, Nasturtium officinale:—Established in Singapore, but supply as yet very limited in the bazaars.

ORD. CAPPARIDEÆ.—*Mamum*, Gynandropsis pentaphylla:—Pods chiefly used. Common in a wild state not much cultivated. *Mamum Kechil*, Cleome viscosa:—A common weed, used in the same manner as the Preceeding, chiefly by Klings.

ORD. MORINGEÆ.—*Kelor* (Horse Raddish tree), Moringa pterygosperma:—Native of Madagascar Pods, root and leaves used. Supply plentiful.

ORD. PORTULACEÆ.—*Daun Gulung* (Purslane), Portulacca oleracea:—A common weed throughout the colony. Cultivated in England as a vegetable. Used in the Straits chiefly by the Malays and Klings, and seldom if ever taken into the bazaars.

ORD. MALVACEÆ.—*Kachang Bendie*, Hibiscus esculentus:—Cultivated all over the Tropics. Supply plentiful.

ORD. LEGUMINOSÆ.—*Kachang Kara Puteh*, Lablab cultriformis:—A good bean, but not plentiful. *Kachang Boty*, Dolichos tetragonolobus:—Moderately plentiful. *Kachang Prot Ayam*, Dolichos sesquepidalis:—Largely cultivated throughout the colony. Supply plentiful.

Kachang Prot Ayam Panjang, Dolichos sesquepidalis var.:—Plentiful. Canavalia virosa:—A good bean said to be in cultivation, but I have only seen one plant.

Kachang Parang, Canavalia gladiata:—A very large bean. Pods occasionally as large as a carving knife, hence the Malay name. Moderately plentiful.

Kachang Kara (Lima bean), Phaseolus lunatus:—One of the best beans in cultivation. Supply moderately plentiful. Also sold in tins imported direct from Brazil, its native country.

French Bean, Phaseolus vulgaris:—Cultivated largely throughout the colony, but brought to the bazaars at an advanced age in order to measure better, but only really good when very young and small.

Kachang Hijau, Phaseolus sp.:—Seed largely used in a germinating state. Supply plentiful. Pods also used after the manner of French beans.

Trong Merah, Agati grandiflora:—Leaves and flowers used.

Trong Puteh, Agati grandiflora alba:—Leaves and flowers used. Supply limited. Seldom reaches the bazaars.

Meng Kawang, Pachyrrhizus angulatus:—The root very much resembles a turnip, both in size and taste, hence called turnips by Europeans in the Straits, but it is in every way inferior to turnip. The supply is apparently plentiful.

Kachang Dahl, Cajanus indicus:—Pods used. Not much grown except by Klings.

Ord. Myrtaceæ.—*Nasi Nasi*:—The young leaves of a species of Eugenia, used by the Malays in Malacca as a vegetable in curries.

Ord. Pasifloraceæ.—*Grenadilla*, Passiflora quadrangularis:—Used chiefly by Europeans; the natives look upon it as unwholesome and dangerous.

Ord. Cucurbitaceæ.—*Timon*, Luffa petola:—Used as a cucumber, but good only when green. If used in a ripe state is said to cause violent purging. Plentiful in the bazaars everywhere.

Kelula Manis, Luffa acutangulus:—Largely used as a vegetable and for other purposes. Supply plentiful.

Kaundon, Cucurbita pepo and vars.:—Plentiful in the bazaars all over the Colony. Not much used by the Malays, who say that it creates cramp in the stomach when eaten raw.

Water Melon, Citrullus vulgaris:—Not very plentiful.

Lobu Ayer, Cucumis sativus flavus:—Very plentiful, and extensively used.

Pria Paddy (Bitter Gourd), Momordica charantiæ and vars.:— } Both extensively cultivated.
Pria, Momordica balsamina:— }

Cucurbita sulcata:—Not very plentiful.

Ketula Ular (Gourd), Lagenaria vulgaris, var. striata:—Very extensively grown. Bazaars constantly supplied.

Ketula (Pumpkin), Cucurbita Moschata:—Several kinds. Very plentiful.

Chocho, Sechium edule:—Established on Penang Hill; in general excellence this cucumber far surpasses all others grown in the Straits.

Ord. Umbelliferæ.— } Leaves only seen. Grown only for flavouring purposes. Supply plentiful.
Sadriea (Celery), Apium graveolens:
Do. do., sp.?
Do. do., sp.?
Do. do., sp.?

Pungga, Hydrocotyle asiatica:—A common weed, used by the Malay and Kling inhabitants only.

(Dill.), Anethum graveolens;—Used in soups, sauces &c. Supply very limited.

Ord. Verbenaceæ.—*Buas-buas*, Premna cordifolia:—Young leaves used in curries. Supply plentiful.

Ord. Compositeæ.—*Tang Ho*, Senecio chinensis:—Leaves used as spinach. Supply plentiful.

Saw., (Lettuce) Lactuca sativa var., } Boiled and used as cabbage.
Sawi Hitam Do. } Extensively grown and supplied.
Salad, Do. Used only as salad, and apparently a very good lettuce, but cut and brought to bazaar at a too great age in order to obtain as much leaf as possible. I have examined this plant very closely, and am of opinion that, if cut when young, it would be little inferior to lettuce grown in Europe. There is also a leaf commonly sold in the bazaar which I think belongs to this order, but no clue to its name has presented itself so far. It is said to be a good vegetable.

Ord. Solaneæ.—*Trong* (Egg Plant), Solanum melangena:—Very extensively grown. Abundant supply in all the bazaars.

Trong Manis, Solanum coagulans:—Plentiful. Used in curries.

Love Apple or *Tomato*, Lycopersicum esculentum:—Grown by Europeans in very limited quantity, and seldom if ever finds its way into the bazaars. The plant, especially the small variety, grows freely, and might be largely cultivated. Solanum nigrum, one of this order, is largely used in Mauritius as a vegetable with currie, but is not used in the Straits, although the plant is by no means uncommon throughout the colony. Its use requires some care, however, being poisonous if eaten raw, and regarded in England as highly dangerous. I have myself used it frequently as a vegetable and can testify to its excellence as such. It has a bitter appetitious taste and is a vegetable one gets much attached to after a time, and the Mauritians seem as fond of it as the Malaysare of Durians.

Ord. Phytolaceæ.—Phytolacca decandra:—Is so very scarce in the colony that it can hardly be said to be in use. It is nevertheless an excellent vegetable, when the young leaves only are used; the seed is noxious. Largely used in the Mauritius as a vegetable.

Ord. Basellæ.—*Tress*, Basella alba:—Somewhat extensively grown, but not nearly enough so. It is an excellent substitute for spinach and grown in England as such. It is better known among the Klings than the Malays. A small supply reaches the Singapore bazaars.

Ord. Euphorbiaceæ.—*Chekop Manis*, Phyllanthus reticulatus:—Largely used as a vegetable with currie by Chinese, Klings and Malays; not so much among Europeans. Supply plentiful. *Ubi Kayu*, Jatropha manihot:—Root largely used as a vegetable by all classes, but the leaves only by the Malays and Klings, especially the former.

Ord. Zingiberaceæ.—*Kunit* (Turmeric), Curcuma longa:—Root used in currie, and leaves as a vegetable, by the Malays.

Ord. Musaceæ.—*Pisang* (Banana) Musa, many vars.:—Pith and young shoot used as a vegetable.

Ord. Aroideæ.—*Kladi* } A small portion of the root used as a vegetable.
Klamomo, Calocasia esculenta:— } Grown extensively for leaves, which are boiled and pigs fed with them.
Kladi China, Calocasia esculenta var.:—
Kladi Hitam, Calocasia esculenta var.:—

Calocasias sp.:—Grown only in Padang. Largely used as a vegetable in Singapore. The Malays affirm that the plant will only grow in Padang. Not cultivated elsewhere.

Ord. Liliaceæ.—*Bawang*, } Very extensively grown and largely in demand. Plentiful supply.
Allium ascolonicum:— }
Bawang Kechil, Allium ascolonicum var.:— }
Bawang Merah, Allium ascolonicum var.:— }

Allium cepa:—Not grown in the colony, but largely imported from China in a green state,

Ord. Commelyneæ.—*Tapak Itek*, Aneilema nudiflorum:—Used by the Malays as a vegetable with currie.

Ord. Boroginaceæ.—Cordia olitoria. Blanco:—The leaf of this plant is used as a vegetable by the Malays, who eat it with boiled rice.

Ord. Scrophularineæ.—*Bremis*, Limnophila punctata:—Used as spinach. Supply very limited.

Ord. Amaranthaceæ.— } Extensively used as a substitute for spinach. Largely grown and largely in demand.
Bayam Durie, Amaranthus spinosus:— }
Bayam, Amaranthus gangeticus:— }

Bayam Pasir, Amaranthus tristis:— } Used only by the Malays and Klings.
Kruma, Alternanthera sessilis:— }

Ord. Dioscoreæ.—*Kledek* Dioscorea batatas:—Extensively grown. Bazaars largely supplied.

Dioscorea bulbifera (?):—Grown more sparingly.

Ord. Convolvulaceæ.—*Kangkong*, Convolvulus repens:—Extensively grown for the leaves, which are used as a vegetable with rice and for feeding rabbits. Supply plentiful.

Ord. Artocarpeæ.—*Sekun* (Bread-fruit), Artocarpus incisa:—Fruit used by the Malays as a vegetable. The tree, however seldom produces fruit in perfection in the Straits, the greater number falling prematurely.

Nangka Artocarpus integrifolius:— } Young fruit used as a vegetable by the Malays.
Champedak Artocarpus polyphema:— }

Ord. Papayaceæ.—*Betek* or *Buah Papaya*, Carica papaya:—Extensively cultivated and used as a vegetable. Plentiful in the bazaars.

Ord. Filices.—*Paku Ruan*, Ceratopteris thalictroides:—Common in ditches. Used chiefly by Klings and Malays.

Anisogonium esculentum:—A fern not uncommon in ditches. Is a very good vegetable, used by the Malays, who also use the young shoots of the following ferns:—

Paku Akar, Stenochlaena palustris:— } All fairly plentiful in a wild state.
Paku Uban, Blechnum orientale:— }
Samber, Thamnopteris nidus:— }

Ord. Gramineæ.—*Rebong*, Gynotochloa aspera (?):—A bamboo the young shoots of which are extensively used among the Chinese as a vegetable and for preserves.

Juggong, (Maize):—Is grown to some extent and used green as a vegetable.

Ord. Palmeæ.—*Pinang*, *Klapa*, Areca and Cocos:—Heart or growing point used as salad. Supply very limited.

2. From the foregoing it will be seen that there are about eighty kinds of vegetables at present more or less in cultivation in the colony. Of that number, but few are exclusively Chinese, but a good deal of the seed from which they are grown comes from China. The cultivation is, however, much at fault, there being a tendency to produce quantity instead of quality, and some control over present system of cultivation seems necessary.

3. The following 45 kinds of vegetables of species cultivated in England have been tried, in Penang, at 1,000 feet elevation, and in Singapore at about 150 feet, with results as follows:—

II.—Vegetables Grown for Trial.

Giant Asparagus,	in Penang grew freely, but not to a large size.
Broad Windsor Beans.	Flowered in Singapore and Penang, but failed to set fruit.
Scarlet Runners, ...	Failed quite everywhere.
Egyptian Turnip, rooted Beet, ...	Did well in Penang.
Delt's Flower Garden Beet, ...	Grew fairly well in Singapore, not tried in Penang.
Broccoli, ...	Grew leaves only in the open ground, makes better centre when grown in Pots. Penang and Singapore experiments gave same results.
Brussels Sprouts, ...	
Cabbage, Large White Erfurt, ...	
Cabbage, Early Blood Red, ...	
Cabbage, Savoy, ...	
Carrots—Early short Horn, ...	Grew well both in Penang and Singapore, but of inferior flavour in Singapore.
Carrot Earliest French forcing, ...	
Cress, Curled, ...	All grew well in Penang and Singapore. Succeeded better in Penang.
Cress, American, ...	
Cress, Indian, ...	
Telegraph Cucumber'	Grew fairly well in Penang Failed in Singapore.
Sundringham Celery,	Grew fairly in Penang.
Cos defiant Celery, Williams' Matchless Celery, ... Major Clark's Red Celery, ...	Grew to leaves only in Singapore.
Dandelion	Grew well in Penang and Singapore.
Musselburgh Leek, ...	Grew well in Penang.
Kole Rabi, ...	Do Do. and Singapore.
Lettuce, Cabbage, ... Lettuce, Tom Thumb, Carter's Giant White Cos, ... Carter's Giant Brown,	Succeeded perfectly in Penang and fairly well in Singapore.
Melon, ...	Failed everywhere.
Mustard, ...	Grew freely everywhere.
Onion, The Queen, ...	Grew well in Penang.
The Student Parsnip,	Grew well in Penang.
Parsley, ...	Everywhere a success.
Peas, Ring-leader, ...	Grew fairly well in Penang.
Peas, Best of all, ...	Failed in Singapore.
Potatoes, Early Ash-leaf, ...	Grew to a fair size, but rather watery in quality.
Raddish, ...	All kinds grew well.
Horse Raddish, ...	Grew well.
Rhubarb.	Grew well for a time in Penang. Failed in Singapore.
Sea Kale, ...	Failed everywhere.
Turnip, Early French,	Grew well in Penang; not tried in Singapore,
Turnip, American Strap leaf, ...	Grew well in Singapore; not tried in Penang.
Tomatoes, ...	All kinds grew well, especially the small variety.
Jerusalem Artichoke,	Failed in Singapore.
Globe Do ...	Failed in Singapore, but produced a few flowers in Penang.

POT HERBS.

Sage, ...	All grew well in Penang and Singapore. Sage and Thyme best in Penang.
Thyme, ...	
Sweet Marjorum ...	
Spear Mint, ...	
Pepper Mint, ...	
Sweet Basil, ...	

4. It will be admitted that these results carry with them a large amount of success, and all that seems required to keep up a supply is the issuing of a standing order to a seedsman to send a regular supply of seeds of such as have succeeded and the appointment, for a year or two, of an intelligent person well acquainted with vegetable cultivation to superintend the distribution of seeds and regulate bazaar supply.

He should keep a register of all growers for sale and submit, for the information of Government, periodical reports on the progress of new vegetables, and encourage cultivators by liberal assistance.

5. By this means private enterprise would be stimulated and the object desired obtained without causing the injury to cultivators which the establishment of a Government, vegetable garden for bazaar supply would entail upon them.

III.—Other Economic Plants.

6. *Coca-leaf.*—The seed of coca was much in demand during the early part of the year, but the value of the leaf has now fallen so low that it would hardly pay to cultivate it in the Straits.

7. *Cubebs.*—There is at present but little cubeb pepper in cultivation in the Straits. Some plants lately received from Dr. Treub have been placed in the Experimental Nursery for trial. Samples of a large consignment from India of prepared cubeb pepper were received at the Garden from a Singapore merchant for botanical determination. The samples turned out to be only one-third cubebs, the remainder Piper nigrum, or some allied specimens. Cubebs can always be distinguished from Piper nigrum by the berries having little stalks.

9. *Black Pepper.*—The rise in the price of black and white pepper has stimulated the cultivation of the plant both in the colony and elsewhere. Several demands from other colonies have been made for the Singapore variety, which is acknowledged to be of superior quality.

10. I made a special visit to the Achinese plantations in Province Wellesley, where the plant is cultivated differently from the mode practised by the Chinese, but the difference only proved to be be what may be summed up in the word neglect, and bore no comparison to the better and higher cultivation as practised by the Chinese. The adoption of living supports by the Achinese (*Dadup*) is a point I would recommend, however, as in everyway more natural and economical than dead wood as used by the Chinese.

11. *Tea.*—The cultivation of tea is likely to prove a success in the Straits if handled with forethought and care. The chief drawback is the tendency the soil has to rent and fissure, even during a short period of drought, but this could be remedied by making special compost and planting in large holes.

12. *Cardamoms.*—Further experiments with Cardamoms show that the atmosphere in Singapore and Penang is apparently too dry for the proper cultivation of the plant, but it would no doubt succeed admirably in some parts of the Native States.

13. *Gambier.*—Observations have shewn that the gambier plant may be cultivated for forty or fifty years on the same land without the land becoming exhausted, if properly cultivated. This is the opposite to the general opinion. I measured the stems of some plants of the age mentioned and found them about 18 inches in circumference close to the ground and still bearing large quantities of leaves.

14. *Croton Oil.*—The Croton Oil plant produces seed freely in Singapore, and could no doubt be

grown with advantage. I would strongly recommend it to planters for trial.

15. *Cassia Auriculata.*—This is an East Indian bark which grows very freely in the Straits. The bark contains a valuable tanning principle, which would no doubt pay in cultivation.

16. *Cocoa.*—The new varieties of Cholocolate grow well, and the plant is now established in the Straits, but white ants, leaf insects, mildew, &c., play such havoc as almost to prohibit its cultivation in some districts.

17. *Nutmegs and Cloves.*—The protracted drought in Penang tried the Nutmegs and Cloves plantation very much, many young plants died, but the drought was of exceptional severity and has not discouraged planting.

18. *Hemp.*—Some plants of Mauritius Hemp, planted for experiment among rough lalang, have coped successfully with that troublesome grass, and although they have grown less rapidly, they have by means of their wide-spreading leaves, prevented the grass from covering them over and cutting off their supply of light.

19. *Rubber and Gutta Percha.*—The Foreign Rubber trees mentioned in previous reports continue to grow well, but in a country where the best rubbers grow wild, it is somewhat superfluous to refer to foreign species, the ultimate success of which may be doubtful. What is more required is the careful conservation and cultivation of native kinds, the growth and produce of which in our soil is not a matter of question. I believe a purley Gutta Taban forest, worked as they do timber forests in Germany, on say, a 30 years rotation would yield a good return in profit, that is to say, a certain area, however large, to be reaped (cut down if necessary) annually, and a corresponding area planted with young trees.

20. *Vanilla.*—The cultivation of Vanilla is being tried in the colony. There are some native varieties which fruit freely, especially in Penang, but I doubt the suitability of our climate for the cultivation of V. planifolia, the kind most prized.

21. *Mangosteen and other Fruits.*—The Mangosteen, which has hitherto been considered to fruit nowhere out of Malaya, is now reported almost simultaneously as bearing fruit in Jamaica, Ceylon, and India, and must be near bearing in the Mauritius and Seychelles Islands.

The cultivation of fruit pays well in the Straits, and orchards might be greatly extended with advantage.

22 *New Economics.*—Introductions during the year include Mimusops globosa, a famous West Indian Rubber tree; Chinese ginger; Chinese rice-paper plant; Yoroba Indigo. Canonball tree of West Indies, and West Indian fruits and medicinal plants the growth and properties of which will be detailed in next year's report.—N. Cantley, Superintendent.

TEA WITHERING.

Our representative paid a visit to Gillwell Park a few days since, and saw the new machine invented by Mr. Gibb's for withering tea. Until the blocks illustrating the machine are ready, we purpose holding our notice of the invention over. Suffice it to say that Mr. Gibbs, with his usual enterprise and skill, has made a clever attempt to solve the problem of withering tea in all weathers. *The Times* gives the following account of the invention:—

"One of the most important of the various operations connected with the preparation of tea for the market is that of withering. For this purpose the freshly plucked leaves are placed on trays on tiers in a building known as the withering house, where, by the aid of the dry, warm temperature, they are withered. This withering process has for its object the bringing out of part of the moisture contained in the leaf, so that every leaf is rendered soft and pliable, becoming to the touch like a thin piece of glove kid. In this condition the leaf is readily curled or twisted in the rolling mill, which is the next operation it has to undergo, withering being the necessary preparation for this treatment. It, however, sometimes happens that a damp atmosphere or a low temperature prevails, in which case the withering cannot be properly effected, and a considerable portion of the crop may be spoiled, thus entailing a heavy loss on the tea grower. Such cases are by no means of rare occurrence, as some of our Indian tea growers to their sorrow can testify. In these circumstances it is of course of the first importance to have some means of remedying this evil and of preventing this serious loss. Heat has been employed to dry the air, but we believe with indifferent success, for if the temperature cannot be perfectly controlled and regulated the leaves will become dried at the edges and in other ways rendered unfit for the subsequent process of rolling. To overcome this difficulty Mr. William A. Gibbs, of Gillwell Park, Chingford, has devised a machine which, in the opinion of those who are qualified to express one, is capable of effecting all that is desired whether the temperature be low or the atmosphere moist, or whether both conditions obtain simultaneously Mr. Gibbs' experience in desiccating machinery has enabled him to thoroughly grasp the difficulty and to provide the precise remedy, but this only after several months of careful study and practical investigation into the subject.

"The machine in question, which we were recently afforded an opportunity of examining in operation, is as simple in construction and operation as can well be conceived, thereby adapting itself to the degree of intelligence possessd by the class of operatives who will be intrusted with its working. It consists of one of Mr. Gibbs's fans fitted in an iron casing mounted on a pair of wheels, and having a small coke fire in a box in front of it. If we add a handwheel for driving the fan and a couple of handles for moving the machine about, barrow fashion, we shall practically have completed its description. There is, of course an air inlet to the rear of the fan, and there are two outlets in front of the firebox. Into each of these latter is fixed a light flexible hose, about 4 in. in diameter, for the distribution of the air from the fan. The work of turning the fan is very slight, and here Mr. Gibbs has met the requirements of Eastern labour, for after the fan has been once started, the slightest touch of the handle at each revolution will keep it going, as the friction is reduced to a minimum. The turning of the handle draws the air into the fan, and it is expelled on the other side; but on its way to the delivery outlet, it is made to pass through a chamber which is placed over the fire, and by which means the air is raised to the desired temperature. It will thus be seen that two streams of warm dry air, one on either side, can be delivered through the hose in to the tea which is laid out for withering. With regard to the range of temperature, we may observe that on the occasion of our inspection the thermometer stood at 63 degrees Fahr. at the inlet of the fan, and at 87 degrees at the outlet, thus giving a range of 24 degrees.

"So far, the question of temperature only has been dealt with. We have now to show how the machine acts in the case of a hygrometric atmosphere. To meet this case there is a small cage fixed in the front of the air inlet to the fan. In this cage are placed roughly broken fragments of chloride of calcium, and through this mass the air has to pass on its way to the fan. The chloride of calcium abstracts the moisture from the air, which enters the fan perfectly dry and is expelled from it in the same condition, the fire not being used if the temperature of the atmosphere be sufficiently high. The machine is perfectly portable, weighing only 1½ cwt., and measuring only about 7ft. in length by 4ft. in height and about 2ft. in width over all.

"The principle of this machine has been applied, or rather added, by Mr. Gibbs to the tea-drying cylinder which he devised for drying the tea as it comes from the rolling mill, and which was described by us towards the close of last year. This machine

consists of a revolving cylinder through which the tea is gradually passed: being exposed during its passage to the desiccating influence of a stream of heated air. In this case the air may have a temperature of some 450 deg. on entering the cylinder, and on leaving it will still be sufficiently warm to be serviceable in withering tea. The air, however, leaves the cylinder laden with the moisture which it has absorbed from the tea, and in this respect is of course quite unsuited for withering. But by placing a cage of chloride of calcium at the exit end of the drying cylinder and a small fan beyond it, the air is drawn through the chloride, in which it leaves all its moisture, and is delivered by the fan perfectly dry and of a temperature suitable for withering, as was demonstrated on our visit. Of course chloride of calcium, being a deliquescent salt, becomes dissolved as it absorbs moisture. In the case of the drier as well as in that of the witherer, however, it is caught in a pan placed beneath the cage, and is afterwards restored to its normal condition by evaporation. It is thus used over and over again, none being wasted, and, therefore involving no expense in this respect beyond the first cost. This simple method of obtaining dry air at moderate temperatures is applicable to many products where heat alone would be injurious, and Mr. Gibbs is now in treaty with a large inporter of timber to construct a building and provide large power-driven fans with calcium chambers for the rapid seasoning of damp timber. He considers that this more powerful arrangement will ultimately be adopted for tea-withering houses when the planters have satisfied themselves as to the value of the process by the use of the portable witherer we have described.

"We thus have a further extension of Mr. Gibbs's ingenious application of physical laws and mechanical principles to the saving of crops, an extension which appears destined to reflect on its inventor as much credit as those by which it has been preceded, and on which he has expended so much thought, time and money. Before concluding, we may refer to an improved apparatus, which we saw in model at Mr. Gibbs's, for desiccating fibrous substances. In this instance Mr. Gibbs has taken his hay-drying machine as the basis. Here he uses a series of forks or tines fixed on two horizontal bars to which motion is imparted by a crank shaft. The material to be desiccated is fed into a perforated floor through which hot air is forced, and the form and action of the times is such as to lift and separate the material under treatment as well as to gradually carry it forward over the floor from one end to the other of the machine, at any desired rate of speed. We thus have another useful appliance for the treatment of such fibrous substances as require separating during the process of desiccation, and which is specially applicable to certain new substances used in paper making, for which purpose, in fact, Mr. Gibbs has designed this model. A large machine, 35 ft. long by 12 ft. wide, is now being constructed, the cost of which as compared with the old-fashioned endless hand machine is less than one-half, while its greater efficiency in opening up the material is obvious to all practical men."—*H. & C. Mail.*

CASSIA LIGNEA AND THE CHINAMEN.—According to the report of the Superintendent of the Afforestation Department of Hong Kong for 1885, there is a great difficulty in growing this tree, as the following extract from the report will show:—"The plantations of Cassia lignea that were made on the hills north of Aberdeen would probably have been in a thriving condition by this time but for the persistence of the Chinese in breaking off the leaves and branches of the plants. They appear to attach some importance to the plant as a medicine, and despite the vigilance of the forest guards, they succeed in keeping the plants in an almost leafless condition. Even in the Botanic Gardens, where the plants are protected by iron tree-guards and wire netting, they have killed several plants by persistently defoliating them and wrenching off the branches."—*Gardeners' Chronicle.*

COFFEE PLANTING IN SOUTHERN INDIA AND CEYLON.—No. I.

(REVIEW OF THE "WRINKLES AND HINTS ON COFFEE-PLANTING" WITH DIAGRAMS AND SPECIMENS OF FORMS BY GEORGE WILDES; MADRAS, ADDISION AND CO., MOUNT ROAD.

By an Old Ceylon Planter.)

Had I been asked my opinion a little while ago, as to whether the Coffee planters of India and Ceylon needed another book of instructions, I should have answered with a decided negative. Behold, they have Laborie, Sabonadiere, Hull, Brown and all the information collected by the *Observer* Editors in the Hand books published by them! I will not now however say that Mr. Wildes' book is quite superfluous, or that it will not fulfil its promise of giving Wrinkles and Hints to the most experienced planters, rather narrow and local but pretty sound, and we cannot expect any one to deal with matters beyond their experience.

There are many things in the book worth knowing and not to be found in other works on the subject, which is sufficient justification for writing and publishing it, if the author and publishers saw their way to make it pay.

In the article on CLEARING, the author is intensely local, and not very decided in his views. He was evidently a rather dry climate to deal with, and he goes no further. Top knots and belts are recommended to be left, which are very unsatisfactory in all cases: get a good fire, and they will be destroyed by it running through them; if they escape this danger, they become nests of weeds and harbours for vermin; forest left on the tops of hills gives no more shelter to the leeward side, than the bare hill will yield. He advises the leaving of gorges where wind rushes violently, but how is any one to know where wind will come; even he himself admits that wind wrings patches of coffee that to all appearance should be free from it. We can have no object in leaving a belt across a hill facing the prevailing wind, knowing that the trees so left will break the wind to the coffee above, exactly to their own height, but belts are worse than useless where there is an inclination of surface on both sides. The shade question has long ceased to be a subject of controversy in Ceylon; we leave no shade trees when felling and we plant none afterwards. Even Liberian Coffee expresses its abhorrence of shade in an average temperature of over 80 degrees Fahr. and a correspondingsun heat. To get a good fire through fallen forest, is the planter's first object and to this end the under-wood should be arranged so as to carry the flame along the surface; and all branches of larger trees should be cut where they stand above the general level.

The author has a very proper idea of the importance of good LINING, and his method is as good as any that can be found. Bad work I have always found to be the result of trusting a measure to a native; not one of them that I have dealt with knows a level from an incline or the difference between a right angle and an acute one. My own method is one hundred and twenty feet squares, all the sides of which I measure and peg myself—the coolies lay coir lines across the squares; a moving line is carried over them from peg to peg and the pegs put in at the crossings. There is generally at least one cooly in a gang, who can lay a string straight, if he sees one end from the other.

From thirty-five to forty years ago, a great controversy went on, among planters about the proper size of HOLES for coffee plants. Some of us brought our opinions with us from Scotland, where twenty years earlier the subject of pits for forest trees had been copiously discussed by landed proprietors and practical men, Sir Walter Scott taking part as an ardent opponent of pits, and a firm supporter of the Spout. I do not know whether the one or the other method ultimately prevailed, but the dispute

was still unsettled when I left home in 1840. In 1842-43 some estates in Ceylon were planted in holes 3 × 3 × 3 feet and others 1 × 1 × 1 and all possible sizes between those extremes, but at no time afterwards could any one have told which was which. In process of time the dispute settled down to 18 × 18 × 18 in. which is now the general practice. In 1842 I tasked my coolies to 120 holes, 40 is now I believe the usual task. The object with the coolies is to get them to hole in the right spot, and make the regulation size. The superintendent must see to this on his own method, or may accept of Mr. Wildes, as suits him. In Ceylon holes are usually filled by taking the surface soil from the upper side, but I have lately had to deal with soil where no filling was needed, but to cut two small drains from the upper side of the hole, at an angle of forty-five with the line, and a few showers silts them full of the prime of the soil.

NURSERIES.

The rearing of nursery plants in baskets should supersede every other arrangement in the case of all delicate plants, but Coffee Arabica can hardly be classed as a delicate plant, where one hundred inches—or upwards—of rain falls in the year, but it is sufficiently perverse, where the temperature is much greater, the rainfall very much lower, and the droughts last for months. Of course, every one must study his own case, so far as climate is concerned. In some parts of Ceylon, no one thinks of making nurseries; they have only to send a gang of coolies into the jungle, to bring in whatever number of stumps may be required. In other parts, where rains are heavy and frequent and the soil soft, the best nurseries are made by clearing the underwood in a piece of forest, gathering the fallen leaves and rotten twigs into heaps, sowing broadcast, and then scattering the leaves, &c. over the seed.

PLANTING.

I have had occasion to remove many large and flourishing coffee trees in old fields in the course of my planting operations, and I do not recollect one of those with a single tap-root running straight down. I have seen many turned by a stone, and going horizontally along its surface, but the most common appearance is a plurality of tap-roots, from two to six, none of which go to a great depth, few indeed being a foot long, beyond the branching point. I have therefore long looked on the fuss so many planters make about the tap root, as mostly humbug. I do not indeed hold that it is a beneficial operation, to turn up the tap-root in transplanting, but I never saw a Tamil cooly, put in a plant without pressing it down, and however often checked he was always found at the trick again. For this cause I have always cut off tap-root at hard wood that is not easily doubled up. It is hardly possible to take up a nursery plant with the tap-root complete, to its deepest fibre, and if that is not done it will branch in the new situation, however carefully treated otherwise, and why should it not branch and who has proved, that a single deep tap-root belongs to a stronger and more fruitful tree, than the tree that owns a divided tap? Else, if we must have perfect plants, put down seed in baskets, and plant out in the field, before the tap gets through the bottom.

The best way of planting is to fasten two pieces of stick—long enough to cross the hole and rest on the sides together at one end, place the plant between the sticks so that it will hang with the root straight down in the centre of the hole, over the loose end of the sticks slip a loop of string so that the plant may be held in position till the earth has been filled in round it. By this plan there can be no possible turning up of the tap-root, or twisting of the lateral fibres.

CATTLE AND MANURE.

I know nothing about the keep of cattle in India, but in Ceylon the manure made will barely pay the expense of keep, when the planter has a tract of natural pasture sufficient for his herd all the year round. The planter therefore who has no pasture land, should limit his herd of cattle to such work bullocks as he can employ on or off the estate with advantage and such cows as may be necessary to supply his table with milk and butter. There is positively no market for any kind of Cattle but working bullocks. The small quantity of beef required is in the hands of the butchers, who purchase native cattle at from R6 to R15, and worn out cart bullocks for next to nothing, and any attempt by outsiders, to introduce a better article by systematic fattening, is resisted by their united might; the only thing a planter can do with his surplus stock is to shoot them and use the carcases as manure. I suspect matters are not much better in India, and the £950 Mr. Wildes recommends to be expended on stock keeping had better be directly employed in the purchase and transport of nitrates, phosphates and alkalies. Cattle manure is an excellent thing, but it may be purchased too high.

ROADS AND DRAINS.

The author has got the right view about the importance of roads, and his plan of tracing and partially cutting them as early as possible is a very good one. To make a drain as the first operation in making a road is the only way to get proper work, for when the Tamil cooly, gets a few shovel-fulls of loose earth to deal with, he scratches it up and down, and back and fore, and round about, and never leaves it till a kick or a curse overtakes him, and sends him forward to stiffer work; when he is set to cut a drain he has no loose earth to manipulate and must put some pith into his strokes to make any impression.

I do not like a road to be even so steep as one in 15, if it be possible to obtain a better gradient; of course they may be steeper where no bandy road can be made. I have before me as I write, a zig-zag, going up a steep face, sprinkled with mighty boulders and bounded by cliffs. None of the few gentlemen who had travelled it made any laudatory remarks on my engineering, but I compensate myself by looking on the work with unqualified admiration. In some recent road making I have involved myself in the necessity of some heavy blasting but that can be deferred till better times, and no one coming after me can improve on my traces, but I forgot I was asked to review Mr. Wildes' book and not to tell my own tale. Well, I agree with all my author says about roads, but I join issue with him about drains. He says "as a rule, and for a permanency, I do not approve of drains; I prefer renovating and and weeding pits, to stop the wash," I have no special objection to supplement my system of drains by wash-holes, but I dare not rely on holes alone, for dealing with the surface water resulting from exceptionally heavy rain; and be it remembered that it is the exceptional, that has in this case to be provided for. One twenty four hours in July 1878, Colombo was visited with a ranfall of eleven inches. Here where I sit twenty miles inland I have seen certainly not less than five inches fall in two hours. Five inches of rain gives upwards of 11 cubic feet of water, to every twenty-five feet of surface. I incidentally learn that Mr. Wildes' "renovation holes are 2 × 2 × 1½ feet, or a capacity of 6 cubic feet, suppose the earth to absorb one cubic foot, which is certainly as much as it is likely to do, the remaining 4 cubic feet must go down the hill, at the nearest to the first natural water-course. Then the surface is encumbered with the loose earth dug out of the holes: this the descending flood searches, and carrying off all the loamy portion in suspension, silts the holes up to the surface with the sand and smaller gravel while the water is forced out of them to augment the stream. This is the one serious objection to all systems adopted with a view of retaining the whole rainfall on inclined surfaces. The terrace, the embankment, the water hole may stand for years and answer the purpose satisfactorily, but the awful exceptional downpour comes at last and sweeps all away.

On a gravel surface there is no need of Drains, or of any other arrangement to save wash, for there is none. The same may be said of soapy clay, which may possibly benefit by deep tile drains, but yields little or nothing to surface wash. The cause is very different where there is a rich loose surface soil, several inches deep, from which every shower carries

off a portion, for the advantage off the neighbouring paddy fields. Such land I would drain from 400 to 800 yards per acre. The drains should be steep enough to keep themselves clear, running diagonally across the hills: they need not be more than a few inches deep. The drainage system generally practised on the tea estates is 440 yards per acre—15 inches deep and on the standard gradient of one in fifteen. It is contended in favour of this system that the 1 in 15 exactly hits the point of keeping the drain free of silt without wearing the bottom and that drains 33 feet apart are sufficiently near to prevent surface ruts. This may be true locally on many lowcountry estates, but I have had to deal with soils where easier gradients did not prevent bottom scouring nor more frequent drains prevent surface ruts.

It is the very foundation of what Monclare calls his system, that the more water sinks into the land the better for the planter. I deny the proposition *in toto*. There is a proper measure of moisture needful to mantain the growth of plants and any excess is injurious so long as it continues and is just as bad as too little; superfluous water very soon passes beyond the region of roots if compelled to remain till it sinks into the earth and therefore does little harm, as the earth only retains moisture as much as fills it, the same as a pint pot which if you keep on pouring after it is full merely runs over, and if more water than the earth can hold is forced on it, it merely filters away below. I am not aware that those who depend entirely on holes to get rid of superfluous water hold the notion that the land is thereby improved, but I maintain that properly arranged drains is the quickest and the most economical way of getting rid of it.

BUILDINGS.

Mr. Wildes is intensely local again in what he says about buildings. We do not even know the terms he uses, but it is little matter as he has nothing to teach Ceylon planters about buildings. This is however a subject on which I am not an authority, and will say nothing more.

WEEDING.

It appears that weeding is not so well understood or so carefully practised in the Wynaad as in Ceylon. The true rule is to keep the necessary labour to go over the estate once a month constantly employed and whatever else may fall behind, never take off the weeding gang to any other work, not even in crop, unless the precaution has taken to put on force enough to go over it in a week just before the heaviest crop comes on. Once let seed into the soil, and the cost of weeding cannot be estimated, and for my own part, I would rather sacrifice a little crop than allow my property to get into weeds. The Wynaad rates for weeding seem to be much higher than those of Ceylon. A recent correspondent of the *Observer*, states that he has weeded as low as 5S cents per acre, which extended to twelve weedings, gives R6-96 per annum, and I know that this may be done.

I cannot see the force of Mr. W's. objections, to burying the weeds as the work goes on. If the "renovation" holes, are of sufficient capacity to contain all the water and all the silt of even exceptionally heavy rains, then indeed, there will only remain the danger of the weeds thrown into them taking fresh root and shedding seed before the next weeding. But I have no faith in holes alone as a protection from wash, for if they ever overflow, they are certain to do more damage than would be done if neither hole nor drain existed. I used, when in charge of the only estate weeded monthly in Ceylon at that time, to give each weeder a small basket to be carried in the left hand for the weeds to be dropped into as picked, which were emptied on the roads, and a momattie went round and buried them in pits below I was in one of the wettest spots in Ceylon but never saw them washed out.

SUPERINTENDENCE.

All that Mr. Wildes writes on this subject, when stripped of details, amounts to this. The superintendent of a coffee estate should have brains enough in his skull to organize and administer a system, integrity enough to act justly in all his dealings, and firmness enough to exact the right from all employed under him. This is the man needed for all kinds of business, but is not the man most likely to be selected in this grasping and over-reaching age, the abilities by all means but moral qualities *be blowed*! We have arrived at the point, of giving our sympathy to every clever piece of roguery, at least till the clever one, has run his head against the laws of the land and come to grief. Smart men, as the Yankies call them, like to deal with smart men; as an edifying exercise of their own wits, it is the honest men who avoid them if they can, a piece of wisdom the stupid men never learn. The old Scotch proverb has it, "If he cheat me once foul fa' him; if he cheat me twice foul fa' me."

Smart or not, the superintendent of an estate, works under a disdvantage in dealing with his proprietor's agent; he stands on a different level than the man who can send him the sack any month in the year, while he cannot choose whom he will serve and may be left a long time without any service whatever. An honest man will at once refuse to do a dirty or dishonest act at whatever cost to himself, but a prudent man will not scald his mouth with other people's broth. If the system or no system of my neighbour is not pleasing to me, it is no part of my business to convey my views to his superiors. I may be conscious that the agent under whom I serve is working the oracle much more for his own interests than those of his principal; I am not called on to push in my oar between them. It is most probably a case of diamond cut diamond, and the proprietor knows more of the affairs between himself and his agent than I can tell him. Some proprietors insist on corresponding with the superintendent over the head of the agent: this no prudent man will undertake; it is unbusiness-like; it causes annoyance on all sides, and most probably leads to the dismissal of the superintendent who submits to it. The superintendent engaged by the local agent should have no official knowledge of any interested party beyond his immediate superior; to him all communications on the business of the estate should be addressed, and if he manipulates them to suit the digestion of his principal, it is no business of the superintendent. The superintendent stands in the same relation to his assistants that he himself bears to the agent, and the same rule should be observed.

One of the heaviest trials of a superintendent is when an agent who has never been a practical planter insists on directing the details of internal manage ment. It is true that in Ceylon the visiting agent is supposed to be a practical planter, but we are all aware that high professional attainments are not the sole or even the chief factor in their selection, and that their crotchets may be as troublesome in some cases as those of the desk planters who never set a pulper or pruned a coffee tree.

It appears to me that Mr. Wildes dwells much longer on minute details than on broad principles. Any youngster can master the details of working an estate in a few months but while he continues a planter, he is always learning something of the less obvious doings of nature, and if he undertakes to become a teacher of others it is not in minute directions about the daily routine that he can most benefit his fellows, but in opening to them the deeper results of experience that every observing man stores up during years of practice.

This book may be locally useful to new beginners but the author has nothing to teach to old Ceylon coffee planters.

PAY AND ALLOWANCES.

Pay and allowances will regulate themselves by the law of supply and demand; the employer will give as little as he can help and the servant will secure as much as he can get. It is the business of the employer to get the fittest man he can secure, and the servant to be fit for the place he seeeks to fill. A good character for efficiency and trust-worthiness will be certain to pay well sooner or later, and for the rest the parties will just act according to the view they respectively take of their own interests. I

either knows how or where, he can do better; the negotation will assuredly fail. It is best for both parties that there should be no unacknowledged perquisites.

Salary settled by mutual consent.

Cook house cooly—general custom.

Tappal cooly—general custom.

Horse keep or equivalent travelling allowance when it is a part of the superintendent's duty to travel on estate's business—general custom.

Keep of a cow.—Special where the estate keeps no cattle.

Cultivation of a vegetable garden—special.

The estate usually finds the heavier articles of furniture, as chairs, tables, couches, beds, almirahs, cash-box, &c, all other necessaries the superintendent finds for himself.

I would never give any sort of work on contract that I had labour enough to do myself. Contract work to get it well done needs even more supervision than day labour and with a properly organized establishment will in no case be cheaper. A contractor means scamped work, if he can possibly get it passed and a constant pressure for advances beyond the value of work performed.

ESTIMATES.

I have put no faith in estimates, since a time I remember in Ceylon when one very simple one served all intending planters the terms were. It will take £10 to plant and bring a coffee estate into bearing per contra. The average crops of a coffee estate will be 10 cwt. When the test came no estate planted during the Forties cost less than £30 per acre,—many of them much more,—and only a few favoured localities, ever yielded 10 cwt. per acre or over in rarely favourable seasons. So far as current expenditure is concerned it is easy for a planter who has the accounts of the estate for a series of years to tell now much money he needs for the next twelve months, but he who attempts to estimate crops before they are on the trees is certain to blunder; indeed it is only an experienced eye that can make a near approximation, with all the crop of the season before it. True the expenditure required to open an estate may be readily enough ascertained but practically, no man works on another man's estimate, unless tied down by stringent orders in which those who give the orders assumed the responsibility as for a cut and dry estimate prepared before the land is selected, setting forth the amount and value of the average crops it must range in trustworthiness with a present estimate, of the rainfall of 1885 in a given locality.

(To be continued.)

TEA AND THE EASTERN EXCHANGES.

The somewhat bewildering effects of the state of the exchanges with the East have a highly important bearing upon the Tea market. The increasing scarcity, or greater purchasing power, of gold, which tends of itself to lower the price of silver, and to lessen the quantity of commodities that can be bought by the latter, has been accompanied by a much greater production of silver. The result of these two causes has been that the silver rupee, the par value of which used to be 2s, as expressed in gold, has fallen below 1s 5d for some time, and has recently even been only 1s 4⅝d or 1s 4¾d. Without going into a tedious dissertation upon the various ways in which this remarkable change has come about, it is sufficient to say that it means that a sovereign, the exchange value of which was formerly 20s in India, is now worth 25 per cent more, or 25s. A price of 1s per lb. for Tea when paid in this country is worth 1s 3d to the producer in India, as compared with former times. It follows that the gain by the exchange has become a most important item, as a matter of account, in calculating the profits of the various Tea Companies, whose books are kept in rupees, and not in pounds sterling. Indeed, the *Indian Tea Gazette* says that there is now more profit from this source, than the difference between the cost at the gardens and the Calcutta sale price. In fact, with an average cost of something like 10d. per lb. for Indian Tea, as made by some of the chief Companies and laid down in London, the present exchange alone means a return of not far short of 2S per cent. It is to be remembered, however, that the greater portion of the Indian Tea gardens have been planted long since the rupee was at par, and probably at a time when its value was about 1s 9d or 1s 10d. Still, a fall to 1s 4¾d from those prices represents a great difference.

The first effect of such a remarkable state of things is to cause unexpected prosperity among the producers, at a period when they looked for bad times in consequence of the greater general production of Tea. The usual results, however, of a depreciated currency may be expected to follow. If so, the growth of Tea cultivation will continue till a point is reached, when the benefit through the exchange will be neutralised, partly by a fall in value here, and partly by a rise in the cost of production in India; for the greater demand for land, appliances, labour transit, &c., in the Tea gardens, will of course be reflected there by some rise in the amount of money which has to be spent in the manufacture of a given weight. It may at present be said that where there was formerly one rupee in India, there is now (judged by the exchanges) material in silver for a rupee and a quarter. In a country where the supply of the circulating medium is ample, such a state of things would immediately be followed by a corresponding rise in money values on the spot. When the United States issued a forced paper currency, it will be in the recollection of most readers how immediately prices, as expressed in paper rose, and how a similar change followed the fresh issues, and also how the reverse took place as the Washington Government paid off the greenbacks. Similar results, doubtless, are following in India in the veiled barter by means of silver, in which trade there is carried on. Indeed, though food and wages have apparently not recently risen in the Tea districts, one of the common subjects of talk among Anglo-Indians is the increased dearness of living in India at present as compared with twenty or thirty years back. In short, as the relation of the supply of silver to other commodities increases, money prices ultimately rise and wages follow.

The effect of such events in a vast empire like India is, however, immensely slower than in an European country. Suppose that in this kingdom all trading transactions were carried out, not by cheques, bills, bank-notes, or gold, but that they had to be transacted by carrying about florins, the equivalent of the rupee, in canvas bags; that the population was increased to 350,000,000; that the area of the country was increased twenty-fold; that there were few railroads, and, broadly speaking, no proper roads; that over a hundred different distinct languages were spoken within our borders, and that there were endless restrictions imposed by religion and by caste, on intercourse between man and man; and, above all, that our natural slowness to change, were indefinitely multiplied by the ingrained conservatism of the unchanging East—if all these causes were put together we should better be able to realise the length of time required to bring about a change in values, expressed in money, in India, as compared with the period requisite to bring about similar results in England or in other European countries. Why, till quite a few years ago, if the Government at Calcutta wished to pay a sum of money in the north of India, the actual rupees were packed in bags and sent in carts drawn by bullocks and guarded by sepoys, who marched on foot in charge of the treasure for some six months, before their goal was reached. The Government for the same reason—the scarcity of currency—even now only makes its own bank-notes legal tender within a limited circle from each of the issuing points. Further, the poverty of the people, according to our ideas, renders alterations in the relations of currency to values even slower, for a rupee almost represents wealth to a nation, where a rich man spends 4d a day on his eating, and where in some of the provinces the labourer gets 30s *a year* as wages and keeps himself. Where any currency at all is common, copper of course plays a far more important part than with us, and it is supplemented not only by the farthings and mites, of which we see so little in this

country, but by a circulation of cowries—shells worth twenty to the halfpenny, and used for small change.

Such a digression may seem to take us far from Tea, and yet brings us back to the point that, comparatively slow though they may be in their operation in India, yet the laws of supply and demand will, in the long run, if silver remains so low, raise prices in India till the present benefit of the Planters, through the exchange, is lost. It behoves them, therefore, not to forget economy in the hour of their apparent prosperity but to prepare for the worse time coming by cutting down expenses and by not letting fixed charges grow as the weight produced increases. Similar causes are at work in Ceylon, in Java, and above all China. The production of Tea is being immensely stimulated, and is increasing beyond the rate of increase of the consumption. This, of course, means constantly falling prices on our side, at a time when the cost of production in the East tends slowly to rise, and when, in addition to other causes, the increased scarcity of gold is tending to lower the prices of commodities in England and in most parts of Europe. While this is so, there appears, on the other hand, no apparent limit to the progressive decline in the value of silver. The actual cost of the bullion in the rupee is said to be about 1s at present, and it is probably a good deal convention and habit that keep it so much above that price. The planters will therefore continue to profit, if the rupee falls further, but by very slow degrees the cost of production would rise in proportion, while selling prices are likely to continue to drop here, through an opposite cause—the "appreciation," or rise in value, of the other chief circulating medium. The exactly contrary effects of these two currents in prices, are thus likely to deprive the tea planters of their present gains by the exchanges, sooner than they would have otherwise lost them.

Inevitable as they may be, these alterations in the values of gold, silver and commodities, while they are in progress, cause an enormous amount of inconvenience, and a good deal of actual loss in some branches of trade (for though the tea planters happen to gain, English exporters often suffer), especially as the causes at work are so difficult to discern or follow, that for a long time people are perplexed to know the reason for what is going on. An influential section of the mercantile community is greatly concerned at these fluctuations in opposite directions in the relations of currencies and prices of gold, silver and other produce. It thinks that the various governments of the world ought to intervene, and to decree that what is really worth 1s 5d is not worth that, but 2s—in short, that humanity at large should accept seventeen pence as being worth twenty-four. The task appears a large one, and of the character of that undertaken by Canute when he rebuked the sea for its progress. After all, it will be found that the main difficulty of the Eastern exchanges arises from the continuous fall in them, for once the rate is stable in mercantile transactions, calculations are readily made, and things equalise themselves. This instability in the relations between currencies and commodities no law could have altogether stopped. The part in favour of a regulation of prices by the Governments of the world, is greatly swelled by the Anglo-Indian official fraternity—a class that lose materially by the present state of the exchanges, because the Government has contracted to pay them so many rupees a month, and not so many sovereigns. It would be well for Indian officials to correct their ideas by asking any tea, indigo, or silk planters, or any exporters of corn, seeds, oils, or other Indian produce, whom they may know, what would be their opinion of the result of bringing exchanges to par, if it could be done at a blow, by an arbitrary law. The planters and exporters from India would probably point out that such a change would instantly ruin them. The views even of the Simla authorities may be coloured by the officials' sufferings through the loss on home remittances and pay. For instance, a despatch has recently been mentioned in the papers, in which the Governor-General's Council combat the assertion, that the recent amazing development in the exterior trade of India is due to the state of the exchanges, while, on the contrary, they put it down to improved communications. New railroads and so on have no doubt immensely facilitated this result of increased Indian exports, but Tea again disproves the assertion of the exchanges having no part in this result. There has been no particular improvement in the modes of transit of Tea from Assam, and yet the production increases rapidly, and is remunerative at prices in England that would formerly have destroyed the industry in a season.—*Produce Markets' Review.*

THE DETERIORATION OF CEYLON TEAS OR THE USE AND ABUSE OF THE KNIFE IN CEYLON.

No. I.

(By an Assam Planter.)

19th August 1886.

Before discussing this all-important subject, let us examine the different agricultural implements provided by the manufacturer for all sorts and conditions of growths, endeavouring whilst doing so to select that best suited to the requirements of the island and the subjects requiring to be operated upon.

First let us look at the Assam churri. Is it not a terrible-looking weapon, with its long, coarse and sometimes horney handle, its heavy back and crooked end? In truth it is as formidable as it looks. Made of the best tried metal, there is nothing that will turn its edge or break its point. When properly handled and a drawing cut given, it will sever with equal readiness a bambu stump or a *nahore* sapling. Unfortunately it is a trifle dangerous, the makers have neglected to provide it with a suitable sheath, thus it is always open and ready for use. Sometimes coolies cannot resist the use of it in the settlement of their disputes, so it may be found advisable to collect them at muster.

Next we come to a modification of the above. It will suit our purpose admirably, for in the first place it is inexpensive, whilst small and light it is very strong and handy and well suited for light work; it can give a big cut on the occasion: this is what we want, but of course it requires having the knowledge where to cut, how and when to do it.

Lastly we have that with a rough sawlike edge: let us dismiss this from our minds with the remark that, being unweildy it is too slow in its task, rough on the plant and tedious on the operator; its use could only be required as a last and very desperate remedy; in a new field like Ceylon it should not be necessary for many years. It will be my object to show your readers how they can best spare the knife with benefit to themselves. Much of the deterioration one hears of is due to its too liberal application; at any rate, this and the heaviest picking combined. Whilst repeatedly advising the abandonment of the barbarous style of plucking so conspicuous in the browsed bushes, the abuse of the knife is a still more crying evil. And now let me urgently impress the absolute necessity of giving the bushes a chance in the coming pruning season. If you have young trees let them run, it can do them no possible harm until they begin to crowd each other, then it will be quite time enough to prune them and there will be no occasion (more especially with high-class hybrid or indigenous) to do more than pass the knife across as nearly as possible at the joint of the main limbs, and as near the centre of the trunk as may be, the higher up one keeps with the knife the better: positively no cleaning out is ever necessary; some well-informed planters contend that for every single wiry twig removed, two come to replace it. The so-called cutting down cannot be too strongly deprecated: it kills many a

tree outright and (so to speak) ages the whole prematurely. With plants three to four years of age that have been cut across and plucked heavily there will be more scope for ingenuity by the careful application of the pruner.

But tea that has been plucked after the fashion usual here, will require a long letter to itself, which you shall have by and by. In the meantime let me enforce upon my brother planters that there is nothing which plays more havoc with a tea garden than the injudicious use of either the knife or the saw.

Assam Planter.

[A good deal of what is denounced as cutting down, has been advisedly resorted to in order to get bushes into good shape, with all possible breadth for plucking, present advantage being deliberately sacrificed for future benefits.—Ed.]

CHEAP QUININE.

Mr. John Hamilton (formerly of Dikoya) has taken a step in the right direction in order to make the cheapness of quinine known and appreciated. He ought to try and get at the people in the "fen" and other marshy districts of the old country where its use can be appreciated; also at the veterinary surgeons who promised to use it freely when cheap. Out here also it is a boon to get really good cheap quinine.—From an American journal we take the following:—

Quinine from the Retail Standpoint.

The daily papers of New York are taking unusual interest in the quinine market. The Reporter has already referred to an article which appeared the other day about adulterations, and we reproduce the following as the work of a reporter on the *Tribune*.

"It may be some consolation to sufferers from malaria to know that there is little if any impure quinine in the market at present. This desirable state of things is not due to any sudden spasm of virtue on the part of druggists, but arises from causes that are purely economical. Quinine is lower in price now than it has ever been; it is selling wholesale at 55 cents an ounce, and is so much cheaper proportionately than its usual adulterants that a loss rather than a profit would result from mixing these with it.

'People are almost certain to get quinine pure this season, no matter where they buy it,' said the proprietor of one of the large drug stores near the Post-Office. 'The most unscrupulous druggist has no incentive to adulterate it now as he did when he used $3 and $4 an ounce for it. Then it paid to mix it with cinchona, which sold for $1 or so an ounce. Yes, that is about the only ingredient used and it has the properties though not the strength of quinine. About the only fault found with a compound of this kind was that it lackedpower. Nothing injurious ever resulted from its use nor, in fact, do I know of any substance that would probably be mixed with quinine which might harm the system. The most despicable form of fraud practised with this drug, is the short-weight dodge. This is worked by some of the extreme 'cut-rate' stores and unprincipled dealers. They sell a pill that contains but one grain of quinine for a two-grain pill, thereby making just double the usual profit, which one would think large enough at present. An ounce of quinine costs the retail druggist a little over 50 cents. There are 480 grains in an ounce. At a cent a grain this gives a profit of over $4 an ounce, allowing for the cost of the rice flour and gum-arabic which form the body of the pills as well as for the time required to roll them. Some of the high-priced druggists charge two cents again, making a profit of about $9 an ounce, or something like 1,800 per cent on their investment. The cheap stores I referred to that give one grain instead of two to their customers, make almost as much as this and few of them are ever found out."

"How do you account for the cheapness of the drug at this time?" was asked.

"Quinine, as you are aware, is derived from Peruvian or Jesuit's bark obtained from various species of cinchona which grow in the Columbian, Ecuador, Bolivian and Peruvian forests of South America. The Countess de la Cinchona, wife of a Peruvian viceroy, was cured of a fever by its use, and when she returned to Europe introduced the medicine there about the middle of the seventeenth century. It derived the name cinchona from her. This bark used to be gathered by the Cascarillas Indians chiefly, who obtained it by cutting down the trees that produced it. This of course, soon thinned out the more valuable trees and such was the reckless stupidity of the Peruvian government that, though it put every obstacle in the way of the tree being planted elsewhere, it was never attempted by a system of forestry to renew the riches thus improvidently wasted. The result was that quinine became scarcer and scarcer every year; the price of it went to an extravagant figure, and at one time it seemed as if this most important drug was likely to become unobtainable. It was at this time that the East Indian government determined to try to naturalize the cinchona tree in India. To obtain seeds and young plants was a difficult task, but Professor Clement R. Markham, Dr. Spruce and others accomplished it, and in a short time a flourishing plantation was yielding large quantities of quinine on the Neilgherry Hills of Southern India. The tree has since become naturalized in Java, the mountainous regions of Jamaica and many other places, so that we are almost if not entirely independent of the Peruvian forests for this great febrifuge. It is this increased production of it all over the world, one might say, which is making the drug cheaper and cheaper every year as the demand for it becomes more widespread in this and all other countries where

"'Men shiver and shake.
Dose, swear and bake.'"

[Such is fame! No express mention of Ceylon which has simply revolutionized the world's trade in bark and quinine.—Ed.]

WYNAAD PLANTERS' ASSOCIATION.

Proceedings of a general meeting, held at Pookote Club, Wednesday, 4th August 1886.

Present:—Messrs. Abbott, Achard, Atzenwiler, Batty, Boosey, Imray, Jones, Jowitt, D. Mackenzie, W. R. Mackenzie, Tanqueray, vanReesema, Walker, Winterbotham, and Romilly. Honorary Secretary; Mr. H. B. Winterbotham in the chair.

Cinchona.—Read letter from Mr. Batty on the question of the approximate possible loss of weight in bark in transit from the estates to the coast. From the discussion which ensued and from actual results stated, it would appear that the loss from all natural causes, except theft, should not exceed three per cent under any circumstances.

Read an interesting paper forwarded by Mr. G. L. Yonge giving the following statistics *re* the renewal of Ledgeriana bark.

"*Hybrid.*—Bark analysed from the same trees for 4 years.

Original ..	1·81	Sulphate of Quinine.
Once renewed..	3·31	ditto.
Twice " ..	4·84	ditto.
Thrice " ..	5·20	ditto.

Ledgers.—Original bark from narrow-leaved Ledgers analysed last year gave 4·09 sulphate with total 5·97, renewed bark, 11 months later, 6·62 sulphate with total 8·49 *broad-leaved Ledgers.*

Original last year 2·90 sulphate with total 6·61.
Renewed 11 months 5·19 " " 8·51.

A broad-leaved Ledger recognised by Professor Lawson as C. Calisaya Hembra, yielded 5·96 of sulphate of quinine with total of 10·06.

The Honorary Secretary called the attention of the meeting to the Government Order in answer to the representations of the Madras Chamber of Commerce on the subject of their competion in cinchona cultivation, and asked whether the Association was prepared to take any further action in the matter. After

a long discussion it was decided that no further action need be taken as Government had pledged themselves not to increase their plantations; in the meantime the meeting regretted the inability of Government to assist us with cheap analyses in experiments with C Ledgeriana bark, as such help would only be in accordance with their expressed opinion for the "raison d'eter" of the plantations.

CORKS AND CORKWOOD.

THERE exists in the art of bottling no more prominent factor than the cork.

The Portuguese cork is inferior to the French in quality, but superior to the Italian, being lighter and whiter. Sardinia produces a kind easily distinguished by its color and weight, being pinkish hued, and heavier than many other varieties. It is considered by the English the best variety which can be obtained, but little, if any of it, comes to the United States. In 1861 it was reported that the cork forests of Sardinia and Corsica had been in a great measure destroyed by improper working; but this report, like the annual rumored failure of the peach crop in Delaware, seems to have made little difference in the supply.

France produces the finest grades of cork, especially in Languedoc province and the environs of Bordeaux. The peculiar velvet cork, so esteemed in the bottling of champagne, is the production of those places, and is becoming very scarce, it being feared it will, in time, become unobtainable.

Africa produces large quantities of cork, but of an inferior grade, although the soil and climate of its northern countries seems peculiarly favorable to its propagation. This is especially true of Morocco and Algiers. The causes of this are to be found in the uniformly high temperature and profuse nightly dews, while the dry, warm, open hillsides are covered with a sufficiency of light soil, peculiarly adapted to the growth of the trees, which attain to a large size here than elsewhere.

There are said to be 2,500,000 acres of cork forests in Algiers alone, of which about 300,000 are utilized. It is said to be capable of producing as much cork as all the rest of the globe, if the inhabitants could but be persuaded to remain peaceable, and give their attention to agricultural pursuits.

In 1859 an attempt was made to introduce the cork oak into the United States, Portuguese acorns being planted, with this end in view, in Wayne County, Miss. All grew, the largest trees, eleven years later, measuring thirteen feet in height, while the trunks had attained a diameter of eleven inches in thickness the cork bark being more than an inch in thickness. In 1872 the planting of cork trees was attempted in southern California, but with what success does not appear.

Among the conditions necessary for successful cork culture, climate and soil are of the foremost importance.

In the Mediterranean basin, where it is indigenous, the tree favors altitudes varying from 1,600 to 3,200 feet. It does not flourish beyond 45° north latitude, and the minimum temperature must not be less than 55° Fahrenheit.

It grows best on southerly slopes, which afford a freer circulation of light and air than do flat lands. It requires abundant sandy soil. Planting is usually performed from seed; as a rule the large, sweet acorns developing into the best trees, which yield the finest cork, the small, bitter acorns producing trees of a coarse and inferior nature.

The most approved method of planting, and that which is employed in France, Spain and Portugal appears to be the furrow or "hill" system, which consists in sowing the acorns twenty to forty inches apart, in a furrow between two or more grape-vines, placed at from five to seven feet apart. The sowing and planting are conducted simultaneously, the vines affording the shelter which is so necessary to the cork tree during its early growth. The young trees are thinned out as required so as to afford abundance of air and light to each. About fifty trees to the acre are recommended by the French cork producers, and the production is about eighteen pounds to each barking of the tree.

The distinguishing feature of the cork oak is that the parenchyma forms the mass of the bark, while the contrary is true with nearly all other trees. In the earliest state of its growth it is much more elastic than it ultimately becomes, owing to its containing in the first instance a large proportion of woody matter. The outer casing of the bark is formed during the first year's growth, and does not subsequently increase; but the parenchyma or inner bark continues to grow as long as the tree is alive.

In consequence of this phenomenon, the pressure of the growing inner bark beneath, forces the outer shell to split and peel off in flakes. The substance thus shed under natural conditions is known as "Virgin corks." It is very coarse and of woody texture greatly resembling the bark of the California live oak in appearance. Its uses, from its coarse nature, are very limited.

The removal of this outer bark from the tree is fortunately when performed in a judicious manner, unattended with any evil consequences to the tree; on the contrary, the operation seems to hasten and assist the growth of the bark, improving its quality, and at the same time the tree grows more vigorous, and attains greater longevity, trees which are regularly barked being known to live to the age of one hundred and fifty years and upwards.

The age at which the first stripping may be attempted varies with the locality, from fifteen to thirty years, the former being the most general.

The yield much resembles the naturally shed virgin cork, and is commonly included under the same term. Subsequently the barking is repeated at intervals of eight and ten years, the quality improving on each occasion. The second crop is also still too coarse for any but inferior uses.—*Independent Journal.*

THE COFFEE CROP-YEAR IN BRAZIL (says the *Rio News*, July 3rd,) just closed has shown no very marked features, but, so far as we can learn, has been fairly satisfactory to exporters. The estimates were very close to the actual out-turn, the estimates being from 4,000,000 to 4,250,000 bags and our receipts amounting to about 3,890,000. From 150,000 to 250,000 are probably carried over. The interruption of traffic on the Cantagallo railway during the early part of 1886 caused a sharp decrease in our *barra dentro* supply, which apparently has not since been overtaken. At the end of October a divergency of opinion arose among our brokers as to stocks, the estimates varying to the extent of 50,000 bags. This has since been reduced to about 10,000 bags by deducting local consumption, which is estimated to be 6,000 bags per month. As to the crop year upon which we are now entering, the extreme estimates seem to be that the Rio crop will produce from 3,750,000 to 4,250,000 bags, the drought in January, it is claimed having reduced the first estimates which were very large. We incline to the belief that the larger figures will more nearly approach the truth. As to Sao Paulo, all advices agree in stating that the crop will be very large. The May and June frosts were not general and even allowing for all damage, there are estimates that the crop will be one-half larger than that of 1885-86. The crop of 1887-88 will show greater prejudice from these frosts, but it is, claimed that new plantations are likely to counteract any probable decrease in the older orchards. In fact, there seems no reason to doubt that Brazil will export the usual average amount in 1886-87, which we consider to be very near 6,000,000 bags of 60 kilos from Rio and Santos.

Correspondence.

To the Editor of the "Ceylon Observer."

PALMS AND LIGHTNING: LIGHTNING CONDUCTORS.

Colombo, 4th August 1886.

Sir,—Though it is some time since you had *an article* on the above, I will act up to the saying "better late than never" and endeavour to explain why palms, which seem externally only slightly affected by a discharge of the electric fluid, be doomed to die.

What causes the discharge to come to earth? It is that the tension of the countrary polar electricity becomes so great as to overcome the resistance offered by the intervening air to their union. Now as electricity always takes the less resisting medium, and air (especially dry air) being the worst conductor, it is natural that high trees and buildings will be chosen in its passage to earth; then, as water (especially acidulated water) is the best conductor, the fluid will choose the most sappy trees though they may not be the highest. As coconut trees are the first high points which the monsoon clouds meet on striking the island it is natural that they should be the greatest sufferers, and as a single coconut tree is not sufficient to carry off the fluid other trees within a more or less extended radius according to the quantity of the discharge are also affected. A queer effect on a tree may be seen in front of Aitken, Spence & Co.'s office.

The reason that palms and *plantains* which have served to carry off the fluid are doomed to die is simply because their life lies in a single sprout in the most sappy, *i e.*, the best conducting portion of the tree, and the quantity of fluid which is sufficient to singe the outer leaves is quite enough to boil the life out of the tender shoot. Other trees, animals and human beings are only affected inasmuch as their life-sustaining properties have been injured.

While on the subject of lightning, a few lines about lightning-protectors (commonly called conductors) may be useful to dispel a few popular errors. The principal action of the protector is to neutralise the electricity in the clouds by discharging into the upper air fluid of a different polarity, thus acting as a "discharger." Its other important action is to act as a "conductor" to the electric discharge by offering to it the easiest passage to earth, *once* the discharge has taken place within its radius. Many persons, especially natives, believe that lightning-protectors act as lightning "attractors," and for this reason will not put up any on their buildings—a great error I should think.

It may astonish you to learn that there is only one thoroughly well protected building in Colombo and that is the Wharf and Warehouse Company's premises at the Wharf, which can be classed A 1. In the next class come the Colombo Club, the Clock Tower, and perhaps the Surveyor-General's Office. On the first of these, though the protector is well put up, there are portions of the building beyond its radius. In the case of the second a grave error has been committed by not metallically connecting the iron ladders and weight pipe in the nterior to the protector. As to the Surveyor-iGeneral's Office, with half the weight of metal used it might be twice as well protected.

There are many buildings, and mill chimneys principally, which might with advantage have their lightning-protectors refitted; and in the case of the barracks, the Military Hospital, De Soysa's buildings and a few more likely exposed buildings, their non-protection simply amounts to gross neglect, and I should certainly not like to find myself within an appreciable distance of the Ice Manufacturing Company's chimney even during the slightest thunderstorm, leaving, out of the question days like the 3rd and 4th of May last, the like of which for electric discharges I have never come across.

Apologising for taking up so much of your valuable time and space, yours faithfully.

Q. E. D.

[We have to thank our correspondent for his clear explanation of what to us has long, in regard to lightning-struck palms, been a mystery. The general information also, is valuable.—Ed.]

THE "TUMBA PLANT," AN ALLEGED CURE OF SNAKE-BITE.

Sir,—A native Indian medical practitioner, writing to the *Madras Standard*, declares that the juice of the "Tumba plant" is an antidote for snake-bites, and gives directions for its use. Will you kindly inform me by what name this plant is known to botanists, and whether it is to be found in this island?—Yours truly, INQUIRER.

No. II.

DON'T DIE IN THE HOUSE—THE "TUMBA PLANT"—A NEW PRODUCT—AN ANTIDOTE FOR SNAKE-BITES?

Kelvin Grove, Colombo, 20th July 1886.

Dear Sir,—Instead of adding a footnote to the letter of "Inquirer" on the subject of the "Tumba plant" as an antidote to snake-bite which you have submitted to me, I make you the following remarks:—When staying at the late Dr. Elliott's at Kollupitiya about 25 to 30 years ago, one evening after we had finished dinner "*John Colombo*" the head appu rushed in and said to the Doctor! "Sir, sir, the Sinhalese woman that you *cured* is *dead*!" We all joined the Doctor in a hearty laugh at his "perfect cure," the facts of which were that a mad dog attacked a Sinhalese girl close to the Doctor's house and bit her severely in several places, and when she was brought to the Doctor he at once did all he could to cauterize the wounds to prevent hydrophobia, but though the wounds healed, and the woman was so far cured, hydrophobia set in and she died. The application is obvious.

I cannot find such a name as the "Tumba plant" in any book at my disposal, but a very common plant in Ceylon is the Getatumba, Lin. Leucas Zeylonica, Br., but I do not believe that this or any other vegetable or mineral antidote has ever been found for snake-bite; that is for the regular injection into the circulation of the poison of a DEADLY SNAKE of mature age; therefore I do not believe in the cure of a cobra-bite by a Mudaliyar described in a late number of your paper. No such cure has ever occurred in all India or Ceylon as far as *true* records are concerned.

About the same time that I refer to, several grass-cutters and other natives used to come to Doctor Elliott to get cured of snake-bites, and the Doctor and myself believed that he was successful in his operations in this respect.

The patients used to come stating that they had been bitten by poisonous snakes and were in great pain. The Doctor searched for the part bitten and generally found it swollen, and he at once raised it by a hooked instrument and cut the piece out, and the patient soon got better; but these were from the bites of the small venomous and not deadly snakes, or scorpions &c., no doubt, and, as already stated, I do not believe in any antidote internal or external for the poison of a deadly snake, once it enters into the circulation, and no such antidote has ever been found.

Will your correspondent "Inquirer" mention the language from which the "Tumba plant" has been derived? How very strange it seems that most of the new and remarkable products have names not found in any native or European books.—Yours truly, W. F.

THE TEA SYNDICATE.

20th August, 1886.

SIR,—The Tea Syndicate circular is now being sent to all members of the Planters' Association and will be supplied to others on application. I would through the medium of your columns, desire to impress upon all those interested in tea the extreme desirability of supporting the scheme by contributing a little of their produce. The scheme is, I think, the only feasible one for increasing with some rapidity the number of our consumers while we are increasing our production, and for establishing the wholesome stimulant of alternative markets. Every one, I think, approves of the idea and recognises the benefits to be derived, but it should be clearly understood that barren approval is of no use, and if the planters of Ceylon are in earnest, and reay desire to see our teas consumed in the Colonies, and America, they must all help, for in such schemes, which at first may require a little sacrifice, there is a tendency to believe that others will make that sacrifice, and a desire not to interfere with their doing so. The syndicate cannot conclude satisfactory arrangements unless we know approximately what quantity of tea we will have to deal with during the coming season and I trust that the circulars will be returned with promise of some support, be it much or be it little, and that superintendents will obtain the necessary permission to contribute. The Syndicate will arrange that those who desire it can, on shipping their tea, obtain an advance of about three-fourths of its value, and this no doubt, will be a convenience to many—although the question has not yet been definitely settled. I do not think any bulking of the various teas will be attempted. Uniformity has advantages, but it would be difficult to obtain and has some drawbacks. It would do away with all the individual incentive, which in an enterprise like this is so necessary. Those shipping good teas will naturally desire that they should go under the estate marks, so that further orders for their teas can be handed to them. In this way I hope many, instead of sacrificing anything by contributing to the Syndicate, will derive individual gain. I should mention that the Syndicate has arranged for the advertisement and sale of packets of Syndicate Tea at the Colombo Hotels, so that all passengers will have Ceylon Tea brought prominently before them. The quantity so sold will of course be very small and unimportant, but the advertisement of Ceylon Tea and the Syndicate's Australian Agents given by these packets will be very valuable, and our thanks are due to those whose public spirit caused them to readily grant the privilege.—I am, sir, your obedient servant,

THOS. NORTH CHRISTIE.

THE WORKING OF THE CEYLON TEA SYNDICATE IN A BUSINESS POINT OF VIEW.

Kandy, 24th August 1886.

SIR,—I trust I will not be considered presumptuous if I venture to call in question certain assertions made by Mr. Christie in his letter appearing in your issue of 23rd inst. I quote the passage referred to:—(1) "I do not think any bulking of the various teas will be attempted. (2) Uniformity has its advantages, but it would be difficult to obtain and has some drawbacks. (3) It would do away with all the individual incentive (?) which in an enterprise like this is so necessary."

In answer to clause first, I do most sincerely hope that bulking *will* be attempted for the first reason given in clause No. 2, viz., that uniformity *has* its advantages. If it *is* difficult to obtain, surely the consignment of individual teas is the most unlikely of all courses to be followed in obtaining it. But again uniformity "has some *drawbacks*." Now this appears to me to be unreasonable. A certain amount of difficulty in obtaining the same I allow; but that *uniformity in tea*, which is expected to find a place in a new market against tremendous competition, has any *drawback* I do *not* allow. It is a power in itself, to my belief, INDISPENSABLE to our new undertaking.

The chief, and only drawback stated is that "it would do away with all the individual incentive."

Is *this* the case? Not necessarily, I think.

In the first place let it be remembered that proprietors are not supposed to send their *entire* crop through the Syndicate, but, as Mr. Christie has it, only "a *little* of their produce" in short a subscription from their crop returns to aid an undertaking which must materially affect every producer's future prospects.

Now, cannot the arrangements of the Syndicate be such as to allow a certain amount of the "incentive" element to remain in this subscription to the Syndicate, as well as in the bulk now shipped to London? Is it *necessary* that the comparative value of individual teas be overlooked, or that teas, up to and over a stated standard, sent to the Syndicate, should not be *fairly* dealt with in a fair division of proceeds, according to the valuation put upon them before shipment by experts whose decision is final?

Is there any reason why *local valuation* should be less powerful as an incentive to the producer than that of Mincing Lane? I can see no reason whatever, and I hold that the valuation of individual teas in Ceylon, before bulking, is a plan feasible in itself and unprejudicial to "individual incentive."

As regards division of proceeds: whatever the valuation put upon individual teas, the value of any individual consignment must form a certain portion of the value of the whole, and the proceeds as a whole must be divided accordingly.

By this arrangement, each consignor gets his dues according to the *value* of the produce he consigns, and I regret that Mr. Christie has expressed any opinion unfavourable to bulking as his opinion is influential. I am in hopes, however, that he will acquiesce with me in my opinion that the uniformity of tea properly obtained may not be altogether deterrent to "individual incentive."

Having considered this question from our own point of view, suppose we turn to the *buyer* and *his* incentive to continue dealings with an unhappy agent who NEVER CAN supply him with tea that he *so* liked at first.

Also the feelings of the agent who, bound to push Ceylon tea, is not in a position to give away a sample of tea to a likely customer (as is the general custom in America) without feeling that he is robbing someone to pay somebody else.

To attempt forcing the American market with one thousand small lots, is in my opinion as futile as the fire of one thousand rifles upon an armoured ship of war. One big gun and one big shot is the weapon to use.

"Those shipping good teas," says Mr. Christie, "will naturally desire that they should go under the estate's mark so that further orders for their teas can be handed to them."

"A house divided against itself cannot stand."

Individual brands may soon be in a position to claim superiority to other brands in America, but *this is not the time for them to do so.*

Hand in hand brothers! Waive local contention until your *market* is *secured*. Then and then *only* can you afford to force the sale of individual brands.

I trust my criticism may be taken, as it is meant, in a kindly spirit. If it leads to a full discussion of these points I will be only too glad, and if proved wrong will accept the opinion of of those who prove to me that they are right.—I am sir, yours faithfully,

J. McCOMBIE MURRAY.

FIBRES AND THEIR PREPARATION.—A London correspondent writes:—"Minchin is home now. and it has only just leaked out why he is here, He got to work on the Fremy process, but found that the chemical melted all the fibre in India. So I supplied the green stems of the China grass here, so that he could prove it in their own works. Cross & Bevan assisted by Johnston have agreed to test all the unknown fibres from India chemically and microscopically on the same scale as in Mr. Christy's book; there are also other departments in the Colonial Exhibition who are asking to be included for this fibre tests and classification."

WE see a claim advanced on behalf of Mr. E. Chasseriau, our leading agriculturalist, as the discoverer of Coffee-Brandy, or Cafeine. What may be the ultimate value of this new spirit remains to be seen, but it appears strange that nobody in Ceylon, Java, Brazils, &c. should have hit upon the idea before, and it, therefore, redounds all the more to the credit of our fellow-citizen should he have "struck ile," which we sincerely trust he has.—*S. F. Press.*—[For a generation past we have read notices of spirit distilled from the saccharine pulp of the coffee bean, but we have never heard of this being done for economic use.—ED.]

CEYLON TEA IN AMERICA.—We sympathise very much with Mr. McCombie Murray's view. In a country like the United States, it would be far better to present one good average grade of Ceylon tea before the consumers, at least until a hold was got of the millions whom we hope to convert to tea, from coffee drinking. We have had a long talk with Mr. Murray on the subject of his mission, or rather future business; he has most promising connections for pushing a big tea business where good tea has never been known, and we are hopeful of the result; but we say, do not let the Republicans be distracted at first with several classes and prices of tea, but let them have ample guarantees from the Syndicate of the purity of the article offered. Moreover, Americans even more than English tea-drinkers, will be glad to learn that in drinking Ceylon and Indian teas, they are discouraging the Chinese foreign opium trade.

TEA IN THE GALLE DISTRICT.—A well-informed correspondent at Galle writes:—"The production of tea in the south of the island has of late increased, and a good many gardens have been opened about Galle, chiefly by native agriculturists. Tea for local consumption is supplied from Morawak Korale and from several estates in the Galle district, viz.. Citrus, Castle, Wallahanduwe, Mount Pleasant, &c. Good pekoe season 1886 is retailed at R1 to R1·25 per lb., other grades from 60 to 80 cents. In the bazaars a fairly good leaf is sold at 50 cents per lb. The usual scented teas from China which were formerly so much in request are scarcely even seen in the market. We presume the local supply has completely put a stop to the trade in the imported article. The tea manufactured at Citrus and Castle estates at Narrawella, about six miles from Galle, is of excellent flavour and apparently much liked by consumers. Nearly all the land now planted with this product were originally either citronella or Liberian coffee estates. Land is also being rapidly opened up at Ratgama and Ganegama under European supervision, and there new clearings will be planted with tea during the next wet season."

STANDARD TEA CHESTS.—Mr. Horsfall advertises a reduction in the prices of his Nos. 1, 2, and 3 Tea chests from 95, 80 and 70 cents to 90, 75 and 65 cents respectively. All the sizes are of standard dimensions, so that nothing is lost by way of freight or dock charges.

JAVA CINCHONA PLANTING.—We give prominence to the following paragraph translated from the *Java Bode* for the *Straits Times*:—Cinchona plantation enterprise in Java seems to be going the same way as that respecting coffee and sugar, its future being also imperilled. The Government have become so convinced of the impending danger that it has directed official inquiries to be made into a disease which has put in an appearance in the eastern portion of the Preanger Regencies among the roots of cinchona trees, the latter dying within a few days after seizure.

COFFEE ON THE RISE.—It scarcely required the result of the Dutch salt at 30 cents (against 28 estimated) to show how Coffee is going to rise. Messrs. Rucker & Bencraft on July 22nd reported:—

A few months ago the question current was whether the low prices then existing were low enough, or whether when the pressure come on in the autumn of the year coffee would fall to a still lower basis. Now people ask themselves are the moderate prices current high enough? will there really be any pressure in the autumn? will coffee later on in the year rise to a higher basis altogether. July August, and often September, are dull months in the coffee trade. If the weather be fine people leave business and curtail rather than increase their liabilities. Again, coffee of course is not so largely consumed in the hot weather, and Brazil receipts run heavy as a rule in August September, and October. On the other hand the public will do well to remember that there are exceptional features current this year in the coffee trade, features which might easily upset the usual run of trade. One feature is this, that we have, existing prices which have been established by years of overproduction, and which, though stocks have heavily decreased, and though the over-production is possibly, some say certainly, a thing of the past, the trade, rightly or wrongly, still maintains will continue as the fair working basis. Another feature of interest is that 1885-86 crops generally were early, and it therefore appears probable that supplies from Honduras, Guatemala, Salvador, Costa Rica, Porto Rico, India Ceylon, and many other places. will be unprecedentedly small for the next few months. We have not time or space to go fully into the matter, but we reiterate that the article has seldom been in a more interesting position; we also note it as a fact that those who look for higher prices are daily adding to their number, though they still differ amongst themselves as to whether now or later on will give the better opportunity for buying. The whole position may be summed up very briefly. If the present reduction in stocks, a reduction which assuredly will for a month or two still further assert itself, is the result simply of poor crops, caused and produced by natural causes of a temporary and transitory character, later on the position will right itself, and stocks will increase again but, if on the other hand, as many experts assert, though the consumption of coffee is steadily increasing, the production is becoming a matter of more and more difficulty; if we are again to see not in one instance but in many countries profuse blossoms succeeded by poor crops, if the evil at work proves to be not above the ground, but below, then of coures overproduction will turn out to be a thing of the past. This digression, however is at present of no commercial value, the question the trade would like decided at the moment is whether current Brazil crop are to total about 5,500,000, 6,000,000 or 6,500,000 bags or higher. As regards the spot market in this port, supplies are and promise to be moderate. Plantation Ceylon coffees are again dearer, and quotations all round are well maintained in a market void of excitement.

GAMBOGE.

The Collector of Malabar reports that there are four species of Garcinia indigenous to the forests of his district:—(1) *Garcinia morella* grows on the Peria Ghat in the extreme north-west portion of the Wynaad taluq up to an elevation of about 1,500 feet. This species yields the tree gamboge of commerce. There is a considerable export from Ceylon, but none from the district. (2) *Garcinia pictoria* is widely distributed, and is found growing along the slopes of the Western Ghats, from 1,000 to 4,000 feet elevation. It is very abundant in the Chenat Nair forests, and fairly common everywhere. It yields an excellent pigment, samples of which were sent to the International Forestry exhibition, Edinburgh, last year; also to the Calcutta Exhibition. The gamboge is collected by lightly scraping the moss and the old bark of the stems of the trees, and then pricking them all over, with an instrument resembling a hair brush, with wire nails fixed in it at intervals of ¼ inch apart. The work should be done from December to March, when there is no rain. The gamboge collects in little tears, about the size of a small pea, in from three to four days, and is quite hard in a week, when it can be collected. The cost of collection amounts to about Rl-8-0 per pound, which is as much the product is worth in the London market; hence there is no trade in it here. A second way of collecting the gamboge is to clean the bark of the trees of all extraneous matter, and then to strip it off, pound and boil it. A yellow extract is thus obtained, which when inspissated yields a golden brown gamboge of inferior quality worth about 6d. a pound. The stripping of the bark, of course, kills the tree. The method is, therfore, a wasteful and expensive one. The fruit of both species are rich in gamboge, and the seeds yield an oil. 3 *Xanthochymus pictorious*.—This species is indigenous to the Ghat forests above Karimpoya in Nilambur. It bears a large golden-colored, thin skinned edible fruit of a pleasant sub-acid flavor, in bunches of 3 or 4 together. It is cultivated at Calicut and in the Wynaad, and is a tree of exceedingly slow growth. The gamboge yielded by it is resinous, and worthless as a pigment. (4) *Garcinia cambojia*.—A very common tree on the Western Ghats, up to 4,500 feet where, however, it rarely exceeds 20 feet in height. It yields a translucid resinous gamboge useless as a pigment. The fruit is ribbed, and of a bright canary colour. The aril is edible, being of a pleasant sub-acid like the mangosteen. The rind of the fruit when green is intensely acid, and is used by the Kurumbers and other wild tribes as substitute for tamarind in their curries. The seeds yield an oil. (5) *Garcinia purpurea*.—A very rare tree on the Ghats, but cultivated at Calicut for the sake of its edible fruit, which is of a bright purple colour. It yields a gamboge which might be used as a pigment. *Garcinias Travancorica et Wightii* are both said to yield excellent pigments, but they do not occur in this district.

The collector of the Nilgiris reports that the *Garcinia pictoria* tree does not grow in his district.—*Madras Mail*.

TYPICAL TEA, COFFEE, CINCHONA AND CACAO SOILS OF CEYLON, AND A FAVOURABLE SPECIMEN OF SOUTH AMERICAN CINCHONA SOIL.

have been analysed by Mr. John Hughes, the Ceylon soils for the Ceylon Planters' Association, the Secretary of which institution has sent them to us for publication, Mr. Hughes being good enough to send us his analysis of the South American soil for purposes of comparison. As Mr. Hughes has pointed out, the considerable proportion of alumina and oxide of iron in the South American soil shows that it can scarcely be so porous as Mr. Thomson represents. Indeed we have had accounts of cultivated cinchonas dying off in Andean plantations, just as they die off not only in Ceylon and India, but in the lava soils of Java. The statement that there are no winds on the Columbian plantation would seem to require equal qualification.

Mr. Hughes has accompanied his figures for the Ceylon and American samples of soil with such copious and exhaustive remarks, that we have little to add to the few notes we have made on the statements of Mr. Hughes. We would only say that the proportions of nitrogen, potash and phosphoric acid in most of the Ceylon soils, are so high as to suggest the presence of manurial substances added to the original soil and not exhausted. If this should not be the case, the proprietors of land showing such good results are to be congratulated on the possession of soils, only needing "a dressing of lime" to prove their fertility in the shape of teeming crops of leaf, fruit, or bark, in accordance with the nature of the plants cultivated.

For the following interesting paper we are indebted to Mr. John Hughes, so well and so favourably known in Ceylon as an analyst:—

CINCHONA SOIL OF SOUTH AMERICA.

The only practical way of ascertaining the chemical and physical properties of soils specially adapted to the growth of particular crops or trees, is to obtain reliable specimens of the soils in which these crops or trees are known to flourish. With this object in view and in order to get a sample of soil representing the natural forest land to which the better species of cinchona were indigenous, I had a correspondence some four years back with Mr. Robert Thomson, whose name has been deservedly associated with the now famous Government cinchona plantations of Jamaica.

At that time he was on the point of going out to South America, and he very kindly promised to procure the desired specimens of forest soil, but as time went on I was afraid I should hear no more about them. However, the other day, much to my surprise and pleasure, I received a note saying he had again returned to Helensburgh and could send me a soil that he had brought home with him according to his promise.

I have therefore much pleasure in sending you the enclosed results of a careful analysis of this soil and believe the figures will be interesting for comparison with those of the ten soils sent me by the Planters' Association, the analyses of which were forwarded to Kandy by last mail and will doubtless be published together with my official report on same.

I gather from Mr. Thomson's letter to me that this particular sample represents the soil of land originally virgin forest, but which has recently been planted with C. Lancifolia and other good species indigenous to the country. However I give his remarks as sent me.

"Soil from Central Cordillera of the Columbian Andes district of Chaparrel. The best varieties of Cinchona Lancifolia grow here. The soil is from an elevation of 8,000 ft; average annual rainfall about 100 inches, but you will see the details from enclosed register of rainfall. Entirely free from winds. One variety of Lancifolia gave 6·20 per cent of quinine 15 months old cultivated here, and several other indigenous species of cinchona gave 1 to 1½ per cent of quinine. The subsoil to a great depth is the same as sample sent except that it is more sandy and contains less vegetable matter, that is to say that it is extremely sandy and porous so much so that the soil immediately after heavy rains becomes perfectly dry. The sample is from the virgin forest exposed to the sun for about 3 years, and the soil

throughout the entire Cordillera is of the same character."

The above are Mr. Thomson's own words and I am sure Ceylon men will attach importance to the remark about the soil being so porous that the rain water rapidly passes away, and the trees consequently do not suffer from wet feet which has been a bad feature on many Ceylon estates and is the result of an impervious subsoil.

Indeed the dying-out of coffee in patches especially when *situated under* or in the immediate neighbourhood of sluggish water-courses is now fully recognized. As regards the analytical results it is gratifying to know that in the matter of the important mineral elements such as lime, potash and sulphuric acid &c., the Ceylon soils are certainly decidedly superior, at least those sent me by the Planters' Association in connection with the present exhibition and which are marked as growing cinchona. Notwithstanding what Mr. Thomson mentions about the soil being so porous I notice that there is 4·823 of water in the air-dried soil and also 21 per cent of oxide of iron and alumina together, which would suggest that the soil cannot be really so very porous or at least not more so than some of the best cinchona soils of Ceylon. In the matter of nitrogen it is above the average of your soils as you will see upon reference to published analyses in my report of 1879 but not above the average of the soils sent to me this year and which are known to represent some of the leading estates in the island.

In one respect this soil is peculiar, the amount of chlorine being unusually high. Whether this is due to exposure to saline rain I have no means of judging, but as the figures ·118 stand they appear quite abnormal for a naturally fertile mountain soil.

It will be seen from the particulars of rain registered, that rain falls pretty equally throughout the greater part of the year and that with a few exceptions which I have had copied out, the daily average is under an inch, although there are two or three inches recorded as having fallen in 24 hours.

March, April and May appear to be the months of greatest rainfall though October is always damp and tops the list in 1885 with the heavy record of 20·47 inches.

It will be interesting to compare these statistics with those of your best cinchona estates, and I will leave the figures for your consideration together with the analytical results of the soil.—

Yours very truly, JOHN HUGHES, F. C. S.

Analytical Laboratory, 79 Mark Lane, E. C.
Aug. 6th, 1886.

ANALYSIS OF CINCHONA SOIL.

From the Central Cordillera of the Columbian Andes in the District of Chaparrel, Republic of Columbia :—

Analysed in the Air-dried Condition.	
Water lost at 212 per cent. ...	4·823
Organic Matters (Containing Nitrogen ·364)	18·687
Phosphoric Acid	·105
Lime	·253
Oxide of Iron...	5·752
Alumina	15·406
Carbonic Acid...	·473
Sulphuric Acid	·055
Chlorine	·118
Magnesia	·214
Potash	·086
Soda	·091
Insoluble Siliceous Matters (containing Coarse Sand 7·620) ...	53·937
	100·000

JOHN HUGHES, F. C. S.

August 4th, 1886.

Register of Rainfall at the Cinchona Plantations Chaparrel, Republic of Columbia :—

From October 1883 to September 1884.		From October 1884 to September 1885.		From October 1885 to April 1886.	
October	10·53	October	12·25	October	20·47
November	9·33	November	6·30	November	5·84
December	4·65	December	5·93	December	13 32
1884		1885		1886	
January	6·88	January	5·10	January	8·62
February	3·25	February	7·23	February	5·11
March	15·65	March	12·50	March	6·88
April	12·75	April	18·97	April	14·80
May	15·25	May	11·38		
June	8·97	June	6·89	Total inches...	75·04
July	2·98	July	2·07		
August	2·20	August	4·68		
September	5·50	September	8·47		
Total inches...	97·94	Total inches...	101·77		

Greatest Rainfall in 24 hours :—

From October 1883 to September 1884.		From October 1884 to September 1885		From October 1885 to April 1886.	
October 10th	1·20	October 4th	1·70	October 7th	1·46
,, 15th	3·20	,, 5th	2·40	,, 13th	4·10
November 27th	1·13	,, 15th	1·40	,, 14th	2·11
,, 29th	1·69	November 2nd	1·00	,, 16th	2·10
December 3rd	1·20	,, 22nd	1·00	,, 17th	1·20
1884		December 5th	1·30	,, 18th	1·30
January 3rd	1·30	,, 22nd	0·62	,, 21st	2·50
February 11th	1·40	1885		November 5th	1·70
March 4th	4·00	January 4th	1·16	,, 22nd	1·00
,, 23rd	2·77	,, 11th	2·50	December 9th	2·00
April 4th	1·50	February 3rd	1·84	,, 27th	2·45
,, 14th	1·15	,, 17th	1·53	,, 28th	2·13
May 5th	1·60	March 12th	2·10	1886	
,, 8th	1·25	,, 26th	2·35	January 22nd	1·60
June 1st	1·12	April 1st	3·11	,, 26th	1·20
,, 24th	1·30	,, 11th	1·70	,, 27th	1·25
,, 26th	2·00	,, 16th	1·46	,, 28th	1·70
July 12th	1·00	May 11th	1·87	,, 30th	1·80
,, 22nd	0·31	,, 30th	2·29	February 11th	2·10
August 8th	0·72	June 7th	1·75	,, 24th	0·86
,, 15th	0·50	July 11th	0·38	March 1st	0·86
September 3rd	1·65	August 7th	1·00	,, 20th	0·86
,, 29th	1·31	September 14th	2·26	April 9th	2·12
		,, 30th	1·62	,, 21st	2·40

CEYLON PLANTERS' ASSOCIATION: ANALYSES OF TEA, COFFEE, CINCHONA AND CACAO ESTATE SOILS FROM CEYLON, BY MR. JOHN HUGHES.

Planters' Association of Ceylon, Kandy,
27th August 1886.

The Editors, the *Ceylon Observer*, Colombo.

SIRS,—I beg to enclose for publication copy of interesting letters with reports from Mr. Hughes on the representative samples of soils from some leading tea, coffee, cinchona and cacao estates transmitted to him for analysis in connection with the Colonial and Indian Exhibition.—I am, sirs, yours faithfully, A. PHILIP, *Secretary*.

Analytical Laboratory, 79 Mark Lane, London, E.C.,
July 30th 1886.

A. Philip, Esq., Planters' Association, Kandy.

Dear Sir,—Yours of the 21st June giving information respecting the Rookwood soils 1, 2 and 3 arrived on Monday last, and I have much pleasure in sending you the results of the analyses of the ten Ceylon soils handed me about the end of May by Mr. Shand, to whom I have also sent a copy of same.

I am writing direct to Mr. Downall by this mail sending him a copy of the analyses of his soil from Dambatenne estate, and giving my opinion as to the kind of manure likely to be most suitable.

As regards these analyses it seems a favourable opportunity to have them printed for the general information of planters and those interested in coffee, tea, cinchona, cacao, &c., and as these results in many cases represent, or are at least supposed to represent as nearly as possible the average soil on certain well-known estates, it would be desirable that the air-dried samples of the soils themselves should be placed for reference in some museum either in London or Colombo.

I will see Mr. Shand on the subject in meantime.—Believe me, yours faithfully,

(Signed) JOHN HUGHES.

ANALYSIS OF CEYLON SOILS.

Samples selected by the Planters' Association and representing estates upon which Coffee, Tea, Cinchona and Cacao have respectively been planted.

The following analytical results represent the soils in the air-dried condition :—

	Coffee.		Tea.				Tea and Cinchona.	Cinchona,	Cacao.	
Name of Estate ...	Ragalla	Dambatenne	Rookwood No. 1	Rookwood No. 2	Rookwood No. 3	Dunedin	Dryburgh	Liddesdale	Pallekelle	Warriapolla
District ...	Udapussellawa	Haputale	Hewaheta	Hewaheta	Hewaheta	Kelani Valley	Matale	Udapussellawa	Dumbara	Matale
Water lost at 212° F ...	4·022	3·765	2·565	1·549	3·091	1·938	4·244	3·536	1·218	2·781
*Organic matter and combined Water...	24·337	14·345	11·749	9·005	15·883	12·838	18·002	16·134	4·818	9·183
Oxides of Iron and some Manganese ...	8·247	9·444	11·679	6·015	4·611	9·841	9·131	4·638	6·857	13·111
Alumina ...	11·949	9·467	11·769	7·933	5·546	10·803	10·894	9·030	5·477	9·911
Lime ...	·385	·434	·359	·213	·149	·302	·449	·743	·450	·287
Magnesia ...	·057	·394	·381	·057	·141	·216	·484	·271	·645	·554
Potash ...	·137	·210	·170	·119	·107	·081	·246	·176	·333	·304
Soda ...	·645	·122	·165	·058	·050	·006	·104	·024	·010	·228
Phosphoric Acid ...	·129	·160	·161	·025	·184	·083	·131	·175	·064	·118
Sulphuric do ...	·013	·043	·027	·068	·063	·001	·014	·041	·020	·056
Carbonic do ...	·791	·273	·242	·584	·164	·120	·391	·531	·201	·451
Chlorine ...	·005	·090	·004	·007	·006	·003	·005	·005	·009	·004
†Insoluble Silicates and Quartz ...	49·899	61·253	60·704	74·337	69·995	63·768	55·905	64·894	79·878	63·012
	100·000	100·000	100·000	100·000	100·000	100·000	100·000	100·000	100·000	100·000
*Containing Nitrogen ...	·521	·411	·282	·114	·429	·117	·496	·501	·114	·199
†Containing Quartz... ...	8·940	10·720	15·740	25·000	30·780	11·020	7·880	8·660	14·680	12·280

JOHN HUGHES, F. C. S.,
Fellow of the Institute of Chemistry,
Member of the Society of the Analysts.

Analytical Laboratory,
79, Mark Lane, July 26th, 1884.

Analytical Laboratory, 79, Mark Lane, London, E. C.

6th August 1886.

A. Philip, Esq., Kandy. Dear Sir,—Mr. Shand as the representative of your Association called upon me this week to express his thanks for the analyses of the ten soils which I had sent him, and copies of which were forwarded you by last week's mails.

Mr. Shand is having these analyses printed in large type, so that when hung up in the Ceylon Court next week, they can be readily seen and read by visitors. He further informed me that he thought a few general remarks, by way of interpreting the analytical results, would be acceptable, and I have therefore much pleasure in contributing the following:—

Of course it will be understood that these remarks are made entirely upon the analyses themselves, and without reference to the respective elevation, rainfall, exposure (more or less) to wind and wash, the general physical character of the land, whether steep or flat, together with its situation, aspect and other matters which are naturally of great importance and demand careful consideration when reporting on the relative fertility of different soils.

1. For general convenience of future reference, as well as in order to arrive at the respective retentive properties of the ten soils, similar weighed quantites of each soil in an equally pure state of division were exposed for a fortnight to the air in a room, when the temperature varied from 60° F. to 75° F. The proportion of water still retained after being thus air-dried was then carefully determined by drying in the usual way at 212° F. and the whole of the different analytical results were accordingly calculated for the soils in this air-dried condition. By glancing therefore along the line of figures arranged under the heading of water it will be noticed that there are great variations: thus Dryburgh 4,244 stands highest; next comes Ragalla with 4.032; then Dambatenne 3,765; and so on down to Pallekelo which has only 1,218.

2. Next as regards the proportions of organic matter and water of combination it will be noticed that there are great variations also under this heading, sometimes, as in the case of Ragalla, Dambatenne, Rookwood No. 3, Dryburgh and Liddesdale; the high results are largely caused by the presence of an unusal amount of nitrogenous organic matter, as will be seen on referring to the column marked nitrogen which is an important element in the composition of such valuable fertilizing matter.

3. The variations of the oxide of iron and alumina in each soil are not very great, but there are notable instances, Rookwood No. 1 containing the most and Pallekelle the least. Generally high proportions of iron and alumina are associated with a more or less stiffness of soil.

4. The lime varies a good deal, Liddesdale having as much as ·743 while No. 3 Rookwood has only ·149, and as ·100 per cent is usually taken to represent one ton per acre of soil to the depth of six inches, it will be understood that these differences although only appearing in decimals really come to a question of tons when considered per acre. In soils originally formed from granitic rocks like those of Ceylon the relative amounts of lime found in each generally may be considered as indicative of its degree of fertility, and therefore its careful estimation is a matter of considerable importance in an analysis.

5. Passing over the items under magnesia which do not call for any remarks, as this constituent is not usually supposed to have any great effect upon the soil, we come to the proportions of potash which are very high in both the cacao soils, also in Dryburgh, and Dambatenne, and fairly high in most of the others, Dunedin in the Kelani Valley being the lowest ·081, but Rookwood No. 2 and 3 are only very slightly higher.

6. The proportions of soda, sulphuric acid, carbonic acid vary, but do not call for any special remark.

7. Chlorine is also somewhat various, but in Dambatenne the proportion is far above the average, though what the reason for such being the case is I cannot

of course say unless it be *exposure* to the monsoon.*

8. Phosphoric acid stands very well in many of the soils: thus Rookwood No. 3 has the most ·184, though curiously enough No. 2 next to it has the least of any, neither soil having been manured. From information furnished by Mr. Armstrong in reference to these two samples, it would appear that No. 2 represents a field of tea 10½ years old in virgin forest land, elevation about 5,300 ft., even lay of land; also that No. 3 represents a field of tea 10½ years old, *steep* lay of land, facing N. E never manured, elevation about 5,300 feet. With this information it seems remarkable that there should be so great a difference in the phosphoric acid which moreover is also followed up in the proportion of nitrogen, both being in favour of the steep land which is specially loaded with quartsz. I am inclined to think therefore that sample No. 3 may have been taken from some rich hollow in which a rather large proportion of vegetable débris had been previously washed down the steep face.†

9. Nitrogen stands very high in many of the samples and must be regarded as indicative of considerable latent fertility, which only requires time and a dressing of lime‡ to render available as plant food. How far nitrogenous organic matter is or is not in an available form cannot be absolutely determined by chemical analysis, but the fact that a soil is rich in nitrogen, at least, is certainly satisfactory, for it tells us that the element which is so important in all fertilizers is present and that it needs only proper cultivation to make it practically useful. A glance at the analyses will show which soils contain the most and those who know the situation of the several estates will be able to judge how far this richness in nitrogen is due to elevation, rainfall even lay of land and freedom from the exhausting influences of wind and wash.

It is noticeable, however, that both the soils upon which cinchona flourishes, are particularly rich in nitrogen: thus Liddesdale has 501, Dryburgh 496, and while Ragalla at present included under coffee has even more than these namely 521 and Dambatenne follows closely after with 411 which is far above the average of most coffee soils previously reported on by myself.

10. The proportion of quartz furnishes the last heading and varies from 7·89 in Dryburgh to 30·78 in Rookwood No. 3, the latter a soil that has already been specially alluded to when speaking of the high proportions of phosphoric acid. Generally a soil which contains much quartz is light and porous in character with low retentive properties and a general poverty in the important elements of fertility: thus Rookwood No. 2 is a fairly good illustration as we notice that the potash, phosphoric acid and nitrogen are all comparatively low and are associated with 25 per cent of quartz, and 1·549 only of water. On the other hand No. 1 the next above (?) with 15·74 of quartz has nearly twice as much nitrogen as No. 2 and is proportionally richer in the other important elements such as potash, phosphoric acid and lime. In fact I have every reason to suppose that No. 1 is generally a much superior soil to No. 2. § Again the Kelani Valley soil furnishes another instance in which with 11·02 of quartz the important elements above alluded to are also low, with the exception, however, of the lime ·302 which is fully high for the average Ceylon soil. At the same time we see two instances (Ragalla and Dambatenne) where the quartz is nearly as high as the last, and yet the nitrogen, lime &c. are certainly very far above the average.* The proportions of quartz must therefore only be considered in *conjunction* with the other items when forming a general opinion of a soil.

11. Taking then all these analyses as a whole, I certainly must consider them as very favourable, and they indicate in many instances a wonderfully fertile soil which under favourable climatic influences should be capable of producing highly satisfactory crop returns. The analyses representing as they do the soils on estates whose names already stand high in local reputation must be useful as a future means of comparison and as every care has been taken to render the results accurate I hope they may in this way be of practical use as well as of immediate interest.

In conclusion I have only to add that if any information is required respecting the particular manure for the respective crops on these soils I shall be happy to express my professional opinion as I have already been requested to do in one case.—Believe me, &c.

(Signed) JOHN HUGHES, F. C. S.,
Member of the Society of Public Analysts.

INSECTS AFFECTING PADDY CROPS IN TINNEVELLY.—The following is a letter from Mr. J. WoodMason, Superintendent, Indian Museum to the Under-Secretary to the Government of India, Revenue and Agricultural Department, Simla, dated 14th May, 1886:—I have the honor to report that the specimens of insects forwarded with the letter endorsed to me by you on 30th April last are no doubt referrable to the species of bug briefly described in 1837 by professor Westwood in his "Catalogue of Hemiptera in the collection of the Rev. F. W. Hope," under the name of *Leptocorisa bengaliensis*. This insect belongs to the family *Coreida* of the insectean order Rhynchota, the vast majority of the members of which live upon the juices of plants, a few only, such as the common bed-bug, attacking animals. The same insect has frequently been received by me from different parts of Assam and of Bengal, in both of which countries it has the same destructive habits. In the Sibsagar district of Upper Assam, where it is known as the "Gandi," it destroys the "Aho Dhan." Professor Stal, the leading authority on the system of the Rhynchota, who, however, had never seen the specimens described by Westwood, suggests that *L. bengaliensis* may be indentical with the bug previously described *L. acuta* of Thunberg. Some insects from Assam that differed, so far as I recollect, in no respect from the museum specimens from the same locality referred by me to *L. bengaliensis* have been named *L. vavicorinis*, Fabr. by W. L. Distant, also a good authority in this branch of systematic zoology. It is hence probable that the names *bengaliensis varicorinis* and *acuta* will prove all to refer to one and the same species, for which the last of these names, as being the oldest of the three, should be retained; in which event we shall have one species of extremely wide range, extending in its distribution, under slight variations of form, from India and Ceylon through Burmah and the Malay countries to Australia, wherein it affects low-lying lands (only occasionally creeping a short distance up contiguous hill-sides) suited to rice cultivation. It is not possible, in our present ignorance of the economy of this pest, to suggest any measures for stopping or mitigating its ravages, or even to form an opinion as to the possibility of any remedial measures. In determining the name of the insect and its place in nature, I have done all that is at present possible. The animal should now be studied in the midst of its surroundings.—*Madras Standard*.

---

* There can be very little doubt that the origin of the exceptional amount of chlorine on Dambatenne estate is to be traced to the not remote salt formations at Hambantota.—ED.

† Perhaps from the sheltered hollow which Mr. Armstrong described in one of his valuable papers, as giving an exceptionally large yield of tea.—ED. C. O.

‡ There is a general feeling that the application of lime is adverse to the flushing of tea; but we suspect that a moderate dressing of lime, would be as beneficial to tea land, especially if clayey and stiff, as to soils growing any other substance. The application of a dusting of caustic lime would seem to be especially indicated when moss grows on the tea bushes.—ED.

§ Unless the sample was taken from an exceptionally rich portion of the estate?—ED.

* Such being the case the question naturally arises whether the samples may not have been taken from spots containing unexhausted manure?—ED.

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, July 29th, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 10s a £7 10
Yellow	Do. drossy & dark ditto	£5 a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	1s 10d a 2s 6d
per lb. and Ceylon	Middling, stalky & lean	8d a 1s 9d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	8d a 1s 11d
2nds	,, ,, ,, ,,	7½d a 1s 6d
3rds	,, ,, ,, ,,	7d a 1s 2d
4ths	Woody and hard	6d a 11d
Chips	Fair to fine plant	1⅞d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	87s a 88s
	Medium	71s a 74s
	Triage to ordinary	54s a 65s
COFFEE Ceylon Plantation per cwt.	Bold to fine bold colory	83s a 104s
	Middling to fine mid.	68s a 81s
	Low middling	60s a 67s
	Smalls	56s a 61s
,, Native	Good ordinary	42s a 44s
Liberian	Small to bold	33s a 51s
East Indian	Bold to fine bold	78s a 121s
	Medium to fine	62s a 78s
	Small	52s a 58s
Native [per ton	Good to fine ordinary	44s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£7 a £17
FIBRE, Brush, per ton	Ord. to fine long straight	£13 a £39
Stuffing	Coarse to fine	£7 a £18
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £35
Do [cwt	Roping fair to good	£8 10s a £13
COLOMBO ROOT, sifted ℔	Middling wormy to fine	16s a 32s
CROTON SEEDS, sifted	Fair to fine fresh	30s a 35s
GINGER, Cochin, Cut	Good to fine bold	65s a 100s
per cwt. ,,	Small and medium	45s a 65s
Rough	Fair to good bold	30s a 45s
,,	Small	25s a 30s
NUX VOMICA, per cwt.	Fair to fine bold fresh	80s a 12s
	Small ordinary and fair	5s a 7s
MYRABOLANES, pale, per cwt.	Good to fine picked	6s a 8s
	Common to middling	5s a 6s 6d
	Fair Coast	6s a 6d 6s
Pickings	Burnt and defective	4s a 5s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	¾d a 1d
LEMON GRASS ,,	,, ,, ,, ,,	1⅜d a 1⅝d
ORCHELLA WEED [℔ lb.	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7⅞d a 7⅞d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	11s a 15s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	7s a 11s
Dust	Ordinary to fine bright	3s a 10s
RED WOOD, per ton.	Fair and fine bold	£5 5s
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £44
Do. chips		£10 a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	9d a 1s 5d
	Fair middling bold	4½d a 8d
	Common dark and small	1½d a 3½d
TURMERIC, Madras, ℔ cwt.	Finger fair to fine bold	12s a 13s
Do.	Mixed middling [bright	11s a 12s
Do.	Bulbs whole	11s 6d a 12s 6d
Cochin	Do split	7s 6d a 8s 6d
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 24s
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches	5s a 9s
4th	Low, foxy, inferior and [pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
ALOES, Soccotrine and	Good and fine dry	£7 a £10
per cwt. Hepatic	Common and good	£4 a £8
CHILLIES, Zanzibar	Good to fine bright	31s a 33s
per cwt.	Ordinary and middling	26s a 30s
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	9¾d a 10d
	Ordinary dull to fair	9¼d a 9½d

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTATIONS
CLOVES, Mother, per lb.	Fair, usual dry	None
,, Stems	,, fresh	2d a 2 1-16d
COCULUS INDICUS	Fair	8s 6d
GALLS, Bussorah blue & Turkey ℔ cwt.	Fair to fine dark	52s a 57s 6d
	Good white and green	42s 6da 52s 6d
GUM AMMONIACUM—	Blocky to fine clean	30s a 60s
per cwt. drop	Picked fine pale in sorts,	£13 10/a£14 10/
ANIMI, washed, ℔ cwt.	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£ 7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden	Sorts	65s a 95s
per cwt. Ghatti	Fair to good pale	32s a 75s
Amrad cha	Good and fine pale	70s a 100s
	Reddish clean	32s a 55s
ASSAFŒTIDA, per cwt.	Clean fair to fine	30s a 35s
	Slightly stony and foul	20s a 26s
KINO, per cwt.	Fair to fine bright	38s a 40s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 100s
OLIBANUM, drop	Fair to fine white	45s a 55s
per cwt. ,,	Reddish to middling	32s a 44s
pickings	Middling to good pale	9s a 11s
siftings	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage		2s 3½d a 2s 5½d
per lb. ,, ,, Ball		
unripe root		9d a 9½d
liver		1s 10d a 2s 1d
SAFFLOWER, Persian	Ordinary to good	5s a 15s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz.	Nearly water white	3¼d a 4¾d
2nds ,,	Fair and good pale	2 15-16d a 3d
3rds ,,	Brown and brownish	2⅜d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine	1s 9d a 2s 4d
	Common foul and mixed	6d a 1s 8d
Rangoon	Fair to good clean	1s 10d a 2s 3d
Madagascar	Good to fine pinky & white	2s 4d a 2s 7d
	Fair to good black	1s 10d a 2s
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	30s a 33s
,,	Common & middling soft	12s a 29s
Natal	Fair to fine	35s a 40s
ARROWROOT Natal per lb.	Middling to fine	3½d a 6d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	63s a 68s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	28s a 30s
	Pressed	23s a 24s
Block [per lb.	Good	22s 9da 23s
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 3d a 3s 8d
Medium	83's a 95's	1s 11d a 2s 2d
Small	100's a 160's	1s 3d a 1s 10d
MACE, per lb.	Pale reddish to pale	1s 6d a 2s 8d
	Ordinary to red	1s 3d a 1s 5d
	Chips	1s a 1s 2d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 9d a 2s 9d
	Dark ordinary & middling	8d a 1s 6d
High dried	Good to fine	1s 1d a 1s 3d
	Dark, rough & middling	7d a 1s
SAGO, Pearl, large, ℔ cwt.	Fair to fine	12s 6d a 14s 6d
medium	,, ,, ,,	12s a 13s 6d
small	,, ,, ,,	8s 6d a 10s 6d
Flour per lb.	Good pinky to white	8s a 9s
TAPIOCA, Penang Flake	Fair to fine	1½d a 2⅝d
Singapore	,, ,,	1½d a 2⅜d
Flour	,, ,,	1¼d a 1½d
Pearl	Bullets, per cwt.	14s a 15s
	Medium ,,	15s a 17s
	Seed ,,	15s 9d a 16s 6

CEYLON UPCOUNTRY PLANTING REPORT.

RESULTS OF THE LATE HEAVY RAINS—QUEER STORY OF A TEA AUTHORITY—"GOW SYSTEM" OF TEA MANUFACTURE—LAST BREAK OF AGAR'S LAND TEAS—COFFEE—THE WEATHER.

30th August 1886.

From the late heavy rains there have been many results: cooly lines washed away, tea stores flooded, big slips on the railway and roads, and little slips on estates, leaking roofs and damp bungalows, wrecked bridges and burst drains, besides many other things beneficial and otherwise. These were natural and to be expected. It was, however, rather out of the ordinary course of nature that planter's expectation, who in an answer to a store-keeper whose smile is not bland, and who expected some grumbling from his customer, said: "No, no, I have not come in to grumble; was just passing and wanted to see if the late heavy rains had washed down your prices any!"

By the way there is a queer story of a tea authority being employed by a local firm to sell or influence the sale of their "Boom Roller." He is not known to be in the swim, but as an authority, he is of the consulted: many men are anxious to get the result of his experience, to suck his brains in fact, and to these he yields of his stores willingly and in an innocent way. He will instruct you in tea from planting to packing, but is greatest in machinery. As to rolling, well, his universal advice is: "Go in for the 'Boom Roller,' two hand ones are much better than one of the large size; both are not likely to break down at once, you know, and *I* can recommend it." If this seemingly unbiassed opinion is followed he scores a commission, and this in a gentlemanly way, having no visible connection with trade.

It is rather a ticklish matter evidently saying anything about Mr. Gow, the tea authority. Around him there has been a good deal of dust kicked up, and I would like to keep out of it if I can. But "There is a Providence that guides our way." and when a friend of mine sent me a note of the "Gow System," I felt I was mixed up, and must take my chance with the others. This is how the matter is put:—"Take half the quantity of the full charge and roll from five to seven minutes; then take it out and do the same with the other half. Heap them both together and allow them to ferment for half-an-hour; then re-roll for thirty to forty minutes, complete the fermentation, and roll again for twenty minutes, then sift and fire." Tea which had been manipulated in this way, and which lately had been getting about 10½d a lb. when treated in the ordinary fashion was valued at a good deal over a shilling. The tea was said to have a fine black appearance and has a strong liquor. To keep this system going, two rollers are wanted, if there be much tea to manufacture, but the difference in price from what the estate had been getting before, and the valuation of the new tea manufacture on the "Gow Sytem" was so great as to make the buying of another roller a mere nothing.

I don't care to name the exact figure which was mentioned, it being something very fine, and a great deal less would satisfy. If Mr. Gow brings about such results, he will have unmistakably shown, that, although good teas can and have been made, still he can make better.

I have not seen any notice of the sale of the last break of "Agar's Land" teas which was disposed of the other day privately at R1·00 a lb. all round. That is a price which should surely satisfy the fortunate proprietor, and take a good deal to beat. The break, I understand, was not sold in grades.

Now that the price of coffee is rising almost daily, it is not a little vexing to see how the miserable sprinkling of crop which we hoped in time to gather is somehow disappearing. Whether it be the effect of bug or the persistent attention of leaf-disease or the sheer "cussedness" of things, certain it is that the lean promise—too scanty even at its best, either to cheer or to inebriate—which was held out of *something* in the way of coffee, this promise is again to be a disappointment. It is not much that any of us on this side hoped from it, as goodness knows; but when you have humiliated yourself to estimate a one-man-crop, and to find that *that* has to be reduced, it is then that you realize what it is to have your mouth in the dust. I heard, however, of more fortunate people; and with them I can rejoice, for it is not many good things which fall in the way of our planting brethren in these days.

The weather still keeps very favourable for the young tea plants, and several showers we had last week were specially welcomed, coming as they did after a few days' hot sun.

PEPPERCORN.

SPRING VALLEY COFFEE COMPANY, LIMITED.

DIRECTORS.—John Brown, Esq., Managing Director, Edward Conder, Esq., Leon Famin, Esq., Henry Hart Potts, Esq.

REPORT.—To be presented to the Twenty-first Ordinary General Meeting of the Company, on Wednesday, the 4th day of August, 1886, at 12 o'clock noon. The Accounts now presented to Shareholders comprise a Balance Sheet, showing the Company's Financial position on 31st May 1886, and Profit and Loss Account for Season 1884-85. Spring Valley Crop somewhat exceeded the estimate given in last year's Report the total weight of Coffee sold being 5,585 cwt. 3 qr. 3 lb., the net proceeds of which amounted to £15,845 4s 2d, equal to an average price of 56s 9d per cwt. Refuse Coffee sold in Colombo realised £663 0s 8d, bringing the total receipts from sales of Produce up to £16,508 4s 10d. The Ceylon Expenditure includes R22,923·20 spent on Tea clearings, and after providing for this, the result of the Season's working is a profit of £1,857 5s 5d which added to the balance of £1,450 9s 11d, brought forward from last year, makes a sum of £3,307 15s 4d at the credit of Profit and Loss Account. The average price obtained for the Coffee was 3s per cwt. below that of last year, and taking into account the sum expended on Tea planting the Profit secured is considered satisfactory. It will be seen that no Cinchona Bark is brought into the present account; this arises from the fact that early in the season the labour force was reduced it being then thought that crop was to be very short. The gathering of the larger crop secured, however, fully employed all the coolies retained, and no labour was available for Cinchona harvesting until after the close of the Company's financial year. The original estimate of the Coffee Crop for Season 1885-86 was 2,450 cwt., the latest reports, however, show that no more than 1,200 cwt. can now be calculated upon. The returns from Produce will be very materially augmented by the large harvest of Cinchona Bark; 25 tons of this Product being expected to come forward. The Coffee Market also shows signs of improvement, but it is not thought that receipts from that crop will be sufficient to meet the year's outgoings. Until the arrival of the last advices, the Board fully contemplated the payment of a dividend at the present time, but in view of the reduced crop as above, they now consider it prudent to carry forward the balance at the credit of Profit and Loss until the produce for 1885-86 has come forward and been sold, when they will be in a better position to see whether there will be any important deficit on that crop to be provided for.

TEA.—Shareholders were informed in last Report

that the Board had resolved on further extending the area under Tea. The extension decided upon has now been planted up, and the acreage under Tea on the Company's Properties is as follows :—

	Planted. Nov., Dec., 1884. acres.	Planted. May, 1885. acres.	Planted. Nov. Dec., 1885. acres.	Total. acres.
Spring Valley ..	271	—	230	501
Oolanakande ..	—	143	—	143
	271	143	230	644

The cost of planting the 271 acres on Spring Valley in 1884, and the 143 acres on Oolanakande in 1885 has been met out of the revenue of the Account now presented, and the cost of planting the 230 acres on Spring Valley in 1885, will be debited to Crop 1885-86. In face of the small crop to come forward during the last-named season, the Board are well satisfied in being able to report such a large area already under Tea. The Tea on Spring Valley is growing most satisfactorily, and the first small plucking is now being secured from the area planted in 1884. On Oolanakande, the Tea bushes are growing rapidly owing to the Estate being in the Low Country where the climate is very forcing; and preparations are now being made for the gathering of leaf. The whole of the Coffee on Oolankande has now been replaced by Tea.

Crop for 1886-87.—The planting of Tea, as above, has reduced the area of Coffee on Spring Valley to 990 acres. This is an exceedingly fine sheet of Coffee. Though leaf disease is still present, the Directors have hopes that this Coffee may yet give good paying crops, and they have resolved for the present to leave it intact. Several small blossoms have already set for Season 1886-87, and as far as can at present be seen that Season should show a good result, as a very considerable quantity of Bark will be available. The year will, moreover, be aided by a steadily increasing yield of Tea. The Directors, with the exception of Mr. Brown, whose fee includes the expenses of his visiting Ceylon, have resolved, in the meantime to reduce their fees by one-half. Mr. Brown returned from Ceylon in April, having visited the Company's properties. Mr. Leon Famin, a Member of the Board, retires on this occasion and being eligible, offers himself for re-election. Messrs. Deloitte, Dever, Griffiths & Co., the Auditors, also offer themselves for re-election.

By order, J. Alec Roberts, Secretary.

26th July, 1886.

Dr. BALANCE SHEET, 31ST MAY, 1886.

	£	s.	d.
To Capital authorized—8,000 Shares of £10 each, issued and fully paid ..	80,000	0	0
,, Reserved Fund	4,012	10	0
,, Sundry Creditors	2,671	5	9
,, Bills payable	800	0	0
,, Sales of Produce, 1885-86	693	18	6
,, Profit and Loss Account	3,307	15	4
	91,485	9	7

Cr.

By Estates				80,000	0 0
,, Sundry Debtors ..				1,093	9 2
,, Office Furniture ..				15	0 0
,, Charges against Crop, 1885-6 :—					
Spring Valley ..	6,188	13	9		
Oolanakande ..	501	17	6		
Freight and Sundry Charges	215	1	4		
Directors' Fees ..	266	13	4		
London Office Expenditure	254	17	11		
	7,427	3	10		
Less Profit on Exchange	2,100	17	11		
				5,326	5 11
,, Cash on Deposit.. ..	4,000	0	0		
,, Cash at Bankers and in Office	1,050	14	6		
				5,050	14 6
				91,485	9 7

OUVAH COFFEE COMPANY, LIMITED.

Directors.—John Brown, Esq., Managing Director. H. H. Potts, Esq, L. Famin, Esq., Edward Conder, Esq. Report.—To be presented to the Twenty-Third Ordinary General Meeting of the Company, to be held at No. 5, Dowgate Hill, London, on Wednesday, the 4th day of August 1886, at 1 o'clock p. m. A Balance Sheet shewing the financial position of the Company on 31st May, 1886, and Profit and Loss Account for Season 1884-85, are now presented to Shareholders. Crop 1884-85, estimated at 5,600 cwt., resulted in a total of 5,566 cwt. 0 qr. 17 lb. The value of this Coffee was £15,950 6s 10d, or, equal to a net average of 57s 3d per cwt. Refuse Coffee sold in Ceylon and proceeds of Cinchona bark brought the total receipts from sales of Produce up to £17,344 3s 8d. The Ceylon Expenditure includes R22,727·17 spent on Tea clearings, and after allowing for this sum, the result of the year's working is a Profit of £1,083 14s 6d. Adding this profit to the Balance of £1,109 6s 6d brought forward from last year, there is to the credit of Profit and Loss the sum of £2,193 1s 0d, and for the reasons which are given below, the Directors cannot recommend a distribution of any portion of this amount. In face of the low prices obtained and the small yield secured per acre, the Directors feel some satisfaction at having been able to carry out extensive Tea planting operations and yet leave a balance of Profit. It was at one time thought that Crop 1884-85 would amount to only 4,400 cwt. and the labour force was reduced accordingly; these hands were so fully employed picking the larger Crop secured, that it was found necessary to postpone any extensive harvesting of Cinchona bark until after the close of the financial year,—the sum of £443 11s 10d appearing as the proceeds of Cinchona bark in the accounts being derived from the sale of 4½ tons of this product. The Coffee Crop Season 1885-86, which was at first estimated at 3,000 cwt. is now expected to yield no more than 1,500 cwt. A very large harvest of Cinchona bark is however expected, but it is feared that the year's returns from these products will hardly be sufficient to meet the ordinary estate expenditure and also the expenditure on the large additional area of tea. The tone of the Coffee market is at the present time very firm. Tea.—The contemplated extension of this Product referred to in last Report has been very successfully carried out, and the area now under Tea on the Company's Estates is as follows:—

	Planted. Nov. Dec. 1883 acres.	Planted. Nov. Dec. 1884 acres	Planted. Nov. Dec. 1885 acres.	Total. acres.
Glen Alpin ...	9	55	118	182
Ballagalla ...	—	74	89	163
Grahams Land	—	16	—	16
Rockhill ...	—	—	65	65
Hindagalla ...	—	120	85	205
Narangalla ...	—	82	90	172
	9	347	447	803

The cost of planting the 347 acres in 1884, has been included in the expenditure of the past year, while the cost of planting the 447 acres in 1885 will have to be provided out of Crop 1885-86, and the small Coffee Crop to be obtained that year, fully upholds the policy of the Board in having accomplished the planting of this further large area of tea. All the Tea planted on the Company's Properties is reported to be growing remarkably well, and the first pickings are now being obtained from that planted in 1884. Crop 1886-87.—The planting of Tea has reduced the area under Coffee, from 1,992 acres to 1,273 acres, 89 acres of Tea having been planted in land formerly not under cultivation. The area of Coffee retained is mostly at a higher elevation and in stronger soil than that which has been replaced by Tea, and up to the present time the effects of leaf-disease have not proved so fatal to its crop bearing properties. It is not the intention of the Board to entrench on this area for the further extension of Tea, unless the ravages of the disease make it unprofitable to continue it in coffee. So far, several good blossoms have set for

Season 1886-87, and as the trees are said to be in a measure fr e from leaf-disease, a fairly good yield may be looked for; which, with the returns from Cinchona and the commencing crop of Tea above referred to, will, it is hoped, enable the Company to again enter upon the payment of regular Dividends. In the meantime, the Directors, with the exception of Mr. Brown, whose fee includes the expenses of his visiting Ceylon, have resolved to reduce their fees by one half. Mr. Brown returned from Ceylon in April, having visited the Company's properties. Mr. Leon Famin, a member of the Board, retires on this occasion, and being eligible, offers himself for re-election. Messrs. Deloitte, Dever, Griffiths & Co., the Auditors, also offer themselves for re-election. By Order. J. Alec Roberts, Secretary. 26th July, 1886.

Balance Sheet, 31st May, 1886.

Dr.	£	s.	d.
To Capital authorized:—			
10,000 Shares of £10 each issued and fully paid	100,000	0	0
„ Reserve Fund	4,000	0	0
„ Sundry Creditors	1,159	4	11
„ Bills Payable	1,750	0	0
„ Sales of Produce 1885-86... ...	1,053	19	0
„ Profit and Loss Account	2,193	1	0
	£110,156	4	11

Cr.	£	s.	d	£	s.	d.
By Estates				100,000	0	0
„ Sundry Debtors ...				1,336	17	2
„ Office Furniture ...				30	0	0
„ Charges against Crop 1885-86:—						
Glen Alphin	3,029	18	7			
Ballagalla	1,462	5	0			
Narangalla	1,606	17	8			
Hindagalla	1,449	16	9			
Grahams Land	934	17	11			
Rock Hill	761	6	4			
Freight and Sundry Charges	592	18	7			
Directors' Fees	308	6	8			
London Office Expenditure	256	9	9			
	10,402	17	3			
Less Profit on Exchange	2,500	14	4			
				7,902	2	11
By Cash at Bankers and in Office				887	4	10
				£110,156	4	11

Sarawak.—An ex Ceylon planter writes:—"Your *Tropical Agriculturist* is indeed a great boon, and is much appreciated in these parts. It is quite a treat to read of the improving condition of the planting enterprise, due, in a great measure, to the Old Rag. You will be sorry to hear of poor Tom Parry's death in North Borneo.

Fruits.—In the Trinidad court are large glass vases containing preserved specimens of the various fruits of the island—jak, breadfruit, sour sop, numerous cacao pods, some with the rind partly removed, &c. There are two good-sized coffee and cacao trees, to the trunk of the latter dried cacao pods are tied, showing how they grow; and a living specimen of vanilla creeper, showing method of cultivation. They seem to be ahead of us in Trinidad in the manufacture of such things as chocolate, prepared cocoa, arrowroot and soaps of various qualities, and I was surprised to see splendid samples of rich-looking comb-honey and to learn from a Trinidad gentleman that he found the keeping of imported bees entirely successful and the export of honey to England profitable. The bees have to be fed during the rains, against which period I suppose nature prompts them to store honey. Are the Trinidad rains more heavy and continuous than in Ceylon? or why should bee-farmers be successful in the one country, and not in the other?—*Cor.*

HORTICULTURE AT BANGALORE.

Bangalore is forging ahead in the cultivation of useful novelties for India. At the recent Agri-Horticultural Show held at the Salbagh Gardens on 4th August, some specimen of hop flowers were among the exhibits and attracted some attention. The hops were cultivated at the Eurasian Colony of Sansmora, in the vicinity of Bangalore, by one of the settlers, who had received the gift of some hop-vine slips from the Manager of the Murree Brewery Company, to be grown as a trial. Now that it has found a success it is probable the cultivation of hops will be largely carried out by the settlers at the Colonies and form a large item of supply to Indian Breweries.

The Exhibition of flowers at the Salbagh Agri-Horticultural Show at Bangalore on 4th August, is presumed to be below the average. This is attributed to the fact that the falls of rain have been unusually heavy and tended to damp off the blooms of roses and run many of the annuals to foliage. The number of exhibits were small compared with previous years; to account for this we have heard it stated that the issuing of Medals instead of small money prizes would make competition keener and create increased attractiveness for amateurs.—*Special Correspondent for T. A.*

THE CULTIVATION OF JALAP.

In December 1880 a Government Order was issued, directing that the report of the Superintendent, Government Botanical Gardens and Parks, on the cultivation of jalap on the Nilgiris for 1879-80 be printed with the order as a Supplement to the *Fort St. George Gazette*, and spare copies struck off for distribution; directing also, with remark, the Commissioner to arrange for the gratuitous supply of tubers sufficient for one-eighth or one-sixteenth of an acre, to persons willing to attempt it, and that the matter of experimental cultivation of jalap at the Lawrence Asylum be brought to the notice of the Committee of Management through the Educational Department.

On the 26th May last Mr. M. A. Lawson, Government Botanist and Director of Cinchona Plantations, Nilgiris, wrote to the Secretary to Government, Revenue Department:—"In reply to your demi-official asking at what cost jalap could be grown per pound on these hills, I have the honor to forward the following calculations. Every acre of ordinarily good soil ought to produce, at the end of three years, at least, 1,000 lb. of dry tubers; and the cost of raising this quantity may be detailed thus:—

	Rs.	A.	P.
Preparation of one acre of land ...	75	0	0
Planting and manuring	30	0	0
Cultivation for three years ...	55	0	0
Digging up and drying the tubers ...	35	0	0
Rates and taxes for three years ...	7	8	0
Total ...	202	8	0

This would make the cost of the *jalap*, as ready prepared for the druggist, annas 3, pies 2 per pound; but as the preparation of the land would be greatly reduced after the first crop had been taken, the cost per pound of every succeeding triennial crop would be considerably less. Taking the preparation of the land at R15 for each succeeding crop, the cost per pound would be annas 2, pies 3. The only person who grows *jalap* on these hills, so far as I know, is General Wilson. This gentleman bought a large quantity of the tubers about four years ago, and has been growing them in the neighbourhood of Kotagiri; and has, I believe, some 400 lb. to dispose of, an amount quite inadequate to meet the indent of 1,500 lb. send into this department. Allowing R50 per acre per annum for profit, the cost per 1 lb. would be annas 4, pies 8; so that, I think, annas 5 per 1 lb. should be the outside limit at which the drug should be sold *on these hills.*

On the 7th instant the following G. O. was passed:—"Government having definitely ascertained in 1877, that the jalap plant could be readily and profitably grown on the Nilgiri hills, endeavoured, between that

year and 1882, by the gratuitous distribution and, when a large demand occurred, the sale of tubers, to encourage the cultivation of this drug by private individuals, in the hope that the result would be that the supplies required by the Medical Department would be procurable in this country in sufficient quantity and at a reasonable price. In the current year, an indent for 1,500 lb. of jalap for the Medical Department was forwarded to the Government Botanist, with the request that information might be afforded as to whether he could meet it. Upon this, Mr. Lawson made inquiries from the different individuals who, from time to time, had procured tubers from the Government Gardens, and the outcome of these has been his learning that only 400 lb. of the drug can be supplied from this source, and that only by one grower. This being the case, and it being clear that private enterprise, to which every opportunity and ample time have been afforded, is unable to meet the calls of the Medical Department, His Excellency the Governor in Council considers it necessary, in the interests of economy, to resume the cultivation by Government of the jalap plant, which was discontinued some years back in order that there might not be interference with private growers. The Government Botanist will, accordingly, at an early date, arrange to begin planting operations calculated to meet an average demand of not less than 1,300 lb. per annum. Government, in issuing these instructions, desire it to be distinctly understood that they do so merely because private enterprise has been shown to be unable to meet the requirements of the Medical Department, and that, when private growers are in a position to supply Government with jalap of approved quality at a satisfactory price, the cultivation of it by the State will be discontinued. A notification will, early in every year be published, for the information of growers, stating the quantity of jalap which will be required by the Medical Department for the coming year and the maximum price per lb. which Government will pay for it. His Excellency the Governor in Council considers it desirable, as the growing of a large quantity of jalap would render the cost of the drug per lb. very small and much below the price in England, that the Government Botanist should address the medical authorities of other Governments in India in view to ascertaining whether they would be willing to draw their supplies of jalap from this presidency. If the total quantity annually required is approximately known, it will be easy for Mr. Lawson to state very closely the price at which he can supply the drug at Madras. It may at present be fairly estimated that this will not exceed 4 annas per lb. The Government Botanist should, when making the inquiries indicated above, forward to the officers addressed a copy of the Government Order embodying the opinion of Surgeon-General Cornish on the quality of the jalap grown on the Nilgiris. Government are of opinion that it would be advantageous if the Medical Department could be supplied from India with other drugs and with preparations which could be manufactured with the help of the Government Quinologist. They therefore resolve to direct Mr. Lawson to place himself in communication with the medical authorities in order to determine what can be done in this direction."—*Madras Mail.*

TEA BLENDING.

A correspondent, who signs himself, "Mincing Lane," writing to the *Grocer*, gives the following hints as to tea blending:—

First main point: Never use a coarse earthy tea.

SUGGESTED BLENDS.

For 2s. retail, to cost 1s. 6d., say:

		s.	d.
10 lb.	fine Ningchow moning (not too large a leaf; pure Pekoe flavour), about ...	1	0
10 ,,	strong plain Kaisow, "Saryune" or "Soomoo"...	0	10½
14 ,,	pungent Assam souchong, not coarse (if large leaf, should be milled to size)	1	1
6 lb.	rich, thick broken Assam or Ceylon fannings.	0	11
40 lb.	(If scent required, 3lb. fine Ouchain or Foochow.		

For 2s. 6d. retail, to cost 1s. 11d.:

14 lb.	choice small leaf Keemun or Ningchow...	1	5
10 ,,	choice first-crop Paklin or honey suckle	1	2½
10 ,,	finest Assam pekoe must be pungent —best if with a touch of autumn flavour)	1	5
6 ,,	very strong, heavy liquoring broken pekoe, either Assam or Ceylon with deep colour)	1	8
40 lb.	(For scent use finest quality only, if any.		

For 3s. retail, to cost 2s. 2d. to 2s. 3d.:

10 lb.	choicest Ningchow or Kintuck	1	8
10 ,,	choicest first-crop Paklin or Peceo congou	1	6
8 ,,	finest Darjeeling or Ceylon pekoe ...	1	8
6 ,,	autumn-flavoured Assam pekoe	1	5
6 ,,	the finest broken Pekoe obtainable, Assam or Ceylon (even small leaf).	2	6
40 lb.	(If any addition, 3 or 4lb. of the best Formosa Oolong, or 3 lb. finest Foochow pekoe.)		

All large teas should be milled being used, so that the general result is a uniform small leaf.—*Home and Colonial Mail.*

THE INDIAN TEA INDUSTRY.

A well attended meeting of ladies and gentlemen interested in the subject of Indian tea took place on Wednesday evening in the Conference Room at the Colonial and Indian Exhibition, when Mr. James Peter, of the Merfinga Gardens, Sylhet, read a paper. Sir T. Douglas Forsyth, C.B., occupied the chair. Mr. Peter began by stating that his object in coming there was to enlighten the British public as to the excellent qualities of Indian tea. He then gave the history of tea-growing in India, with which our readers are already familiar. It had been found that tea would "grow"—he said "grow" with emphasis—from 40 feet to 5,000 feet above sea level in almost any soil. Having given a description of the young plant, how it was first placed in the ground, Mr. Peter said attention was then turned to keeping down the jungle, and as soon as the plant was fairly established cultivation began, when all thereafter depended upon the nature of the soil. In regard to manufacture, he remarked that to this day the difficulty remained—indeed, it was the planters' greatest difficulty—of withering the leaf. It was, of course, in wet weather, when for weeks at a stretch the atmosphere was damp and muggy, that the worst difficulty was experienced. The tea had to be taken off, and the question that cropped up was "what could we do with it? This made the planter sad, and he could assure those present that planters would hail with delight the success of any inventor who would enable them to defy the elements. (Hear, hear.) Here was scope for the inventor. The man who was able to turn out withering machinery capable of withering in the worst of moist wether, would be sure of a fortune. Some speculation existed as to the yield per acre of tea in India. He found that the average yield was 360 lb. per acre. The present season's total crop was estimated at the large quantity of seventy millions pounds. The average price of teas now was 1s. 2d. and at this figure almost all the Tea Companies were able to pay good dividends. Now, he was anxious to put before the British public the advantages of tea as an investment. Would it pay, what were the best means to make it known, and, how were they best to enlist the sympathy of the people at home, with the view of increasing its consumption? To the first enquiry he replied, that tea as an investment would

pay, and pay handsomely. He had been met with the seemingly unanswerable statement that tea did not pay the investor when much better prices were obtained than could possibly be commanded now. He (the lecturer) said that no investment paid in which those responsible for results were persons not thoroughly acquainted with their subject. Planters in India were in this position at first, but by degrees they increased their knowledge of tea-growing, and at the present time there was no body of men more intelligently devoted to the task than India tea planters. (Cheers). Better communication existed between the tea districts and Calcutta, and facilities generally were greatly improved in the tea industry. The teas produced in Assam had found their way with the public up to this time owing to their intrinsic merits, and not by any combination either in India or at home. Indian tea might have forced its way sooner in the world had planters, plantation owners, and all those interested worked together. But no, in Assam it was the same now as at the beginning, no co-operation for the general good. Let them look at little Ceylon and its planters, who began after the Indian grower, and by dint of hard work, and working together, they had pushed their teas to the front of the tea industry. Tea-growing in Ceylon had, comparing it with India, entirely outstripped the larger country. A great deal had been written at various times on this question—a great deal of sentimental writing. The surest way to success was to give a better article, for less money than others. In this Indian tea planters could come to the fore. Indian tea generally, did not differ extensively from China, excepting in two great points—Indian tea was purer and gave a more pungent flavour. This being so, it was more economical—in addition to being better flavoured—because a smaller quantity of Indian tea would give an equal result as against a large quantity of China tea. Most housewives imagined that if the tea in the cup was perfectly black, they had obtained the best possible results (laughter) and had got good value for their money. One pound of Indian was worth at least 1½lb. of China tea. Indian tea was being sold in all the markets of the world. At first people did not take very kindly to it in Australia, but now a great demand existed. In America it had not made much headway, but a friend of the speaker who was in Canada, recently observed that the use of Indian tea had grown enormously fron the time he was in Canada, previously. Many private families were getting it direct, and the article was steadily advancing. When once India tea was used in a family, no one would revert to China—he had never known an instance. He knew of a case in which China had been imported, because some people could not stand the strength of our own growth of tea. (Laughter.) That was, however, very easily remedied. Now, he wanted to revert, for a moment, to the subject of finance. It seemed strange to him that it was so difficult to get money for tea planting, not for new plantations, but for those already established. The banks shielded themselves with the plea that tea was not known as an investment. One way in which the British public could very materially assist the planter was, by helping to remove the ridiculous legislation which encumbered him at every step. The labourer was fenced round with many absurd regulations. The houses must have a window and a door in a certain spot and of a size. These were to meet sanitary requirements. He had no objection to this; indeed he thought them very necessary, but when the coolie shut his window for ever, barricaded his door, and by way of company introduced his cow into the family circle, he (the speaker) entertained some doubts as to the wisdom of such legislation. What the planter wanted was freedom of action. There was so much that hampered him in connection with the laws affecting coolie labour that radical changes would sooner or later be necessitated. (Hear, hear.) There was no fear that planters would neglect the coolie. If only from self-interest the planter would see that his labour was properly housed and cared for. It cost a great deal to import the labour, and when once there it was not likely the planter would risk government interference through his neglect. It was only necessary to mention one absurd instance. If the death rate on an estate exceeded 7 per cent, the Government could step in and shut up the place entirely. No planter would object to this rule, provided labour was allowed to come and go freely. The extraodinary growth and importance of the industry, rendered it essential that all such rules shuld be relaxed. In conclusion, he assured them that Indian tea gave better value for money than any description of China tea produced.

Mr. Parker Thomson said he wanted to ask Mr. Peter a question or two. It seemed to him that Mr. Peter touched on the most important feature of the tea question only at the end of his paper; it was—Would Indian tea pay? That question was to him more important than any. Mr. Peter said they must lower the prices. That meant, that the cost of producing it must be lowered. He wanted now to ask Mr. Peter in what direction the cost of production *could* be reduced. There was no prospect of the quantity from China being materially diminished, and it was clear to everybody that the fundamental law of supply and demand must operate here as in everything. If Indian prices were lowered as suggested, the outturn must be increased, but before that increase could be utilised a market must be found, and it seemed to him that the market for Indian teas of the future would be discovered in the decline of China growths. (Hear, hear). He could imagine the answer Mr. Peter would give to his (the speaker's) enquiry as to the direction in which attempts to reduce cost of output would be made. Eleven years ago (1874) the Assam teas were sold in London at an average of 1s. 11¼d. per lb., and companies he knew of, paid on capital invested dividends as high as 22½ per cent. The average last season (1885) was just under 1s. 1d. per lb. Dividends amounting to 20 per cent, had been paid by the same companies; so that although there had been a decline in price of over 10d., they were in 1886 yet able to declare a dividend only 2½ per cent lower than in 1875. (Applause.) The cost of producing their tea had enormously increased during the eleven years named, and yet the tea was very much cheaper, so that he was at a loss to understand in what particular item of expenditure Mr. Peter hoped to reduce. On this side he could not see any chance of lowering. Duty and freight must be paid.

Mr. Peter said he was glad to be asked some questions. He could not, however, speak definitely at this moment as to the reduction or means of reduction now being contemplated. As one source from which personally he expected unusually excellent results he might mention Main's drier, which he understood would wither the leaf in any condition of the elements, which, as he previously stated, would be a Godsend to the planters. The process of withering was one of the most expensive, and if the consumption of fuel were smaller they would be able to do with fewer hands. The "Sirocco No. 3," one of the latest out, had withered more maunds per day than any other up to the present.

Sir D. Forsyth asked whether Mr. Peter would give his experience as to manuring.

Mr. Peter said his experience of manuring was not very great; when he found that one part of the garden was wearing out he added 15 or 20 acres of new cultivation to make up for the loss in the old ground. He had not, however, the slightest doubt that in the future as cultivation wore out they would have to take to manuring and condensing their areas. The subject of manuring had not up to this time, received any or very little attention from tea planters in India.

Sir D. Forsyth asked what kind of manures would be used

Mr. Peter said the manures would be those used on our English farms, bone dust and chemical manures. He had tried them all. His experience was that whereas bone dust would last well for two

years, the crops being equally good in both, the chemicals produced quite a different result. The first year the tea was good; but the effects of the manure the second year were scarcely felt—at least, advantageously felt. Besides this, the chemical manures, he discovered, made the plant more sensitive, and, unless they were constantly kept up—he might liken it to a stimulant—the bushes, deteriorated. A little had been done in the way of top-dressing, with excellent results. In cases where roots were washed and left exposed, the manuring he spoke of had been eminently satisfactory. He was in favour of top-dressing twenty acres of old cultivation, as against opening up twenty acres of new ground.

Mr. Wyllie, formerly an Assam planter, said it was nearly twenty years since he was connected with tea planting in Assam. The great difficulty then—and gathering what he had from the remarks of the reader of the paper, he discovered that the great difficulty now—was withering. He desired to ask Mr. Peter whether from his own personal knowledge, he could name any machine or any contrivance which had dealt successfully with withering tea or was likely to deal in a practical form with it. He had been in Cachar, Sylhet, and Assam provinces, and could himself testify to the tremendous loss in every way which the withering process entailed.

Mr. Peter replied that he had seen Mr. Gibbs's machine for withering purposes which was most excellent. The Main machine, manufactured by A. and J. Main, Glasgow, was a magnificent drier, and he had every reason to believe that Mr. Main's machine would meet with the success it deserved.

Sir D. Forsyth said he wanted to make a remark. He had been connected with tea for a long time. His experiences in India, however, were not in the tea districts of Assam. Now Mr. Peter placed his average yield per acre at 300 or 350 lb. In his (the speaker's) experience they had never attained to anything like that, except in a few very exceptional instances. The greatest difficulty, perhaps, they had to deal with was the shortness of yield. He wanted to know how they were going to reduce their expenditure and increase their yield. The climate was responsible for a good deal, but there were other agencies at work besides the climate. Indian tea was, in his opinion, making its way exceedingly well. Everybody who cared anything for good tea knew that Indian tea was pure. It was not adulterated like China tea, and people were beginning to find that fact out. If the objects mentioned by Mr. Peter as to increase of yield and reduction of cost could attained, he prophesied that before long Indian tea would stamp all inferior teas out of the English market. (Cheers.)

The usual vote of thanks having been carried with acclamation, the company separated.—*Home and Colonial Mail*

THE BLACKMAN AIR PROPELLER.

The Blackman Air Propeller Ventilating Company, Limited, of 57, Fore Street, London, E.C., exhibited at the Norwich Show six of this firm's air propellers of different diameters, as well as a model of George Greig's patent fan all these of their own manufacture. These air propellers have already earned the world-wide reputation of being the most efficient, most convenient, and most economical form of punkah yet brought out for use in cases where it is desired to really remove from, or supply large volumes of air to large apartments or buildings. The old-fashioned punkahs merely cause an oscillation of the air contained in the room or building, whereas these air propellers are capable of changing the whole of the air contained in the building, either by the supply or the exhaust process, as may be desired. Over and above its mere utility as the best means of ventilating ships, public and private buildings, &c., for sanitary purposes or for the sake of comfort, and by using a *kuss kuss tattie* in connection with one of these air-propellers the air can be cooled to perfection, it is worth while to point out to our readers that it is a peculiarly opportune invention for removing the saturated damp atmosphere of tea-houses in cases where no exhaust fans are used for getting rid of the moisture evaporated during tea-drying. It has lately been repeatedly pointed out that the saturated condition of the atmosphere in tea houses is most prejudicial to tea manufacture, inasmuch as it prevents rapid drying and tends to "stewing." Were these propellers brought into use in *pucka*-built tea-houses, we have no hesitation in saying that a great improvement would be noticed in the tea manufactured, and a considerable economy in fuel would certainly be effected inasmuch as the constantly renewed air itself would be so much more absorbtive. A 48-inch propeller, fitted with the lately applied multiplying gear, is capable of propelling or removing 5,000 cubic feet of air per minute, and only requires one coolie to work it. It is easily packed for shipment, and weighs under a hundredweight complete.—*Home and Colonial Mail*.

CINCHONA AND TEA IN MADULSIMA AND HEWA ELIYA.

This District, so far out of the ordinary beaten path of Ceylon travel, is one of the most favoured in the Island for the growth of Cinchona, and Tea is now growing as luxuriantly and flushing as freely at an elevation of 4,000 feet and upwards as in the most favoured of Kandyan districts. Few strangers and only at long intervals, visit the Estates, and the first impression on entering the District is not pleasant, owing to the wretched-looking fields of abandoned Coffee the road passes through. The feeling, however, rapidly gives place to surprise at the luxuriant fields of Cinchona and equally fine fields of still rich green Coffee which rapidly replace the abandoned desolation of the first part of the journey. Much of the soil is poor to all appearance, but it is this apparently poor quartz soil which has proved so fertile to Cinchona, whilst the heavier and richer soils are shewing a cover of Tea, which for its age cannot anywhere be surpassed. In no district in Ceylon has there been more attention paid to the planting of Cinchona, and what were at one time considered the most valuable varieties were reared in nurseries on which neither money nor supervision was spread: but unfortunately the Ledgeriana, Calisaya, Officinalis, &c., have not given the returns so confidently expected. Many varieties never reached maturity, others cankered and died off, whilst in almost every case the percentage of Quinine was found to be far lower than in the original or parent trees in Java or India; and it is the at one time greatly despised Succirubra and its acclimated sprouts or Hybrids, commonly known as Robusta, which have covered our hills with the present luxuriant growth of this valuable tree. The average extent now under Cinchona in this small District may be placed at 2000 acres in various stages of growth, and although the axe and the shaving knife are making inroads on the plantations, a large portion of the coppiced trees are growing from the stools. Far more serious, however, is the insidious disease known as canker, which, once established, is like the leaf-disease in Coffee and cannot be eradicated; but we find that healthy, self-sown seedlings are not only less liable to canker, but are hardy and thrifty growers, and the analysis is also good, so that planters are now at a nominal cost planting hardy, natural Cinchonas in sufficient quantity to replace the trees destroyed annually in harvesting the bark. Already about 800,000 pounds weight of bark has left the district, and shaving and harvesting are still going on. Next year the harvested bark may reach a milllion pounds weight, and it will be some years before there is any appreciable dimunition of the crop. The planting of Tea and the consequent necessity for uprooting the Cinchona will be the first cause of a material falling off in the yield of bark, but the fact that Cinchona grows best on the poor quartz and gravel soil, whilst Tea luxuriates most in the deep rich brown loam of Uva will show a distinct and well-defined limit for the cultivation of the two plants. In Tea cultivation we are several years behind the Kandyan and low country districts; in

fact, the oldest Tea in Madulsima is only two and a half years old, but so rapid has been the extension of this cultivation, that there are now 2,000 acres under Tea, and 600 will be added this season. On Uva Estate there are 400 acres of Tea, and here the first planting only, 18 months old, is as fine a cover of Tea as any in the Island, and the question of flushing may now be finally set at rest, as growth during the dry months of June and July has proved to be fully as good as anything in Kandyan country. The flush on trees 18 months old cut down to the hard wood in June, in one month from cutting, gave a growth of ten to fourteen inches. On Galoola Estate the Tea is even finer and more luxuriant and stronger in growth at the same age. I have mentioned these two Estates without disparagement to other Estates, simply to shew what may fairly be expected from Tea in Madulsima and Hewa Eliya. Much of the Tea is quite equal to a yield of 600 lb. made Tea to the acre, and when the ground is not too steep to fork in manure I see no reason why the maximum Ceylon yield of 1200 lb. should not be obtained. The character of the plant in Uva is essentially different from the Tea shrub raised from the same jât of seed at a similar elevation on the Kandy side. The growth is much stronger and thicker, and lateral branches are thrown out with more regularity from every eye on the stem; the foliage is denser, and the leaves remain longer on the bush and are of a darker colour; the stems of the young shoots are thicker, and the brown or ripe wood follows more quickly on the flush; the leaves are also thicker and heavier, and it will be found in practice when plucking, although I have had no opportunity as yet of fully verifying the correctness of this statement, that a given number of tips, including the Souchong leaf, will perhaps weigh as much as 20 o/o more than lowcountry grown Tea. It will probably be found necessary to pluck what usually termed fine plucking, and there may be found some difficulty in the manufacture at first, but the samples of made Tea I have tasted and tried, although only roughly made, bear me out in all I have previously said as to the value of Uva Tea—they have both strength and flavour. Several Tea factories are being erected in the District, and before 1886 closes, Uva, or at least Madulsima, Tea will have proved itself in the market. Most of the Estates have a small reserve of forest which will last some time, and charcoal may be had from the low country in any quantity, but a cart road is much wanted from end to end of the District, that is from Passara to Roeberry Estate. There are no bridges of any size required, and a good gravel road might be constructed for say R12,000 per mile. At present length and difficulty of transport are the great drawbacks to this District. No Estate will be able to send down full chests of Tea, and even half-chests will be difficult of transport to the cart road.—Local "Advertiser."

THE COLONIAL EXHIBITION.—NO. VII.

CEYLON.

From all points of view the collection from Ceylon is one of great interest. Tea, as might be supposed, occupies a prominent position, numerous samples being exhibited, some apprently of excellent quality. The preparation of Tea for the market is well illustrated by a series of photographs. In the course of ten years the Tea industry has marvellously increased in Ceylon. In 1876, 282 lb. only were exported, and in 1885 it had reached 3,796,684 lb.—this increase being the result of a high quality Tea, the distinguishing characters of which are described as richness of flavour combined with strength—"the results of most careful cultivation and systematic attention to every detail of manufacture." In the excellent *Illustrated Handbook and Catalogue for Ceylon*, which has recently been published, it is said that "On a Ceylon Tea estate the leaf is never allowed to be handled from the moment it passes into the factory to the time it is bulked in a huge heap preparatory to packing in chests; every stage in the delicate operation is passed automatically, and thus the most rigorous cleanliness and freedom from possible taint is secured."

Amongst spices, Cinnamon takes the most prominent place. Magnificent bundles of this bark are shown, together with chips and clippings. These chips, it seems, are largely used in the manufacture of Thorley's cattle food, as well as in perfumery, and in the distillation of Cinnamon oil, a good deal of which is also made in the island. Jaggery, which is a coarse description of sugar obtained chiefly from the Palmyra Palm (Borassus flabelliformis), was exported from the Northern Province of the island during the past year to the extent of nearly 7,000 cwt., valued at £2,000. Besides this large consumption of Jaggery in Ceylon, the trade might be made one of great importance, as there is at present an active demand from Europe.

Under dyes and dye stuffs we find Jackwood, the wood of Artocarpus integrifolia, which, it is said, "dyes an extermely useful yellow, and is used by the natives for dyeing house mats, fibres for ornament, as well as for giving to cotton and silk cloths the peculiar pale canary colour which is required for the robes of the Buddist priesthood. It is not exported."

Of Anatto, of which there are some fine examples, both of seeds and paste, the Handbook says:—"This useful and rather delicate orange red dye is obtained from the pulp surrounding the seeds of Bixa orellana. This dye is largely used in Europe and India in dyeing silks and also for colouring cheese and other articles. The pulpy matter is separated from the seeds by boiling, and when dried pressed into cakes and shipped. It is imported into England chiefly from French Guiana, where it is native; but the plant is an ancient introduction to Ceylon and is now semi-wild."

Besides a large collection of small wood specimens, of which there is published an excellent list, there are some remarkably fine examples of the choicer cabinet woods such as Calamander, Tamarind, Satinwood, &c. Of the first of these, obtained from Diospyros quercita, it is unsatisfactory to known that it is becoming extremely scarce. The tree is of slow growth and the forests in the south of Ceylon are now denuded of all their Calamander trees of a size suitable for furnishing cabinet wood. Of Satinwood the produce of Chloroxylon Swietenia we also learn from the Handbook that the "trees are common enough in the northern, eastern, and north-western forests, but the proportion of these which yield "flowered Satinwood" is very small, and this description of wood is therefore comparatively high in price. One would not think there was any scarcity in Satinwood when one sees such elaborate show-cases made of it in which the Ceylon Teas are exhibited, and the use to which it seems to be put in Ceylon for carriage building.

The Ceylon court is well arranged, and the Handbook and Catalogue is one of the best of the Exhibition Series. *John R. Jackson, Curator, Museums, Royal Gardens, Kew.—Gardeners' Chronicle.*

COFFEE ROASTING.—"It is a nice task to brown coffee just right," said a New York coffee-roaster the other day. "Nearly everybody browns coffee too much. It comes out burned instead of browned, although it is greatly to the interest of the wholesalers not to brown it too much on account of the loss of weight. When the berry is roasted until it becomes red, instead of chestnut colored, as is customary, it preserves its maximum weight and aroma. One hundred pounds of berries roasted properly lose but fifteen pounds in weight. As usually roasted they lose twenty pounds. If roasted long enough the berry glazes over and turns dark brown. It loses a fourth of its weight in the process." "Why does the grocer overroast his coffee, then?" was asked. "The trade demands it. The coffee that is made from over-burned berries is black, and the flavour is rank. The popular taste is educated to choose black coffee, and would find the light-colored liquid made from the reddened berries rather insipid at first, and would refuse to buy enough to learn to admire the rich flavor of the reddened berries."—*American Paper.*

Cassia:—The attempt that has been made by the afforestation Department of Hong Kong to grow *Cinnamomum Cassia* appears to have met with an unexpected check. According to the report of the Superintendent of the Department, the Chinese persistently break off the leaves and branches of the plants, and notwithstanding the vigilance of the forest guard they manage to keep the plants in an almost leafless condition. The reason assigned is that the Chinese use the leaves in medicine. (*Gard. Chron.*, July 17, p. 82).—*Pharmaceutical Journal.*

Coffee as a Disinfectant.—Years ago some studious German made the observation, the correctness of which he endeavored (and to a great extent also succeeded) to establish by statistical data that coffee, if taken early it the morning on an empty stomach, acted as a preventive against infectious and mainly acute epidemic diseases. He quoted a great number of cases where individuals accustomed to drink a cup of hot coffee for breakfast had either escaped an epidemic of typhoid then ravaging the part of Germany in which the observer lived, or if attacked by the disease contracted it in a much milder form, while all those who died from the disease had not been in the habit of taking coffee in the morning. This was a good number of years ago, at a time when in many parts of Germany coffee was still either an unknown or so costly a beverage as to be looked upon as a luxury that only the rich could enjoy. We have forgotten the name of the physician, but remember that the medical profession did not take kindly to the idea of coffee being a disinfectant, or, as they then said, an anti-zymotic, and those who could not deny the correctness of the observation itself ascribed the apparent immunity to other causes, many to the hot water with which the coffee was prepared. That the physician, however, has not been so wrong has been but recently proved. During the last meeting of the Prussian army surgeons in Berlin, Medical Director Oppler reported that after extensive investigations, which he related in detail, he had discovered that we possess in coffee an antiseptic remedy of no mean value, but one which could well serve for the purposes of a first dressing of a wound received in a battle. If employed at once it totally prevented suppuration, but if used after pus has already accumulated in the wound, it leads to the formation of a scab, beneath which the wound heals with asepsis. The coffee should be employed in the form of powder, and as it might entail the loss of valuable time to have to grind first the roasted coffee bean, which in Prussia every soldier is bound to carry about him, O. recommends the use of coffee-tablets, which have been recently discovered by a Hamburg firm, and which answer their purpose admirably well, as it is only necessary to rub these tablets a little, when they at once assume a powder form.—*American Paper.*

Agriculture in Coorg was thus reported on in the Administration Report for 1884-85:—The area of land held under grants for coffee &c., and denoted in Statement I. E. Fiscal (2) as "Zamidari" was computed at 73,199 acres in 1884-85. Of this area 37,544 acres bearing an assessment of R67,602 were held by Europeans, and 35,655 acres with an assessment of R65,591 by natives planters. The area of European estates has been diminished by 699 acres since the previous year, and by 2,910 acres since 1882-83. The average size of European Coffee Estates, is estimated at 163 acres, and Native Plantations and of at 7·8 acres. A considerable area of unassessed Bane land (the wooded pasture land) attached to farms under rice cultivation) is cultivated with coffee, and it has been for some years past in contemplation to survey and assess these lands. It is expected that a commencement will be made during the ensuing working season. *Labor* for the coffee estates, though late in coming, was plentiful at the end of the season. The Cooly Maistries are no longer stimulated by the high rates formerly paid by the estate owners, the heavy losses sustained of recent years having led to a disposition to curtail expenses in every possible manner. The monthly wage now offered varies from R6 to R7½ for a man, and R3½ to R4 for a woman. *Prices.*—Allusion was made in last year's report to the sudden fall in the price of coffee which took place early in 1884. The price had fallen during that and the previous year from R40 to R26 or R25 per cwt, and in the English Market from 100 shillings to 61 shillings per cwt. The local price has with occasional slight fluctuation been maintained at the former average rate of R26 per cwt. The season was on the whole fairly good. The South West Monsoon rains were lighter than usual during the usual June and July, the rain-fall gauged for those months at Mercara was only 16·55 inches and 29·61 inches respectively. The fall during August, however, amounted to 42·94 inches, and thus a fair average was maintained. Notwithstanding the late period at which the rains commenced, the outturn of the cereal crops was fully equal to the yield of former years. The coffee crop was somewhat affected by the untimely occurrence of the blossoming showers, as well as by the circumstance that the yield of the previous year had been in the most instances large. The cultivation of cinchona has not received the same attention as in the previous years as it is feared that the enterprise will prove a failure owing to the low prices for the bark now ruling in the English Market.

The Colonial Exhibition.—The literature pertaining to this Exhibition is not unnaturally extensive, and for the most part it is excellent. Each colony has caused to be prepared a short account, which generally includes a summary of the history, foundation, government, physical and natural features, as well as commercial products of the colony. In this way an amount of authentic information has been got together which can rarely if ever have been made so accessible before. Adverting more especially to matters in which our readers are more directly concerned, we note an excellent descriptive and classified list of the woods of Queensland, by Mr. F. Manson Bailey, the Colonial Botanist. The Ceylon catalogue, in addition to a mention of raw products generally, has a list of the drugs and of the timber trees of Ceylon, to occompany the specimens exhibited by the Director of the Royal Botanic Garden. The New Zealand catalogue also comprises a list of native woods, but not so usefully arranged as in some other cases. New South Wales issues a general statement of the progress and resources of the colony, but no list of products. The Cape of Good Hope catalogue includes descriptive lists of medicinal plants and of woods. The official handbook of Natal deals with generalities, and the same may be said of Fiji, a special feature of which, however, are the elaborate meteorological details, which will be useful for future refcrence. South Australia furnishes an excellent general account of the nature, history, and products of the colony. The Victorian handbook is remarkable for the copiousness of its illustrations. Canada has an admirable summary of its history, productions, and natural resources, accompanied by two large sized maps, which enable us to realise the extent of the Dominion, and the splendid prospects in store for it. The special British Guiana catalogue is very interesting to peruse, and the notes on timbers instructive, though here, as elsewhere, the use of popular names, compulsory in this case, is a great drawback. The notes on the Straits Settlements contain an interesting history of the colony, but little detail as to its products. The West Indian courts so far seem least well represented in this enumeration of literary exhibits. Tasmania, for some reason or other, does not appear to be represented at all in this Exhibition. We are frequently asked to give information and advice to intending emigrants—a task which, at least so far as the counsel goes, we rarely comply with, for reasons that will be sufficiently obvious; but since the opening of the Colonial Exhibition we have referred all applicants to the Exhibition and to the official reports. We allude to this matter because in our judgment it shows the desirability of securing a permanent Colonial Museum, where every applicant may find the information he is in search of.—*Gardeners' Chronicle.*

THE NORTHERN TERRITORY OF AUSTRALIA.

Port Darwin, July 6th.—The Government nursery is now (July 9th) located at the new site about a mile and a half from town. All buildings, fences, and the most valuable plants have been removed and work at the new nursery is now on a firm footing.

A late visitor to Cox's Peninsula says it is disheartening to see the rapidity with which the two abandoned plantations in that locality are reverting to their primary condition of tangled jungle. Nearly every vestige of the trees and plants introduced at the cost of so much time and labour on Erikson & Cloppenburg's holding have vanished, one of the buildings has been destroyed by a bush fire, and the remaining erections are on their last legs, prematurely decaying for lack of a caretaker; the doors are falling from their fastenings, and the interior of the dwellings have been monopolized by white ants, who have riddled every article of furniture left lying about, displaying a special weakness for Scripture, for they have gone for several Bibles with such vigour that little remains but the bindings. Shovels, hoes, wheelbarrows, coils of wire, blacksmith's tools, and several other once useful articles are mouldering away in the vicinity and quickly being dissolved into their original elements. Harris & Head's plantation, which has not been abandoned very long, is in a better state of preservation. There are numerous papaya-trees and banana plants loaded with fruit, but there is also a thick crop of tall grass growing right up to the dwelling-house, which only needs a careless spark to afford food for a fire which would sweep away every trace of what took so much toil to produce.

CINCHONA IN JAVA.

The following translation of M.Van Romunde's Report on the Java Gardens for the 2nd quarter of this year—recently received,has been made for the *Observer*. The most noteworthy fact is that there is not the slightest reference to "canker" in the Report extending up to 30th June, but of course the Government Gardens may have escaped the trouble so far. The Government crop of bark does not increase:—

Report on the Government Cinchona Plantations for the 2nd quarter of 1886.

The rains continued to about the middle of May. The latter half of the month was very dry, as was also the beginning of June, after which a few rainy days were again registered. Planting out in the open ground from the nurseries was pushed on as much as possible, when the state of the weather was favorable.

The dry weather had a beneficial influence on the young plantations, this influence was particularly noticeable on such plantations as had been highly cultivated at the latter part of the wet monsoon. The harvest of this year amounts to fully 100,000 Amsterdam pounds of bark, of which 85,106 pounds were sent to Batavia by the end of the quarter. This harvest was almost exclusively obtained by thinning out close plantations, and consists chiefly of C. Ledgeriana. On the 15th April fully half of the produce of the harvest of 1885 was disposed of by public sale at Amsterdam. The gross proceeds amounted to 190,000 guilders (gulden) being an average price of *f* 0.79 per half kilogram. The highest prices were obtained for a very fine lot of C. Calisaya bark in long quills which fetched up to *f* 3·86 per half kilogram. The highest price offered at this sale for C. Ledgeriana bark was *f* 1·85 per half kilogram. The inquiry respecting the influence of succirubra stems on the bark of the Ledgeriana grafted thereon, is steadily pursued. The results of the chemical researches shall, if possible, be made known during the coming quarter.

The original Ledgerianas as well as the old Succirubra plantations produced such an insignificant seed-harvest, that only a very few sales of cinchona seed could be held, which produced a gross result of *f* 552·75. The graft-plantations of Tortasari promise in the course of the third quarter an abundant harvest of valuable seed, so that important sales will then be held.

(Signed) Van Romunde,
Director of the Government Cinchona Plantations.
Bendoeng, 5th July 1886.

Report on the position of the Government Cinchona Plantations in Java for the 2nd quarter of 1886 :—

Position of the plantations, and their mean elevation above sea-level. The highest expressed in meters.	Number of Plants in the Nurseries.			Number of Plants in the open ground.				General Total for Plants.
	Ledgeriana	Succirubra	Officinalis	Ledgeriana	Calisaya & Hassskarliana	Succirubra & Calloptera	Officinalis	Lancifolia	
Lembang ..... 1251 Mountain range Tankubang Pran	—	60,000	—	5,000	6,000	130,000	—	—	201,000
Nagrak ..... 1625 Mountain range Tankubang Pran	200,000	—	—	220,000	30,000	24,000	34,000	—	508,000
Tjibitung ..... 1327 Mountain range Wajang	100,000	200,000	—	50,000	—	200,000	15,000	—	565,000
Tjibeureum ..... 1580 Mountain range Malawar	190,000	—	—	150,000	—	18,000	—	—	358,000
Tjinjirocan ..... 1546 Mountain range Malawar	500,000	200,000	—	160,000	30,000	60,000	4,000	9,000	963,000
Rung-gunung ..... 1625 Mountain range Tilu	20,000	20,000	—	75,000	10,000	95,000	2,000	—	222,000
Kawa Tjiwidei ..... 1950 Mountain range Kendang Patuha	50,000	50,000	—	1,600	—	35,000	190,000	—	326,000
Tirtasari ..... — Mountain range Malawar	40,000	—	—	105,000	—	—	—	—	145,000
Totals of the several kinds...	1,100,000*	530,000	—	766,000†	76,000	562,000	254,000	9,000	3,288,000
General total of all kinds...	1,630,000			1,658,000					

* 40,000 grafts are here included. † 145,000 cuttings and grafts are here included, besides the 3,900 original Ledgerianas more or less.

TEA IN UVA.

Everything concerning the practical development of the tea enterprise in the Province of Uva is full of interest at the present time, and we have been much pleased with a series of reports from diverse hands, which we have had the privilege of looking over. When a Colombo Agent with a considerable experience of tea writes to a Manager in almost the *ultima thule* of Uva as follows, "The teas you send down are first 'chop' and leave nothing to be desired; if you can send us teas like these from Uva in quantity, the enterprise cannot fail of success," it is evident that the district is to take no second place in its quality of tea. Madulsima 'broken pekoe' has been valued lately by London experts at 1s 10d and upwards; while here is a local report on another series of samples from the same district:—

"Your tea is excellent and bears favorable comparison with about a dozen tea samples we tried with it. The report written on your tea was as follows:—

'Sample No. 4.—Broken Pekoe.

Appearance:—Fairly well twisted, slightly greyish, good display of tip.

Fermentation:—Good and even, bright.

Liquor:—Strong, dark, good flavour, somewhat rasping.

'Sample No. 4.—Pekoe.

Appearance:—Twist uneven, evidently hand-rolled, somewhat greyish, grading defective, some red leaf and congou present.

Fermentation:—Even and bright.

Liquor:—Strong, dark liquor, slightly metallic taste.

"For commercial purposes you should grade as we are doing elsewhere. Pluck out tea leaf, pass through a No. 8 sieve, then break all save congou through the No. 8 mainly by gentle pressure of the hand, not against the metal. Take out dust by a 30 or 32.

"Your B. P. is beautiful and have a splendid liquor, only two on the table were better, a B. P. of Kerr's and old Taylor's.

"The pekoe has too much tip, I think, and is rather disfigured by congou and a little red leaf. It liquors splendidly. What you want is a roller, and you could look over most men."

The Galoola Tea Factory, we learn, was opened on the 1st September. Machinery will doubtless be required on a good many other estates erelong.

CEYLON TEA.

The pamphlet issued by the Ceylon Planters' Association, has at length reached us, a copy having been courteously posted to our address by the Secretary. The coloured lithographs, when looked at closely are more patchy than artistic, but they give a very good idea of what is intended to be illustrated, viz.:—

A Tamil Woman Plucking Tea Flush;

View of a Tea Estate and Factory;

Weighing in Green Tea Leaf.

As a large portion of our readers are interested in the subject, we quote the text which accompanies the illustrations. The writer certainly does justice to our new staple and turns the tables effectually on those whose "vested interests" in the inferior teas of China and Japan led them to prejudice the public mind as far as they could against the stronger and purer competitor as if it were a dangerous poison. But it ought in fairness to have been mentioned that Indian Tea and its producers bore the chief burden and heat of the day in the fierce and bitter controversies which once raged in England around the competing teas of India and the Far East. By the time Ceylon tea came on the stage, many of the old enemies of Indian tea had been converted into friends and had contracted vested interests in that product, which the tea-drinking public had come gradually to appreciate for themselves. Ceylon tea, therefore, apart from its merits as combining in an unmixed form delicate flavour with strength, had less prejudice and selfish opposition to contend with than was the case when "Ind of Great Mogul" first entered the lists as a competitor with "Far Cathay" and its world-renowned "Thay." This might have been generously mentioned; but the object of the writer was to recommend Ceylon tea, and this task has certainly been well performed. We trust the circulation in tens of thousands of this pamphlet, the show and sale of Ceylon teas in the Exhibition and the efforts of the Syndicate will be to increase consumption in markets already open and secure favour for our product where it is as yet unknown, or only partially known; so that consumption may be in proportion to the increased production which the writer of the brochure correctly anticipates:—

TEA IN CEYLON.

In the minds of the British public the name of Ceylon has been chiefly associated with the production of Coffee and Spices; the latter in poetry, but in poetry only, imparting their fragrance to the very air.

While Ceylon Coffee and Ceylon Spices are of superior quality and remain most important articles of trade, it is Ceylon Tea that is rapidly becoming the staple product and the one for which the island will soon be most celebrated.

Seldom or never has an industry made such progress or a new article of consumption overcome by its intrinsic merit the opposition of vested trade interests as has Ceylon Tea.

In 1873 the exports of Tea from Ceylon were 23 lb.; in 1885 they have been 4½ million lb.; in 1886 they will be about 10 million lb.; and in the near future 40 million lb will be exported.

The area under Tea in the island is rapidly extending, and already about 120,000 acres have been planted. Over 700 European planters and 150,000 Indian and Sinhalese laborers are engaged in the cultivation. Some of the plantations are but little above sea level, while others run up to an elevation of 6,000 feet. The average altitude of the larger districts is about 4,000 feet above sea level, an elevation at which the climate is pleasant and most healthy. A railway runs up into the hills and a good system of cart roads exists, so that most of the estates are already within a day's journey from Colombo—the capital and shipping port.

At a time when dietetics has almost become a science, when purity and cleanliness in food and beverages are so strongly insisted on, it is strange that greater attention has not been called to the more than doubtful nature of much of that which is consumed as Tea.

It has been said that, if to be an Englishman is to eat Beef, to be an Englishwoman is to drink Tea. True it is that the article which in the sixteenth century was a luxury, costing ten guineas a pound and consumed by a hundred people, has in the nineteenth century become a necessity, costing two shillings a pound and consumed by millions.

Did the people of Britain thoroughly understand the difference between British-grown Tea—such as Ceylon's—and that of China or Japan, it is certain that those who could get the pure, clean, machine-prepared leaf which is turned out from the planter's factory, would never touch the far from pure article prepared by the hands and feet of the unwashed Mongolian.

In China and Japan Tea is mostly cultivated in small patches by the peasantry, who gather the leaves and prepare the Tea in their huts in a very unfastidious manner. The Tea, either in a half-

manufactured or finished state, is sold to petty dealers who in turn sell to larger dealers.

The large dealer mixes and manipulates Teas, packs and sells them to the European Merchants for shipment to England, Australia, or America. The manipulation of Tea is an art in which the Chinaman excels, and in many of the inferior kinds the quality is infinitely deteriorated—thus, "the dust of the leaf is mixed with clay and manipulated into the form of the ordinary leaf"—this is with appropriate philological coincidence termed "lie" Tea. "Tea leaves which have been already used are again manipulated and rolled into shape and sold as genuine Tea."

The Teas of Japan, which are almost entirely consumed by our American cousins, are frequently and admittedly "faced" with a mixture of Prussian blue and soapstone.

The Ceylon estate cultivation and manufacture are very different, and it may not be uninteresting to give a brief account of how *pure Tea* is made. Visitors to the Ceylon Court in the Colonial and Indian Exhibition will find an interesting series of photographs from life, attached to the exhibits of Tea, illustrating the various operations

The Tea bushes are planted in lines at regular distances over hundreds of acres of carefully roaded and drained land, which is regularly weeded every month. Once a year the bushes are pruned down to a height of about 2 feet; and eight weeks after the pruning the first "flush" of young shoots is ready to be plucked, and during the height of the season the flushes reoccur every ten days. Coolies, having a small basket attached to their girdle, then go round and pluck the bud and a couple of the tender half-developed leaves. At mid-day, and again in the evening, the leaf is weighed and taken into the factory. The leaf is at once spread very thinly on trays or shelves to wither. The time which the leaf takes to wither—to become soft and pliable without drying up—varies with the weather, but as a rule the leaf gathered one day will be sufficiently withered the following day.

The withered leaf is [then] placed in the rolling machine; an ingenious and effective machine which is driven by water or steam power. The rolling lasts for nearly half-an-hour, at the end of that time the leaf has become a moist mass of twisted and bruised leaves, out of which the expressed juice freely comes, technically called "the roll." The roll is then placed in trays to ferment or oxidise; during this process it changes from a green to a copper color. The subsequent strength and flavor of the Tea depend, to a great extent, upon the fermentation—a chemical process, the success of which is not entirely within the control of the Planter, but depends greatly on the weather and takes a time varying from two to six hours.

The next process is that of firing. The roll is thinly spread on trays, and placed either over charcoal stoves or in large iron drying-machines, and at the end of half-an-hour it is thoroughly crisp and dried and has become Tea. The Tea is then sorted or sized, by being passed through sieves of different mesh (see working model of a Tea-sifter in the Ceylon Court) giving the varieties of broken pekoe, pekoe, souchong, congou, and dust. The broken-pekoe, which consists chiefly of the opening-bud of the leaf, gives the strongest Tea, perhaps too strong a Tea to be infused by itself; and a mixture of pekoe and souchong makes the most pleasant drinking Tea.

The final process is that of weighing and packing. When a sufficient quantity has been manufactured the Tea is again slightly fired, to drive off any suspicion of moisture, and packed while warm in lead-lined boxes carefully soldered down to exclude air.

Such is the mode of careful, cleanly preparation in the specially erected factory of the Ceylon Planter; and every drinker of genuine Ceylon Tea may be certain that it is *absolutely pure*.

Specimens of the various classes of Tea, above named and also of fancy Teas, from all districts in Ceylon and grown at all elevations (from sea level up to 6,000 feet) may be seen in the Ceylon Court. And every information regarding the industry may be obtained from the Planters' Commissioner at the Exhibition. Ceylon Tea, in packets guaranteed by the Planters' Association and also as a beverage, is sold in the Tea Room attached to the Ceylon Court as well as in the Ceylon Tea Kiosks in the Exhibition Grounds.

Ceylon Tea stands unrivalled for its combination of strength and flavor; and the pure Tea gives a beverage pleasant and beneficial to those who drink it. One cannot doubt that, were the well-meaning evangelists in the cause of temperance to realize the difference between pleasantly-strong well-flavored stimulating Tea and the "wishy-washy" decoction infused from the cheaper China Teas, their efforts to substitute "the cup which does not inebriate" for that which does might be made much more successful.

In addition to the other good qualities Ceylon Tea possesses that of being economical; for it is generally admitted that two pounds of Ceylon will go as far as three pounds of China.

The Tea you drink should be—1.—Pure. 2.—Wholesome. 3.—Pleasant. 4.—Economical.

And Ceylon Tea justly claims pre-eminence on these grounds.

Would-be purchasers of Ceylon Tea must be warned that there is danger (just as there is with everything which has earned a good name and become popular) of a spurious or admixed article being sold instead of what is genuine.

French Walnut Wood.—The finest and most costly of veneering woods is the French walnut. This is imported from Asia Minor and Persia. The burr is the valuable portion of the tree, and sometimes as much as £100 to £200 was obtained for them while one at the Paris International Exhibition in 1878 realized the enormous sum of £1,000, or about 8s per lb. weight. The use of this wood is now limited to pianofortes. For a particularly fine piece of ebony £1 the pound has been paid, as it is difficult to get large pieces which can be used without cutting.—*M. Mail.*

Natal and Mr. Angus Fraser.—The O. B. C. sold their branch at Port Elizabeth to a local establishment, which has since had to write off half its capital, and our old acquaintance, Angus Fraser, having taken shares in the concern, was naturally somewhat irate at having a hint that his salary would be reduced in like proportion; so he gave the Bank notice to quit, making the fourth O. B. C. man now in London "on the staff," the others being J. B. Morphew, A. Carmichael, and J. D. Dawson. In reply to my enquiries about Natal tea. Mr. Fraser laughed consumedly, and said the severe and long droughts to which the district was subject rendered tea cultivation out of the question, and what he had seen of it had convinced him that nothing would ever come of that industry in any part of the Cape territory.—*Cor.* Local "Times."

The "Tropical Agriculturist" is the means of bringing us some curious requests and enquiries. Here is a letter received by the last mail which we publish in the hope that it may come before the eye of the writer of the valuable paper referred to which we took over from the pages of the Melbourne *Leader*, as duly acknowledged at the time:—

Surinam, Plantn. Gagtlust, 25th June 1886.

To the Editor of the *Tropical Agriculturist*, Colombo, Ceylon.

Dear Sir,—By reading your novelles, 1st Jan. 1886, vol. V. No. 7, p. 505, "Management of Fruit Trees," the few lines had such effect to me as amator of fruit trees, that I contain to pleas you to bring me in transaction with the writer.

In this case you will oblige to give me the address of the writer, if it is possible,—I am your obedient servant,

S Crench,

Old President of the Agriculture, &c. Society, Surinam.

A TRIP TO CHIRIQUI: CACAO, BANANAS, VEGETABLES, COCONUTS, &c.

From an article so headed in the *Gardeners' Chronicle*, we quote as follows:—

Leaving Kingston, Jamaica, on November 8, we entered the lagoon of Chiriqui on the 14th by a zigzag course between an island and a point of the mainland through a passage known to navigators as Bocas del Drago, or Mouth of the Dragon, but locally known as "Boque's Mouth." Once inside, a broad expanse of water was before us almost deserving the term of inland sea, for certainly the term lagoon, as it is generally understood, is not an appropriate name for these waters.

In the provision fields we found Plantains, Bananas, Pumpkins, Cassava, Sweet Potatoes, Yams, &c., growing in the greatest profusion; the only enemy they appeared to have to contend with being the "We-we," or Umbrella Ant. This insect—although very destructive, it is true—did not appear to effect the general results of the cultivation, and the groves of Cacao on the outskirts of the field were in most instances untouched by it. We found large colonies of this insect in every part of these islands, and it is without doubt in a great measure due to the labours of these little creatures, assisted by the numerous land crabs, that the probably once barren coral rocks which form the foundation of these islands are raised from sea-level to become fertile fields adapted for the production of food for the human race.

Plantains and Bananas produce large bunches, which meet a ready sale on the spot, at the hands of captains of trading schooners running to and from the Isthmus of Panama. "Sarse," the roots of a species of Smilax, known to commerce as Sarsaparilla, also meets a ready sale, large quantities being grown at various places in the lagoon, and not a little is produced and brought down by the Indians from the mainland.

The varieties of Cacao (Theobroma Cacao) were numerous. The most commonly cultivated were the white and red-skinned varieties, the green-skined is a very heavy cropper, and produces beans of excellent quality.

Chocolate of good quality is manufactured locally. The beans are first roasted, then deprived of their skins, and afterwards ground on a small, flat, porous stone, the crushing instrument, also of stone, being of a shape similar to a housewife's rolling-pin. We had frequent opportunities for testing this preparation, and often declared that, if travellers of the olden time tasted as good a mixture as it was our fortune to drink, it was no wonder that they described it as being "Food for the Gods."

Another distinct species of Cacao was met with, which, though of doubtful value as an economic plant, was of sufficient botanical interest to induce us to spare no pains to introduce it into Jamaica, in which endeavour I am glad to say we were primarily successful, as growing plants reached Kingston in safety, and are now contributed to the Castleton Botanical Garden. The plant has not as yet been scientifically determined, but I may venture to state that it will probably prove to be Theobroma bicolor.

The tree itself is of a stout spreading habit, its trunk and branches being much thicker than those of the ordinary kinds; but it is not so erect in its mode of growth.

In the Cacao groves we saw many trees of the ordinary kind reaching a height of over 40 feet while the "Tiger Cocoa" seldom reaches more than 15 or 20 feet.

Several plants of a tree locally known as the "Wild Cocoa" were met with in the forest, and botanical specimens duly secured, which will probably prove the plant to be, not a Cocoa at all, but a species belonging to the allied genus Herrania. The plant has but a small single stem, its leaves resembling at a short distance those of the common Papaw (Carica papaya). The pods are small, ten-ribbed, with roundish seeds, covered with a thick sweetish pulp, much sought after as a "bush" delicacy by the juvenile members of the community.

On our return from the morning's outing we examined the locality around the settlement in which we were residing, and it was found that little cultivation was attempted near the dwellings, but that groves of Cacao and Coconuts abounded everywhere, while many of the inhabitants took great pride in showing me their "Soopa" trees. This is a palm well known under the name of Gulielma speciosa, Mart., but now referred by the authors of the *Genera Plantarum* to the genus Bactris. Wallace in his *Palms of the Amazon* thus describes it:—"This most picturesque and elegant Palm has the stem slender, cylindrical, and thickly set with long needle-shaped spines disposed in rings or bands. It reaches 60 feet in height, and grows quite erect, though in exposed situations it becomes curved and waving. The leaves are very numerous, terminal, pinnate and drooping, forming a nearly spherical crown to the stem; and the leaflets growing out of the midrib in various directions, and, being themselves curled and waved, give the whole mass of foliage a singularly plumy appearance."

"The fruit is the size of an Apricot, of a triangular oval shape, and fine reddish-yellow colour. In most instances the seed is abortive, the whole fruit being a farinaceous mass."

"This palm appears to be indigenous to the countries near the Andes. On the Amazon and Rio Negro it is never found wild." It is most commonly known as the 'Peach Palm,' from the similarity of its fruit, in size and colour, to some species of the genus Amygdalus, to which the Almond, Peach, and Nectarine belong.

The fruits are eaten either boiled or roasted, and have a flavour, to our taste, somewhat combining that of roasted Spanish Chestnut and Sweet Potato. As they are very wholesome I ate several, which I particularly enjoyed. They are said by Wallace to be "also ground up into flour, and made into cakes, which are roasted like Cassava bread, or the meal is fermented in water, and forms a subacid creamy liquid. Parrots, macaws, and monkeys, eat them greedily, but the latter gentry are prevented when in a wild state from obtaining them by the prickly nature of the stem.

The trees were growing at sea-level, and as the temperature is similar, I believe it would be an excellent plant to introduce for growing on the plains of Jamaica. As an article of food it would certainly be a valuable plant to the poorer inhabitants of this island, provided they could be induced to overcome their invariable prejudice against "Buckra tings." The fruit will stand transport with great facility when ripe. I had a single one which I kept for some twenty-five days, and that it was found in a comparatively sound condition on my arrival in Jamaica.

THE RED SPIDER.

(TETRANYCHUS TELARIUS.)

The red spider is not correctly speaking an insect, though it is commonly spoken of as such, neither is it a spider, as its name would imply, but an acarus or mite. Whether its name is correct or not, it is a most destructive and troublesome pest wherever it makes its presence felt; it by no means confines itself to one or only a few kinds of plants, as many insects do, but it is very indiscriminate in its choice of food, and it attacks both plants grown under glass and those in the open air. When these pests are present in large numbers the leaves on which they feed soon present a sickly yellow or schorched appearance, for the supply of sap is drawn off by myriads of these little mites, which congregate on the undersides of the leaves, where they live in a very delicate web, which they spin, and multiply very rapidly; this web and the excrement of the red spider soon choke up the pores of the leaves, which, deprived of their proper amount of sap, and unable to procure the carbon from the atmosphere which they so much need, are soon in a sorry plight. However promiscuous these mites may be in their choice of food plants—Melons, Cucumbers, kidney Beans, Hops, Vines, Apple, Pear, Plum, Peach trees,

Limes, Roses, Laurustinus, cactuses, Clover, Ferns, Orchids, and various stove and greenhouse plants being their particular favourites—they are by no means insensible to the difference between dryness and moisture. To the latter they have a most decided objection, and it is only in warm and dry situations that they give much trouble, and it is nearly always in dry seasons that plants, &c., out-of-doors suffer most from these pests.

Sulphur is one of the most efficient agents known for killing them; but it will not, however, mix properly with water in its ordinary form, but should be treated according to the following recipe:—Boil together in four gallons of water 1 lb. of flowers of sulphur and 2 lb. of fresh lime, and add 1½ lb. of soft soap, and, before using, 3 gallons more of water; or mix 4 oz. of sulphate of lime with half that weight of soft soap, and when well mixed, add 1 gallon of hot water. Use when cool enough to bear your hand in. Any insecticide containing sulphur is useful. In hot-houses one of the best ways of destroying these creatures is to paint the hot-water pipes with one part of fresh lime and two parts of flowers of sulphur mixed into a paint. If a flue is painted in this way great care should be taken that sulphur does not burn, or much damage may be done, as the flues may become much hotter than hot-water pipes. During the earlier stages of growth keep the atmosphere moist and impregnated with ammonia by a layer of fresh stable litter, or by painting the hot-water pipes with guano made into a paint; as long as the air in the house is kept moist there is not much danger of a bad attack. If Carnations are attacked, tying up some flowers of sulphur in a muslin bag and sulphuring the plants liberally, and washing them well in three days time has been recommended.

Tobacco water and tobacco smoke will also kill these pests, but as neither tobacco nor sulphuring the hot-water pipes can always be resorted to with safety in houses, by far the better way is to keep a sharp look-out for this pest, and as soon as a plant is found to be attacked to at once clean it with an insecticide which it is known the plant will bear, and by this means prevent other plants from being infested. These little mites breed with astonishing rapidity, so that great care should be exercised in at once stopping an attack. A lady friend of mine had some Castor-oil plants growing in pots in a window which were badly attacked, and found that some lady-birds soon made short work of the mites and cleared the plants. The red spider lays its eggs among the threads of the web which it weaves over the undersides of the leaves; the eggs are round and white; the young spiders are hatched in about a week, and they very much resemble their parents in general appearance, but they have only three pairs of legs instead of four at first, and they do not acquire the fourth pair until they have changed their skins several times; they are, of course, much smaller in size, but are, however, in proportion just as destructive as the older ones. They obtain the juices of the leaves by eating through the skin with their mandibles, and then thrusting in their proboscees or suckers through which they draw out the juices. These little creatures are so transparent, that it is very difficult to make out all the details of their mouths accurately. The females are very fertile, and breed with great rapidity under favourable circumstances all the year round.

The red spiders, as I have already stated, are not real spiders; but belong to the family Acarina or mites, a family included in the same class (the Arachnidæ) as the true spiders, from which they may be easily distinguished by the want of any apparent division between the head and thorax and body; in the true spiders the head and thorax are united together and form one piece, to which the body is joined by a slender waist. The Arachnidæ are followed by the Myriapoda (centipedes, &c.), and these by the Insectæ or true insects. The red spiders belong to the kind of mites called spinning mites, to distinguish them from those which do not form a web of any kind. It is not quite certain at present whether there is only one or more species of red spider; but this is immaterial to the horticulturist, as their habits and the means for their destruction are the same. The red spider (Tetranychus telarius) is very minute, not measuring more than the sixtieth of an inch in length when full grown; their colour is very variable, some individuals being nearly white, others greenish or various shades of orange, and red. This variation in colour probably depends somewhat on their age or food—The red ones are generally supposed to be the most mature. The head is furnished with a pair of pointed mandibles between which is a pointed beak or sucker. The legs are eight in number; the two front pairs project forwards and the other two backwards; they are covered with long stiff hairs; the extremities of the feet are provided with long bent hairs, which are each terminated by a knob. The legs and feet appear to be only used in drawing out the threads and weaving the web. The thread is secreted by a nipple or spinneret situated near the apex of the body on the underside. The upper surface of the body is sparingly covered with long stiff hairs.—G. S. S.—*Rural Australian.*

MINOR INDUSTRIES FOR THE WEST INDIES.

The following letter from Mr. D. Morris, formerly Government Botanist of Jamaica to Governor Robinson of Trinidad, will be read with interest:—

Royal Gardens, Kew
21st May, 1886.

Dear Sir William Robinson,

On my arrival at Kew, Mr. Thiselton Dyer was good enough to place in my hands correspondence and papers bearing upon the prosecution of Minor Industries in Trinidad, which are of a very interesting character.

The Island is to be congratulated upon the able and energetic action you have taken in this subject: and possibly no time is so suitable as the present for drawing attention to small industries, which in the aggregate, would go far to make up the difficiency in the larger stables of Trinidad, and of the West Indies generally. I am not sure how far I can help you, but I shall be happy to give the results of my experience and knowledge in Jamaica and other places known to me: and it is quite possible that indirectly, if not directly, suggestions thrown out in this manner may be capable of being utilized as local circumstances may allow.

As regard the utilization of Trinidad-grown Corn Meal and Sweet Corn, a letter from Kew was sent a few days since to the Colonial Office, which no doubt will be duly forwarded to you. The weak point in papers received here was the absence of numerical results in Mr. McCarthy's Report. The general impression all round was good: but in these days men require a substantial and reliable basis on which to rest their conclusions, and unfortunately in this instance it was not supplied. I wrote Mr. McCarthy on the subject but, as was natural, he had not brought his books with him to England and hence could not give me the detailed analysis of the two corns. He has promised to supply them on his return to Trinidad and I would recommend, that they be published as soon as possible. If it can be shown by actual analytic results that Creole-grown corn is richer in food products than American imported corn, the superiority of the former will be established beyond question.

Tea will grow in Trinidad at elevations above Cacao and the Hybrid-Assam variety is specially suited for a warm, moist climate such as exists in Trinidad. It is essential to have a trained experienced manager from Ceylon or India, and such a man might be obtained for about £250 a year. In addition to supplying local wants, I should think a good quantity of Tea might be supplied to the Mainland at renumerative rates. A plantation of say 50 acres, might be established at the rate of £10 per acre. The first crop would be available in

3 or 4 years, and the results, even on an experimental estate, give a good return on the capital invested. If started in connection with a cocoa estate the expenses would be reduced to a minimum regards buildings and Offices.

The Ground-nut (*Arachis*) will only thrive in light sandy soils which however require to be fairly rich. In Virginia and Kentucky the "Peanut" is very important crop, and if it could be established at Trinidad, and the "nuts produced at a price to compete with the States," there is a large market open there for them. An experiment tried in a few districts at Trinidad would soon show what prospects the industry would have. Seed nuts can be had in any quantity.

Among Minor Industries to which attention might very well be directed, I would mention a few here, in the hope that my remarks may stimulate inquiry and lead to some practical result.

Limes, I know, are cultivated in Trinidad, and the export of crude lime-juice may have been already attempted. The most acceptable form however for presenting lime-juice in the market is as "Concentrated Juice." This is prepared by boiling the crude juice down to the consistency of thick molasses. The proportion of concentrated juice to the raw juice should be as 1 to 16. Just at present concentrated lime-juice is selling at very high rates, viz:—about £30 per pipe. I commend this cultivation within certain limits: and I have no doubt that there is plenty of scope for it at Trinidad. In some Islands I find that a trade is arising for the seeds of the Musk Mellow (*Abelmoschus Moschatus*) which are used for perfumery purposes. I believe the chief market for this "Vegetable Musk" is in France. The plant itself is a common weed in Tropics, and might be grown in the rows between Sugar cane, Indian corn or other field crops. The parts used are the seeds cleaned from the husk, which, when crushed have a strong flavour of musk.

It is a matter of surprise that the cultivation and preparation of Vanilla has not taken a larger hold in Trinidad than it has done. At Martinique and Guadeloupe, Vanilla, exactly similar to what is found at Trinidad, is sucessfully cultivated and the exports are considerable. This is an Industry suitable to old and somewhat feeble people and requires no laborious effort or exposure to the sun. Black pepper is another small industry capable of being carried on successfully at Trinidad and at an outlay that is purely nominal.

Annatto (*Roucou*) is just now in large demand. Thisis produced by a shrubby tree of a hardy character, not browsed upon by horses or cattle and capable of being established on rather poor savannah land. Seeds may be planted a few in each hole 12 feet apart and in three or four years the plants will begin to bear.

There are various drugs and spices which might be successfully introduced into the Island, but it is impossible to enumerate them here.

Bee-keeping with Italian or other good strains might be greatly extended in the West Indies. In Jamaica, Bees-wax appears as an important item in the Exports.

I have thus far only given general hints and offered suggestions which might be hereafter devolped.

At to the best means of promoting the growth of minor industries, there is nothing better than the system of Agricultural Boards which you have already organized to act as local centres. These Boards might very conveniently distribute seeds and cuttings of economic plants and give practical information respecting their proper treatment. To aid in this latter work it is important to prepare and distribute all over the Island leaflets or bulletins, couched in simple and clear language, giving directions to the people how to proceed with industries the details of which are new to them. The preparation of such leaflets will require at first some care and attention, but they are invaluable if rightly worked.

In the West Indies there is an unfortunate absence of publications dealing with agricultural matters and to this fact in a great measure is due much of the doubt and hesitation which exists respecting new industries. I know of no better publications on miscellaneous tropical cultures than one published monthly in Ceylon called "The Tropical Agriculturist" and for which Messrs. Trubner, 57, Ludgate Hill, London, are Agents.

The plan of offering prizes through the Agricultural Boards is an admirable one. The prizes might consist of seed, plants, agricultural tools and implements, or purely a money prize. Annual shows, trials of tools and implements, friendly contests in agricultural tasks, are all means for exciting the interest of the people in progressive ideas and in eventually bringing about an improvement in habits of thought and life as bearing upon agricultural matters.

I shall be happy to give any further information in my power and shall at all times take a deep interest in your efforts to infuse life and energy into the agricultural interests of the West India Islands.—I am, believe me, very sincerly yours,
D. Morris.

His Excellency, Sir Wm. Robinson, K. C. M. G. Governor of Trinidad.—*Trinidad Chronicle.*

BALATA INDUSTRY.

In the *Journal of the Society of Arts* for Nov. 20th, 1863, a list of subjects for premiums was published, amongst which was one "For any new substance or compound which may be employed as a substitute for India-rubber or gutta-percha in the arts and manufactures."* This was responded to in the *Journal* for February 26th, and March 4th 1864, letter being published in the latter from Sir William Holmes, from British Guiana, advising the despatch to the Society of a box containing samples of balata, both in the fluid or milky, as well as in the dried or coagulated state. In the letter referred to, Sir William Holmes speaks of the small specimen which was exhibited in tbe International Exhibition of 1862 as attracting a considerable amount of atteution, and further says, so far as he could judge, balata was not to be rivalled either by India-rubber or gutta-percha, possessing "much of the elasticity of the one, and the ductility of the other, without the intractibility of India-rubber, or the brittleness or friability of gutta-percha." Sir William Holmes further expressed a hope balata would, ere long, be included as an important item amongst the exports of the colony. Notwithstanding that this was written so far back as 1864, little or nothing has been done since towards making balata a regular article of import; occasional notice has been drawn to it from time to time, and tbe subject as frequently allowed to drop. As a poof of the truth of Sir William Holme's statement as to the ductility of balata it may be mentioned that a sample of that exhibited in the Exhibition of 1862, and presented to the Kew Museum at the close of the Exhibition, is still in a fairly ductile state, and shows no such brittleness as is the case with gutta-percha.

In connection with this subject of the development of balata, Mr. G. S. Jenman, Government Botanist, and Superintendent of the Botanical Gardens in British Guiana, has just drawn up a very exhaustive report, the result of which, it is hoped, will be to bring the substance into a regular commercial channel.

The title of the report is "Balata and the Balata Industry, Forest Laws, &c.," and it commences with a very interesting description of the bullet tree region, including its inhabitants, character of the vegetation, &c. Coming to the immediate subject of the report, Mr. Jenman describes the bullet tree, from the bark of which balata is obtained, as a large forest tree

* In a paper on "Gutta-percha in Surinam," Professor Bleckrode described balata as the product of a tree named by him *Sapota Mulleri*. *Journal*, vol. v. p. 625, Oct. 9, 1857. See also vol. viii. p. 713, and vol. xxxii, p. 14.

ranging from Jamaica and Trinidad to Venezuela and Guiana. He refers it to *Mimusops balata*, and says—"The vernacular name appears to be applied to two species or sub-species which are united by Grisebach, in his 'Flora of the British West Indies.' Young plants of *Mimusops globosa*, of Jamaica and Trinidad growing in the Gardens, seem to be distinct from the Guiana type. The tree grows to a height of 120 feet, and has a large spreading head. The trunk is nearly cylindrical. The bark is about half an inch thick, with deep paralled fissures an inch or so apart. The hard reddish-coloured wood is one of the densest in the colony, and is used for all sorts of purposes where great strength and durability is required. The tree is more plentiful in both the eastern and western parts of this colony than in the intermediate region. From the east bank of the Berbice river to the Corentyn is the region of its greatest plentifulness in the colony, but its distribution extends still eastward beyond the Corentyn into Dutch Guiana, where a grant of several hundred thousands acres has recently been required by an American firm for collecting balata. The trees are more plentiful in this region in the depths of the forest than near the rivers, hence the creeks form arteries to the balata grounds. Several of the creeks on both sides of the Canje are instances of this. The wood cutters of this district regard the tree as inexhaustible; in the interior of the forest it exists in profusion and abundance, and lies beyond the reach of the balata collectors as they at present conduct their operations. As the trees near at hand become exhausted, they will no doubt alter their habits, and make clearings as drying places in the heart of the forest; but now they are under the obligation of returning to the settlements on the creeks with the milk they have collected to dry. Under this necessity they can at most only penetrate about two days', journey, but, so far as they have explored, they report there is no diminution in the abundance of the trees. The forest at this depth, of course, has never been touched by woodcutters, as, for convenience in getting their timber out, they have to confine their operations to the banks of the river and creeks, rarely going in more than a mile or two."

Regarding the character and value of balata, Mr. Jenman says its strength is very great, and as it does not stretch under tension, for special appliances, such as bands for machinery, it is unequalled. It has recently been pronounced by an American firm of manufacturers as "the best gum in the world."

Dr. Hugo Müller, F. R. S., in a report on the substance says: "It seems that balata is by no means neglected, and in fact it would find ready purchasers if more of it came to the market; as it is, the supply is very limited, and generally it comes only once a year. It commands a higher price than gutta-percha, and this in itself is a proof of its usefulness. It is used almost in all cases in which gutta-percha is used, but on account of its higher price only for superior purposes. It seems that balata is treated by the manufacturers simply as a superior kind of gutta-percha, and, therefore, its name disappears when manufactured. Nevertheless, balata is distinctly different from gutta-percha, and this is especially manifested in some of its physical characters; for instance, it is somewhat softer at ordinary temperatures, and not so rigid in the cold.

"In one respect balata shows a very marked and important difference from gutta-percha, and that is its behaviour under the influence of the atmosphere, whilst gutta-percha, when exposed to light and air, soon becomes altered on the surface, and changed into a brittle resinous substance, into which the whole of the mass is gradually converted in the course of time. Balata, on the other hand, is but slowly acted upon under these circumstances. The electrical insulating quality of balata is said to be quite equal to that of gutta-percha."

Mr. Jenman says that the collecting of balata is an open and recognised business, is carried on only in Berbice, but he proceeds to show that the greater part of that so collected is not obtained from trees on Government grants, but surreptitiously from Crown lands; and Mr. Jenman further says that much damage is done to the Crown lands by the depredations of collectors, and "that it is desirable, in the interest of the colony, till effective rules are devised for the protection of the forest and preservation of this valuable wood, that the trade should be discontinued."

The life of the balata collectors is a very hard one. The ground they have to traverse is generally very wet and swampy. In many cases the traveller sinks at every step up to his knees, and this continues for miles, and water often has to be waded through up to the armpits. When the collecting ground is not too far distant, women sometimes accompany the men, and cook or assist in laying out the calabashes, and collecting the milk while the men fell and ring the trees. The collectors connected with a grant sell the milk they collect to the agent on the grant, and never dry it themselves. The price for pure milk is four shillings per gallon, or occasionally a dollar, and for clean well dried balata one shilling per pound. Considering the circumstances of the people who follow it, balata collecting, if pursued with Industry, is a paying business. The calling pays better, while the season lasts, than the best mechanical trade; with fair weather, a man can earn from one to five dollars a day at it, and an exceptionally expert collector has been known to make twenty dollars in three days.

The instruments used in collecting the milk are an axe for felling the trees,, a cutlass for making the channels in the bark to cause the milk to flow, and two or three gourds in which to collect the milk. The collector commences operations by chipping a piece of the bark from the selected tree, and if the milk runs well he quickly shaves the moss and rough bark from the side he intends to tap, then stooping down with his back to the front of the tree, but on one side of it, he cuts from the base of the tree obliquely upwards towards himself, in the bark, a narrow channel, then moving round the other side, a similar one. These grooves are generally about eighteen inches long; they form an acute angle at the base, just below which a niche is cut in the bark and is slightly lifted with the end of the cutlass, and a calabash inserted by the rim under it. Occasionally a piece of palm or maranta leaf is inserted under the bark, and the calabash is placed on the ground, the leaf conducting the milk into it. The channels are then quickly cut upwards parallel to each other on the opposite sides, about ten inches apart, the operator continuing them as far as he can reach, which is about eight feet from the ground. The milk trickles from cut to cut down this zig-zag line into the calabash beneath. The best collectors cut the bark with much neatness and precision, and do not injure the trees; but little care is usually taken, and the wood is injured with every stroke of the cutlass, the result being that numerous trees are killed, and left standing. Large trees are always tapped on the opposite sides, careful collectors leaving the intervening spaces or subsequent years. It takes from five to ten minutes to cut the channels in each tree, and the milk runs from forty to sixty minutes; at first it forms a little rivulet, but after about twenty or thirty minutes, it only drips. After a little use, the gourds become so coated on the inside with dry balata, that they have to be occasionally soaked in water, when it peels off freely, leaving them perfectly clean again. The yield of a tree varies according to circumstances. If favourable, a tree 15 inches to 20 inches in diameter, bled 8 feet high, will yield 3 pints of milk. Trees are often felled, and then tapped by ringing the bark in parallel transverse lines, at intervals about a foot apart.

To dry the milk, it is poured into shallow wooden trays, the insides of which are previously rubbed over with oil, soap or grease, to prevent the balata sticking, and the substance is exposed to as much air as possible, and sometimes to the sun. In fine weather it takes two or three days to dry, and in wet weather a week or more; when it is sufficiently dry to be removed from the boxes, the sheet is thrown over a line or bar to drip and become hard.

A good deal of foreign matter is found in the milk, and Mr. Jenman says adulteration is systematically carried on, and the agents have at all times to be on their guard against it.

The report concludes with a consideration of the damage done to the forests, and some remarks on their better conservation.—*Journal of the Society of Arts.*—[We have carefully read the Report of which the above is a summary and the conclusions we have arrived at are that Balata gum is not equal to India-rubber, and that the prices received for it do not justify the destruction of the noble forest trees which are felled simply for the sake of the bark juice. Ed.]

The "Whistling" Tree.—In Nubia there are groves of acacia extending over 100 miles square. The most conspicuous species, says Dr. Schweinfurth, is the *Acacia fistula*. Its Arabic name is "soffar," meaning flute or pipe. From the larvæ of insects which have worked their way to the inside, their ivory white shoots are often distorted in form and swollen out at their base into a globular bladder-like gall, about one inch in diameter. After the insect has emerged from a circular hole, this thorn-like shoot becomes a sort of musical instrument, upon which the wind as it plays produces the regular sound of a flute. On this account the natives of the Soudan name it the "whistling tree."—*Indian Gardener*

Green Manuring.—Vegetable substances in their green and succulent state are powerful fertilisers when thoroughly incorporated with the soil. A great portion of the bulk of green crops is obtained from atmospheric sources; and after a green crop is ploughed in, the soil necessarily contains more of the organic elements essential to vegetable nutrition than it did before that crop was grown; it is richer, in fact, by the carbon, oxygen, hydrogen and nitrogen, which the green crop has obtained from sources independent of the soil. In like manner, the crop grown after a green crop has been ploughed in has the advantage of a regular supply of mineral elements, which have been worked up by the roots of the fertilising crop from the soil and subsoil, and which in many instances, owing to their sparing solubility, are with difficulty obtained under ordinary circumstances. —*Morton's Cyclopædia.*

Mica Mine in Groton, N. H.—The ledge is really a large hill of solid rock, composed in the regular order, after the covering of schist is removed—quartz mica, feldspar, again through the hill to an uncertain depth. The work of blasting has been carried forward there until an open drift has been cut 300 feet long, at least forty feet wide, and not much less than fifty feet deep. Branching off from this cut is a tunnel now about seventy feet long and twenty feet high, drilled horizontally into the ledge. Small iron tramways lead to the dump, and little cars, pushed by hand, carry the refuse rock out of the way. The mica crystals of all sizes, from an inch across to more than two feet in their larger axis, protrude from sides and from above and below, with their planes at every conceivable inclination, waiting for some well placed charge of giant powder to free them from the mass of worthless rock in which they are imbedded. These crystals vary from the size of one's hand to blocks two feet in length and from six inches to a foot in thickness, and are rapidly split into sheets by a group of men seated on low stools. The thin sheets are carried from this group to a long line of men standing at benches, who cut them to the largest possible patterns with tinman's shears. The market value of mica depends on the size of the sheets.—*Rocky Mountain Mining Review.*

Bones.—It is well known that bone dust is a first class fertiliser where sufficient farmyard dung is not available. But it is sometimes advisable to supplement it with some other materials containing important elements, such as potash, in which it is deficient. It is a great pity that the German potash salts are not to be procured here. The discovery some years since of large deposits of potash salts in Germany has led to an enormous demand in Europe and America for agricultural purposes. Good muriate of potash, which is one of the salts above alluded to, contains about 50 per cent of pure potash, and is most valuable to use in combination with bone dust. Then to add to the stimulating quantities of the fertiliser, some salt containing ammonia or nitric acid should be added. Soot, containing a large percentage of sulphate of ammonia, is excellent, if only to be obtained in sufficient quantity. Nitrate of soda, another agricultural salt largely used in Europe and America, will also supply nitric acid. It is very soluble and is most valuable in dry seasons, as a very little rain will wash it down to the roots. Supposing we have these at hand, we might apply to an acre of land, five cwt. bone dust, two cwt. muriate of potash and one and a half cwt. of nitrate of soda. This would be a first-rate fertiliser for ordinary farm land.—*Rural Australian.*

Boxes for Young Plants.—These are of different sizes—from 15 inches to 20 inches wide, 16 inches to 30 inches long, and 2½ inches to 3½ inches or 4 inches deep. I buy empty soap and other boxes at grocery stores at the price grocers are allowed by the manufacturers for returned empties. I cut these boxes lengthwise into three parts, and in this way get two complete plant boxes (one from the top and one from the bottom), and all except the bottom of a third one. The bottoms of these third boxes are supplied from factory strips, or a few boxes laid aside for furnishing bottoms only. Of course, the boxes got from the top and bottom cuts are close-bottomed, and that will not do for plants, but that is soon altered. When young plants are raised in pots, their roots become root-bound, or twisted into a tight mass; if at planting time we undo these balls of roots, it will for a short time materially check growth, and if we set out the plants without unfastening their roots, the roots never become uncoiled, and although the plants may wilt less at the time of setting out, they do not afterwards grow as thrifty as those do whose roots are not coiled into a mass; and they also are more susceptible to injury by drought. For all one-season plants, such as Geraniums Coleuses, we should avoid pots. Plants in boxes need less care in watering than do those in pots, and in moving boxes from one place to another, we move 100 plants with as much ease and as quickly as we would six or seven in pots.—*Ibid.*

The Value of Salt.—Severe pains in the bowels and stomach are often speedily relieved by the application of a bag of hot salt. A weak solution of salt and water is recomended by good physicians as a remedy for imperfect digestion, and for a cold in the head it is a complete cure snuffed up from the hollow of the hand. We have known severe chronic cases of catarrh entirely cured by persistent use of this simple remedy every night and morning for several months, when the best efforts of the best physicians failed to do any good. It should be used milk warm. A good handful of rock salt added to the bath is the next best thing after an "ocean dip," and a gargle of a weak solution is a good and ever-ready remedy for a sore throat. As a dentifrice, salt and water is very cleansing and also hardens the gums. It will also prevent the hair from falling out. When broiling steak throw a little salt on the coals, and the blaze from the dripping fat will not annoy. A little in starch, boiled or raw, will prevent the irons from sticking. If the irons are rough, put a little salt on thick brown paper, lay a piece of thin brown muslin over it, and rub the iron over it till perfectly smooth. Ink stains are entirely removed by immediate application of dry salt before the ink has dried. When the salt becomes discoloured by absorbing the ink, brush it off and apply more; wet slightly. Continue this still the ink is all removed If new calicoes are allowed to lie in strong salt water for an hour before the first washing, the colours are less likely to fade. Damp salt will remove the discolouration of cups and saucers caused by tea and careless washing. A teaspoonful of salt in each kerosene lamp makes the oil give a much clearer, better light.—Katherine Armstrong in *Farmers' Review.*

SELECTION OF LAND FOR TEA GROWING IN JAPAN.

Mr. T. Futatszzi, a member of the Committee of the Central Tea Industry Association, Japan, having inspected the cultivation of tea in China, some of the estates in Ceylon and Darjiling in India, has, with a companion, spent a few days in Ceylon on his homeward journey. Gathering the materials for an exhaustive report upon what he has seen, this gentleman expressed himself much gratified with the attention paid him in his journey in British territory and the readiness with which all information was afforded him in response to his inquiries. He was good enough to supply a paper on the soils of Japan, entitled "The Mode of Selecting Land for Growing Tea in Japan :'

1. The red lime soil, partly black and mixed with a little sand, is quick to grow tea, is free from the invasion of insects, and the tea grown on it has an excellent flavour and taste.

2. The same kind of soil as above, only not mixed with sand, is almost equal in capacity for tea-growing to the first, but is more liable to devastation from insects; besides the tea grown on it is not pungent.

3. Light black soil, partly red, is very quick to grow tea. It wants, however, to be fully manured or the tea bushes are apt to die away. The tea leaf contains very little of tenacity and is hard to twist, and consequently produces a large quantity of fannings. Gardens on such soil pay the owners well for first nine or ten years, but not beyond that limit. The tea made from it is not good (superior ?)

4. The red lime soil is slow to grow tea for the first nine or ten years. It is liable to invasion of insects, and heavy oily manuring must not be done for the first six or seven years. It is recommended to bury in only green grass and leaf, until a change is effected in the soil. Although the crop of tea for the first nine or ten years is not so large as from other gardens, it eventually produces the largest quantity, and the tea will be found to be the best in quality.

5. White yellowish lime soil mixed with sand requires manuring to the utmost. Tea is slow to grow in it, but in other points equal to that of other gardens.

6. Pure black soil is not preferred in Japan, as the cold and frost in winter and early spring kills the bushes.

These statements are generally admitted in Japan to be the actual condition of tea gardens, but first of all it is very important to have a deep soil—say eight to ten feet as the main root of the tea plants grows straight downward. Therefore we choose the poor deep soil rather than that which is shallow and rich, if there is hard lime soil or rocky sand below 3 feet of its surface.

The crop of tea made per acre in Japan is as follows :—500 to 735 lb. per annum in the districts of Kioto, Kanagawa, and five others; 417 to 490 lb. per annum in Osaha, Hiogo, and nine other districts; 139 to 390 lb. per annum in Tokio, Nagasaki and seventeen other districts. The average yield of all these districts is 438 lb. per acre, and the average size of the tea gardens belonging to each proprietor is only about three and three quarter acres. It must be mentioned that most of the tea growers do not depend solely upon tea for their livelihood, but mainly depend upon rice growing and other agricultural employments.

There are one or two interesting items in the above report, principally as showing the conditions under which tea cultivation is carried on in Japan. There are but few of us in Ceylon who can afford to look forward for nine or ten years as a preliminary period in which cultivation and growth must be subservient to profit, though doubtless from a purely agricultural point of view it ought to be so. In some of the districts mentioned the rate of produce per acre is considerably more than we have hitherto seen stated, and it must not be lost sight of that to arrive at actual correctness with figures from so large a number of very small gardens, must be an extremely difficult task, and it does not appear from what source these returns have been compiled. In all probability the smaller and more carefully cultivated gardens produce a much larger quantity of leaf than the larger estates. There are one or two questions to which Mr. Futatszgi would like to have the answers if any of our readers will be good enough to supply them :—

(1) What is the largest break of Ceylon tea sold locally ?

(2) What is the largest break of Ceylon tea shipped from the island ?

(3) What is the cost of opening tea land up to the 2nd year. 1st Forest-land ; 2nd land turned from a coffee into a tea estate (details are not wanted except as to cost of tea plants.)

(4) What is the cost of transport of tea from Darjiling to Calcutta ?

As regards the third question we may at once say that while R110 to R130 is not too high to bring forest land into cultivation, with planting and two years' expenditure; in the case of coffee estates transformed into tea, the expense would probably not exceed R70 to R80. The "Tea Planter's Manual," to be ready in a few days, will however supply the needful information on this point and many others.

The Amsterdam Quinine Works.—The *Pharmaceutish Weekblad voor Nederland* states that the Amsterdam Quinine Works may soon be compelled to stop working; but that efforts are being diligently made by the directors and a few gentlemen interested in the cinchona trade to avert the threatened disaster. If the works are closed it is feared that the Java bark would be consigned to Germany instead of to Holland, and the latter country would thereby lose an important and growing branch of commerce.—*Chemist and Druggist*, Aug. 14th.

The Production of Heat in Flowers has often been observed and measured, and the general chemical explanation given of the phenomenon is no doubt true in the main. It depends upon oxidation or the union of oxygen gas with the tissues of plants or their contents, and to the "combustion" or destruction that goes on in consequence, accompanied by the emission of carbonic acid gas. [This statement, from the Gardener's *Chronical*, seems to have a direct bearing on the discussion respecting the so-called "fermentation" of tea.—Ed.]

The Crisis approaching in Brazil.—The *Pall Mall* has the following remarks in the course of a review of Mr. H. C. Dent's "A year in Brazil":—With regard to slavery, the slaves are gradually being emancipated, and slavery will soon have ceased to exist, besides which, the lot of a slave in Brazil would appear to be very bearable one, and cases of cruelty seem to occur but very rarely. Slaves are worth up to £200 sterling. The financial position of the country is a chronic state of borrowing more than it can pay, and of thereby getting more and more hopelessly into the mire of bankruptcy. Stockholders should beware in time.

THE LONDON "TIMES" ON THE "CEYLON COURT."

There is nothing very striking in the following Report, but it is of importance simply because it is the view presented of Ceylon to the reading world by the leading English journal:—

THE COLONIAL AND INDIAN EXHIBITION: CEYLON.

The very varied and highly attractive exhibits of this most charming of islands are appropriately placed at the end of one of the Indian Courts. The whole arrangements and decoration of this court reflect high credit upon the Commissioner, Sir Arthur Birch, and his able assistant, Mr. Davidson. On entering the court through the richly-carved Kandyan porch, we do not think that it suffers in the least from comparison with the splendour of India. The visitor sees at once a likeness and a dissimilarity, and experiences a sense of relief at the compactness and methodical arrangement of the court, after the confusing superabundance which he has just quitted. In the colouring and design of the walls and the roof the main object has evidently been to adhere as closely as possible to the arts of Buddhism, of which the traditions and sites have been maintained in the highest purity among the mountains of Ceylon. The most notable colour, therefore, in the decorations is that shade of yellow which is the sacred colour of Buddhism, and this yellow is blended in the other shade constantly depicted in the Kandy temples. The attractive and handsome entrance gateway has been erected with the same object of reproducing the traditional features of the country's art. It is a Kandyan porch flanked on each side by a loop-holed wall, the whole copied from portions of the King's Judgment Hall of the Buddhist Temple in Kandy. The carving was executed in Kandy by Sinhalese workmen. On passing through the entrance the eye is attracted by the decorations on either side, especially the frieze, which is the production of Kandyan artists, and which describes the Perahera, or grand annual procession, and other phases of Buddhist worship; and those on the west wall facing the entrance and terminating the portion of the building assigned to Ceylon. High up on the wall is seen a coloured bronzed figure of the Gautama Buddha, modelled in high relief, seated in the attitude of contemplation. Below the Buddha the passage westward is made through a gateway, elaborately carved in ebony, coconut wood, and coromandel, faithfully copied by Sinhalese workmen from a stone gateway found at Gapaboo, an ancient capital of Ceylon. On either side, at the base of the west wall, is arranged a very fine collection of all the woods of Ceylon, numbering over 250. Some of the finer woods are further exhibited in slabs of timber affixed to the wall. These include the special cabinet woods—satinwood, coromandel (or colomander) tamarind, ebony coconut wood, and a number of others whose names are not familiar to English ears.

The cases near the entrance porch are devoted to a display of the arts and wealth of Ceylon—tortoise-shell work (in which Ceylon stands pre-eminent), lace, ebony carving, and ivory in all stages from the tusk to the most minute carvings. The jewels include a very choice collection of Ceylon gems—the cat's-eye, ruby, sapphire, and many others of minor value, and some good strings of pearls. Native jewellery has been largely lent for exhibition, and can vie successfully with that of the Indian Empire in quality, though not in quantity. The same remark applies to the exquisitely beautiful silver work, the Kandyan goldsmiths specially excelling in their *repousse* work. The Kandyan pottery exhibited deserves attention from its unique colouring and its astonishing cheapness, which, we believe, disposed of the whole collection a few days after the opening of the Exhibition.

The second half of the court is devoted to the exhibition of the native and European industries. Among the former the collection of pearl-oyster shells and the models illustrating the method of fishing for them are instructive; while the native agricultural interests in cinnamon, the products of the coconut and palmyra palm, are adequately represented. Plumbago, the only mineral in Ceylon which it has yet been found profitable to work, is shown as befits an industry in which Ceylon takes the lead in the world's markets. The European enterprise which has made Ceylon wealthy and prosperous in the past is more fully represented than at any previous Exhibition. Prominent among all are samples of tea of all qualities and from gardens at all elevations from sea level to an altitude of 6,500 feet. Arrangements have been made and are daily carried out with Messrs. H. S. King and Co. for the sale of this tea both in the cup and by retail in the gardens, in order to give the public an opportunity of judging of the quality and price of this now, and that only within ten years, the foremost industry in Ceylon. The Ceylon tea-house between the court and Old London has become one of the favourite resorts of the Exhibition for wearied afternoon visitors and dangling couples, who enjoy their tea all the more that it is served by white-robed Sinhalese, with their jet-black heads coronetted in a crosscomb. Ceylon coffee (a fading industry), cinchona, and cacao, are also well shown, as well as paddy and rice in various forms, grain of other kinds, cardamoms, indiarubber, and many other products from this exuberant island. The scenery of the island is well illustrated by numerous pictures by Miss North and Mr. Gordon Cumming, and a good collection of photographs by Mr. Skeen, of Colombo. A view of Kandy in the principal entrance hall of the Exhibition is worthy of notice. It is from the brush of an amateur, but from an art point of view will compare favourably with the views representing the other leading colonies. The Ceylon Court, like the Indian and Canadian Courts, has its sporting trophies, foremost among which is the huge stuffed elephant, surrounded by other trophies of elephant shooting. Some well arranged cases of leopards, deer, &c., are shown, and enough is to be seen to remind sportsmen that there is no country as accessible as Ceylon in which big game can be found with equal ease. The elephant taming scene near the gateway is particularly instructive and interesting.

Such is a running summary of the leading features in a court in which every exhibit has some special interest attaching to it, and in which there is no padding, if we may be allowed the expression in this connexion. Some of these exhibits, however, deserve a little further notice. First of all comes tea, now the leading industry of an island which only 10 years ago could export no more than 1,400 lb. In 1885 the quantity exported amounted to 4,350,000 lb. Along the side of the court are three long cases of satinwood, containing samples of teas as prepared in Ceylon from 30 different estates and sorted in the various grades of broken Pekoe, Pekoe, and Souchong. Besides these there are also samples from about 150 estates shown in the exhibits of Messrs. H. S. King and Co. (Tea Trophy) in the North Court. In the catalogue attached to the entries of most of the samples the rainfall in the estate is given; it is always high, ranging from 100 to 200 inches. Tradition says that tea was introduced into Ceylon by the Dutch during their occupation of the island, but we only know for certain that the first plants were brought from China somewhere in the forties. It was not, however, till 1865 that the low price of coffee drew the serious attention of planters to the possibility of successful tea cultivation. Seeds were brought from Assam, where the indigenous tea plant had apparently not been recognized until after it had hybridized with the introduced Chinese variety. It is this hybrid variety which is now most generally used in Ceylon and is known as the Assam hybrid. Still, it was not until the devastation of the coffee estates by the ravages of the *hemeleia vastatrix* that tea planting was undertaken on a large scale. The scepticism incidental to an agricultural novelty caused much wavering, until it became an indisputable fact that the moist climate of a great part of the island, its abundant labour supply recruited from Southern India, and its exceptional transport facilities by road, rail, and river, were specially favourable to tea cultivation, that Ceylon teas could be placed in the market

at a less cost and command a higher average than those of India. As the plant is now being cultivated with successful financial results from the sea-board to an altitude of 6,000 ft. it is impossible to say where the limit of production may lie. It is estimated that in the present year 140,000 acres are under tea, and this area is rapidly increasing, for coffee planters are making all haste to turn their estates into tea plantations. There seems, however, to be some danger in all this haste. We believe that the plant may be shorn of its leaves in Ceylon much more frequently in the year than in China; but is there not some danger of exhaustion in this rush, and that in the course of a few years both the plants and the soil may be exhausted. However, with so competent an adviser at hand as the Government botanist, Dr. Trimen, dangers of this kind need not be blindly incurred. Ceylon teas may be had in retail at all prices from 11d up to 20s per lb. The average price of the tea sold in Mincing-lane in 1885 was 1s 3¾d per lb. But the comparatively high duty on tea and the extortionate profits of retail dealers increase the wholesale price in bond largely before the tea reaches the consumer. However, we believe that an excellent Ceylon tea may be had for 2s per lb., and what the Ceylon tea-grower should do is to take some means of securing agents in this country who will be trusted to give Ceylon tea when asked for. The following figures as to area and export may be interesting:—

—		Area under Cultivation.	Export.
1875	...	2,700 acres	1,438 lb.
1880	...	9,000 ,,	162,575 ,,
1885	...	100,000 ,,	4,353,000 ,,
1886	...	140,000 ,, (probable)	8,300,000 ,,

For 1887 it is estimated that 14,000,000 lb. will be exported, and for 1888, 25,000,000 lb. Still Ceylon has a long way to go before it can compete with either India or China. The value of the tea exported from Ceylon in 1885 was about £250,000; that of China was about seven millions sterling, and of India over four millions.

Though coffee is in danger of being put into the shade by tea, still the many fine samples shown in the Exhibition prove that it still remains one of the most important, if not the most important, cultures in the island. How it has declined may be seen from the fact that in 1877 the quantity exported was 971,000 cwt., while in 1885 it was only 310,922 cwt., and the estimate for the current season is not more than 200,000 cwt. Still, the value of the export in 1884 was £1,106,000, by far the highest export item, though the lowest value for coffee since 1853. It would surely be a pity to let it lapse entirely; there must be some means of preventing the plant from utterly deteriorating. Next to coffee, hitherto the most important export has been cocoa-nut oil, of which, as well as of copra, a good many excellent samples are shown. The export of oil has risen from 134,000 cwt. in 1876 to 423,830 cwt. in 1884, though it fell to 274,990 cwt. in 1885. The value of the oil export in 1884 was £448,000. Another oil, an essential oil, which has rapidly increased as an export, is that known as citronella, used by soapmakers and perfumers. The quantity exported has risen from 1,760,000 oz. in 1881 to 5,721,000 oz. in 1885. Next to products of the cocoa tree cinchona is the most important economical exhibit in the Ceylon Court, and, indeed, it bulks more largely, as the product is shown in all states, from the broken bark to the tree. It was only in 1872 that planters seriously turned their attention to it, but the progress was so rapid that in 1884 the value of the export was over £389,000. The quantity exported increased from 18,730 lb. in 1873 to 11,678,360 lb. in 1885, the result being to greatly reduce the price of this invaluable bark in the market. Still, there have been disappointments in its culture, arising from extravagant expectations. One familiar method of collecting the bark is to strip it from the tree in alternate layers, a new covering rapidly taking the place of that stripped off. Whether this method is deleterious to the tree, as one would expect, results have not yet proved. Specimens of the tree so stripped are shown in the court. As will be seen from the many samples exhibited, Ceylon has many other drugs and spices to show; the production of these by natives could be increased to any extent required, and certainly should be encouraged. Dr. Trimen exhibits a collection of over 360 native vegetable drugs from the Central Province. The tobacco exhibits remind us that a considerable quantity is sent across to India to be made into cigars; while the native cheroots of Jaffna can be had at from 4s to 20s per thousand, cheap enough smoking surely for those who care for it in this form. Cane-sugar, though shown, is of little importance, though the Jagghery, or sugar of the Palmyra palm, is in some demand as an export, and is capable of development. We have, of course, specimens of the famous arrack of Ceylon, and, besides these, a pot arrack still, Government derives a large revenue from the licences to arrack shops—£153,500 in 1885. A good many specimens of cacao will be found in the court, and of this £32,000 worth was exported in 1884. The export has grown from 122 cwt. in 1880 to 9,863 cwt. in 1884, though it fell to 6,758 cwt. in 1885, mainly, we believe, owing to the attacks of an insect pest, combined with prolonged drought. Paddy and rice, the staple food of the people, have, of course, their place in the Exhibition, but although over 5,000,000 bushels of rice are produced annually, as much more has to be imported. Cinnamon, of which some bales are shown, has not now the importance as an export it once had, the price having fallen tremendously; still 1,574,022 lb. in bales and 629,000 lb. in chips were exported in 1885. It would be useless to go over all the other food products, spices, and drugs, which have been sent from this productive island. Over £81,000 worth of cinnamon was sent to England alone in 1884.

Although nearly four-fifths of the area of Ceylon is still a forest country, still timber has not that importance as a commercial product which it might have under an intelligent and energetic forest department. In the Exhibition, heavy timbers are particularly prominent, and some of the woods are marvellously beautiful. A Forest Act has recently been passed. It is only in the extensive and thinly-inhabited dry plains of the northern parts of Ceylon that any extensive forests remain, and even here in most places the good trees have been cut out. But all that is needed is demarcation of the best portions and rigid protection and proper conservancy of them for a few years to render them a permanent source of valuable timber.

The exhibits of wood in the Ceylon Court consist, first, of an extensive series of hand specimens—*i. e.*, blocks about 15 in. high, illustrating no less than 255 species of Ceylon trees. These have been prepared with the bark left on, and exhibit, besides transverse sections, vertical, tangential, and oblique ones, thus fully showing the character of the wood. The native and botanical names are painted clearly on each specimen, and much pains have been taken in the accurate determination of the latter by Dr. H. Trimen, the director of the Botanic Gardens, Peradeniya, who prepared and exhibits the collection; secondly, a series of handsome planks of the best or most ornamental timbers arranged to form a panelled wall or dado. The woods employed here are satinwood, ebony, jack, nedun, tamarind, sapu, wa, suriya, suriya-mara, pumburu, and calamander; thirdly, a series of discs, including, besides some of the above, also kumbuk, del, palu, goda-kirilla, &c., many of large size; fourthly, miscellaneous specimens, including several palms, as the coconut, kitul palm, areca palm, and four entire palmyra palms from the north of the island surmounted with carved capitals of the same wood.

Out of the great number of woods many of excellent character, growing in Ceylon, only a very few sorts are exported—ebony, satinwood, halmilla or Trincomalee wood, and wewerane or ranai. Teak is not native to the island, but grows well in the southern parts and ought to be extensively planted. India is the principal market, but ebony goes to England and also largely to China. This is a very hard wood, but the Sinhalese carpenters turns out highly-carved furniture, of which fine examples are shown in the Court. Satinwood is a heavy, strong and beautiful timber, well-known and generally admired, especially

the "flowered" variety. From its durability it has been lately a good deal used for railway sleepers in the East. The handsome table cases containing the planters' exhibits of tea, coffee, &c., were made at Colombo of this wood. Trincomalee wood is of a light reddish-brown colour, and remarkable for its combined strength and lightness. It is a wood which should be more widely known. Of the timbers and cabinet woods used in Ceylon itself one of the most interesting and curious is calamander, a word corrupted from the Sinhalese name Kalumediriya. This is obtained from a slow-growing, rather small tree of the wet low-country, which has become extremely scarce, and, unfortunately, is entirely confined to Ceylon. Being very peculiar in appearance it is much sought after by wealthy natives for furniture, and some very handsome and highly-carved cabinets are exhibited. The ordinary furniture woods of Ceylon are jak and nedun. The former is a very common tree, though not originally native; its wood; when first cut, of a crude yellow colour, seasons into a fine chestnut, and is scarcely to be distinguished from mahogany when old. It is, of course, a well-known tree also in India. Nedun (*Pericopsis Mooniana*), on the other hand occurs only in Ceylon. It is an attractive wood, easily worked, and has a good deal the appearance of walnut. If it could be obtained in sufficient quantity it might become a favourite wood for furniture in Europe. Another very ornamental wood is Wa, dark brown with small black lines, but it is small and rather coarse in texture, and is actually chiefly used in Ceylon for fuel on the railways. Na and palu are both called ironwood, but have no relationship to one another. Both are extremely hard, heavy, and durable, and much used for piles of bridges, the latter also for railway sleepers. The light cedar-like wood called hulankik is much used for furniture and carving, being close-grained easily worked, and durable, presenting much similarity to teak. There are many other Ceylon woods deserving of notice as furniture or cabinet woods, such as the suriya (used in carriage building at Colombo), the mendora, the lunu-midella (of which the outriggers of native boats are always made), the tamruana, and the lujan, some of which it might be worth while to export on trial.

The importance of Plumbago, of which such fine specimens are shown, may be seen from the fact that in 1884, £46,000 worth was sent to England, which was only half what was sent in 1882. The Ceylon like most of the other Courts, has its show of fibres, and here they are of substantial importance. The leading feature is no doubt coir, the product of the coconut palm, and was exported to the extent of 84,000 cwt. of yarn in 1885 and 12,700 cwt. of fibre. To England alone the export of cordage and twine in 1884 was valued at £177,500.

The Gems of Ceylon would require an article to themselves, but here we can only draw attention to the many beautiful exhibits of sapphires, rubies, cat's-eyes, moonstones, amethysts and other beautiful gems, both mounted and unmounted. One very rare Alexandrite cat's-eye is specially worthy of notice. With them may be classed the native gold and silver work, the fine *repoussé* objects, and the exquisitely beautiful gold and silver filigree work. The brass work also deserves attention, and especially the many beautifully-carved objects in ivory, ebony and other woods, and cocoanut shells. The tortoise shell exhibits are also many of them exceedingly beautiful, and the pottery is a study in itself. The finely-chased swords and knives and the other weapons in cases and on the walls attract much attention, while the models of natives, though few, are instructive. Specially interesting, in our estimation, is the very valuable collection of objects from the Maldive Islands, in case M. lent by Mr. C. W. Rosset. The portraits of these islanders show them to be a dignified and self-possessed people, while their weapons, silver and gold jewelry, cloths, and other manufactures show them to be well advanced in art and civilization. Not the least interesting exhibit in this case is a primitive telephone, consisting of a string between two drums, and which is perfectly good for short distances

Every traveller agrees that few islands of the world are richer or more beautiful than Ceylon. Haeckel's descriptions are scarcely less glowing than those of Tennent. The very fine map of the island on the wall of the Exhibition shows that the rainfall is below 50 in. over but a small area. It varies in other regions from 75 in. to 200 in., though about 100 in. may be taken as the average. Its insular character renders Ceylon remarkably healthy for a tropical country, and the richness of its soil is shown in the great variety and luxuriance of its products. Notwithstanding its long occupation by Europeans, Portuguese, Dutch, and English there is much yet to be done before the island is developed as it might be. The population in 50 years has increased from 1,000,000 to 2,760,000. Its revenue and expenditure in the same period have trebled, rising from £400,000 to about £1,200,000 respectively. During the same 50 years the trade (exports and imports) has been multiplied eight times, rising from £1,000,000 sterling in 1836 to £8,000,000 sterling in 1885. This surely is significant enough of progress under British rule. Should the Government continue a judicious expenditure on public works and useful institutions, and planters and natives work together to develop all the possible resources of the colony, "this beautiful island, from its geographical position, its excellent harbour accommodation, and healthy climate, is destined to justify its Brahmin title of 'the Pearl in the brow of India,' or Lanka, 'the Resplendent."

COFEEE; HOW IT IS SOLD IN ENGLAND.

Writing to the London *Times* Mr. Shirley Hibberd says:—

Coffee deserves the importance it has acquired as a subject of publice discussion, and the more so because it is but little understood. At good tables poor coffee is too often seen, and it may be said that on the world's table (in these parts) it is never seen at all, but in its place appear various nauseous and injurious imitations. Valuing coffee as a great aid in hard work, I made a resolve to have the real thing on my table daily or "perish in the attempt." Thereupon, I entered upon a series of experiments that were at least amusing if not particularly profitable. I bought every kind of coffee I could see or hear of, and tried every possible (and some impossible) way of making it, having the assistance therein of a diligent and clever cook. One striking result was the discovery that all ready-ground coffees sold in canisters, packets, and other "convenient" parcels are bad; some very bad, a few infamously bad. After trying innumerable samples without noting one that was worth trying again, I concluded that canister coffee is an unmitigated cheat—consisting usually of a mere shadow of the real thing, with a great bulk of chicory and more or less of what is termed "colour," this being simply burnt sugar to give factitious strength. What may be termed "chandler's coffee" is so bad that I strongly recommend a trial of it to respectable people who love good living, for they ought to know, by a taste of real agony how the poor are robbed and poisoned, and have as it appears, no protection from law, gospel, or the customs of society. It is not good policy to purchase coffee ready ground, but if it must be done the supplies should be small and frequent. Any one may test the purity of ground coffee by shaking a little over a tumbler of clear, bright cold water, and leaving it for an hour or so. Pure coffee communicates its colour to cold water slowly and when the colour has been imparted the infusion is still bright and clear, and the colour is never deep. But chicory and other adulterants quickly produce an opaque and dark infusion. The difference is so striking that for ordinary purposes

a better test is not required. To place good coffee on the table daily is a simple and inexpensive business, but it cannot be done at a penny a cup, as some folks are in haste to aver. At for 12d to 20d. per pound a good coffee in berry is always obtainable, and 16d. may at the present time be considered a fair family price. It is best to roast and grind as wanted, but the grinding is the one important point because ground coffee quickly parts with its aroma, and there is a great charm in having it made immediately from the mill. In some houses the trouble of grinding is thought much of, but as a matter of fact, it is almost nothing and a mill costing only a few shillings will last a lifetime. Coffee should never be boiled; it should be made with soft water at boiling heat but if hard water must be used it should not be made to boil until wanted, for boiling augments its hardness. A common tall coffee-pot will make as good coffee as any patented invention, but a *cafetiere* is a convenient thing as it produces bright coffee in a few minutes, and thus enables us to secure a maximum of the aroma and dispense with the use of any rubbish called "finings." Every one to his taste, we will say, but as careless people make the coffee too strong one day and too weak the next, the ground coffee and the boiling water should be both measured, and it will always take as much as four cups of water to make three cups of coffee. For the breakfast-table the addition of about one-eighth of chicory is an improvement, but for the dinner-table coffee should be made without chicory, because it dulls the piquant flavour of the genuine article. Two points in coffee-making deter people from using it—the trouble of grinding and the boiling of the milk. The grinding however, must be done, and it is really nothing, but the boiling of the milk may be advantageously evaded by using Swiss milk, which harmonises perfectly, and by many well-trained palates is preferred to fresh milk heated.

PLANTING IN NETHERLANDS INDIA.

BUITENZORG GARDENS—JAVANESE COOLIES—SUGAR—CINCHONA.

(Translated for the *Straits Times*.)

The yearly report on the Government Botanical Gardens at Buitenzorg for 1885 has just been published. The particulars given of the improvements made and work done last year in keeping up and increasing their usefulness show satisfactory progress, especially in the determination of the Netherlands India Sapotaceae or family of plants yielding gutta-percha. Dr. W. Burck, assistant Manager of the Gardens, commissioned by Government to investigate the subject, has determined the existence of 94 different varieties of which no less than 24 were represented in the gardens. Dr. Burck has drawn up and brought out a monograph on Gutta Percha plants describing no less than 55 new species of which 11 were discovered by himself. Another family of plants forming a subject of investigation in the Gardens, was that producing Minyak Tinkawang or vegetable tallow. From many quarters, as well from Holland and the Netherlands Indian possessions as from Britain and the British Colonies, inquiries were made into the Botanical characteristics of the so called Minyak Tinkawang, a tallow exported from Borneo, and in great demand throughout Europe and America for industrial purposes. Research soon disclosed the fact that the tallow in question was obtained from a great many different kinds of trees belonging to the Dipterocarpeæ and Sapotaceae families of which but little was known botanically. Owing to the cultivation of these plants being of great importance from the demand for the tallow the yield, it was decided upon by the Garden authorities to set to work make a thorough investigation of the subject, by first of all undertaking systematic research regarding the Dipterocarpeæ to be found in Netherlands India. The first steps taken to carry this through were directed to calling in the aid of Major General Haga, the then Civil and Military Governor of West Borneo, and of the Resident of that Division. Their co-operation resulted in the securing of a large collection of dried specimens of tallow yielding trees from West Borneo, besides a piece of Minyak Tingkawang from each tree specified. Dr. Burck has been since actively engaged in these researches. The results will be made public in the next annual Gardens report.

The Batavia *Dagblad* comments as follows on the description of Javanese coolies as being full of arrogance and false pride given by a Johore correspondent in a recent number of the *Straits Times:* "It is rather amusing to find a British writer complaing that Javanese of the lower classes who go to other lands in search of coolie work or have been recruited by crimps for the purpose are in fact too proud and too arrogant in nature to make good coolies. It is especially instructive to the British to find their cherished belief, backed by natural jealousy of another colonial power in neighbouring countries, that the Netherlands colonies are the scene of tyranny, oppression, and extortion, meeting with little confirmation when they come in personal contact with the people of Netherlands India, especially with the lower orders. Instead of a submissive slavish sort of people they meet with fellows of whose arrogant air they complain, and who do not show that submission to discipline indispensable for coolies to be serviceable.

It is to be hoped that the so-called arrogant air of our Javanese coolies will give the British in some way another idea regarding the oppression and slavery under which the Netherlanders in the Far East bring the people under their sway—so at least the British persuade not only themselves but also the world whenever they can." The *Dagblad* points out that the substitute system under which while the number of a gang of Javanese coolies continues the same, the faces are continually changing, is also known in Java, the substitutes being called *orang ganti*. This is accounted for by the Javanese coolie being perhaps too honest to abscond and fancying that his employer has nothing to complain of when he takes upon himself to substitute some other coolie in his stead.

Java sugar shows no signs of improvement in value, quotations ruling now under 8 guilders per picul. So near are planters being drawn to the brink of ruin that the Home Government has been alarmed into promising to do something to alleviate their lot. Meanwhile, notwithstanding the deadness of the times, enterprising individuals are casting about seeking fresh outlets for speculative energies and unemployed capital. Paper mills and cement works started at various places will yield little to make up for the certain loss resulting from the scanty outturn of staple articles, when plantation enterprise not longer pays remuneratively. The moment all is over with sugar and coffee cultivation, it will be hard work to keep new industries going.

Several influential persons interested in the cinchona trade have forwarded a memorial to the Netherlands Minister for the Colonies in favour of increasing the number of bark action sales at Amsterdam to eight a year. They urge this course on the ground that Java cinchona has of late been shipped by holders more and more to London

where auctions of bark are held every fourteen days. In their opinion, the Government, from its being the greatest importer of the article, is fully abel to prevent the larger portion of the Java bark shipped on private account from finding its way to London.

NOTES ON INDIAN AND CEYLON PRODUCTS FROM THE OLD COUNTRY.

(*From Our Special Representative.*)

CEYLON TEA—CEYLON AND INDIAN COURT AT THE "COLIND" EXHIBITION.

I saw in a grocer's window a printed bill which stated in large letters that "the finest tea now imported was from the mountain gardens of Ceylon, grown at from 4,000 to 6,000 feet above the sea," and another smaller one, of which I enclose a copy:—

CEYLON TEA.

The climate and soil of Ceylon have proved themselves peculiarly adapted to the successful cultivation of Tea, and the product of many of the Estates possesses all the richness and flavour of the old-fashioned China Souchongs, combined with the strength and fulness of Indian Teas, but without their excessive astringency. Such Teas are perfection in themselves and need no blending.

It is now about ten years since the Ceylon Planters first turned their attention to the culture of Tea, the export in the years 1875—6 being only 482-lb which had increased in 1882—3 to 1,522,882 lb. and still further in the following season, to 2,263,000 lb. According to the *Grocer*, a correspondent, writing from Colombo under date August 1st, states:—"Already our export for the new product, Tea, has doubled itself within the year, and during 1886 it will again double itself, with an ever-increasing value of the article." There are now 35,000 acres under cultivation, which will be in full bearing 1887—8, during which season it is estimated the export will reach Ten Million Pounds.

Prices—2s 6d and 3s per pound, in original leaden packages only, weighing 1-lb and ½-lb nett.

Sold by—E. J. WILLIS' Tea Dealer, Boscombe

But there is another link with Ceylon in a house not five minutes' walk from here, the name of which is *Talawakellie*! It has only just been finished, and is at present to let furnished: the owner, I learn, is a Rev. Mr. Godson; what is his connection with our island? As might be expected, the name is popularly mispronounced with the accent on the first syllable.

I notice from your last *Overland* that Dr. Watt's story about the jungle of 50 to 100 feet tea trees is regarded by many of your readers as well as yourself as a 'pull at the long bow.' But though he learned doctor may have exaggerated a little, perhaps unconsciously, may not trees of at least 50 feet high exist in their wild state? You are mistaken in supposing that the Indian planters who visited Ceylon were astonished at the *height* of the 'giant' trees on Abbotsford and other estates: it was the immense lateral growth of the branches to which they had never seen anything equal in India. As to height, Mr. Tod of Assam told Mr. A. M. Ferguson, Jr., that he had on his own estate a clump of trees exceeding 50 feet.

I have already given a pretty detailed description of the Ceylon Court, and will only add that when I visited it last week I found that on each side of the porch had been placed tubs with tropical plants, such as *Cycas circinalis* (Sinh. *Madu*), &c.; also that Col. Clarke's map of the mountain district has been now hung where its details can be examined minutely and justice done to its workmanship. The Ceylon tea houses seem to be as well patronized as ever. With regard to the complaints of correspondents in your columns as to the quality of the tea served there, I cannot offer an opinion as I never drink tea; the coffee and the chocolate are, as I can testify, excellent. Closely connected as our island is with India, it is natural that it is to the Courts of this empire that I should first take your readers. The space allotted to India is divided into (1) the Indian Hall; (2) the Art Court; (3) the Imperial Court of Economic Products; (4) the Court of Private Exhibitors; (5) the Tea, Coffee, and Tobacco Court; (6) the Administrative Galleries; (7) the Indian Palace and its adjuncts; and lastly (8) the Indian Jungle and Kuch Bihar Trophy. To begin with the last, it is naturally a great attraction to visitors, but the thought that must strike an Indian *shikari* would be, I should think, "C'est magnifique; mais ce n'est pas la—nature": at least, I should imagine one could hardly find so many animals congregated in such a limited space in their native wilds. In the Indian Hall (1), which is hung with rich chintzes and guarded by portrait models of the various types of the Indian soldier, are cases in which are models of some of the P. & O. Co.'s latest vessels while an illustrated pamphlet giving the history of the Company and details as to its fleet &c., lies handy for visitors to take away. To the general public the Art Courts (2) are, I imagine, the most attractive, with the magnificent Jeypore entrance arch, the courts of the different states, presidencies and provinces with their varied and often elaborately carved screens, and the thousands of articles of value and beauty therein displayed. But these I must pass over and come to the Economic Court, (3) which is entered by an archway thus described in the Official Catalogue:—

The Forest Trophy.—The massive archway which forms hte entrance to the Court is constructed entirely of I dian timbers, and designed by Mr. F. B. Manson, Deputy Conservator of Forests, Chutia Nagpur, Bengal. The middle portion is 22 ft. broad, and rises to a height of 15 ft.; the side parts are 12½ ft. high. The total breadth of the trophy is 46 ft., and it is 5 ft. in thickness. It contains 3,000 specimens of useful timbers.

The timber specimens used in its construction belong mostly to the Bengal Economic Museum, and have been lent by the Government of Bengal. The trophy includes also the greater part of Mr. J. S. Gamble's collection described in his "Manual of Indian Timbers." The specimens so described are marked with a letter followed by a number; the letter denotes the region from which each specimen was obtained. In addition to these collection a large number of new blocks of wood, furnished by the Inspector-General of Forests, have also been built into the trophy. The very extensive series of timbers thus brought together has been arranged on the trophy in geometrical patterns, and on either side of the arches are placed fretwork panels of teak wood in arabesque design. A border of alternating dark and light woods surrounds the entire framework. The pilasters are supported by large slabs of timber, bevelled to show the grain of the wood. For the construction of the ornamental arches some of the principal Indian timbers procurable in Calcutta, viz., teak, sál, sissu, and pine have been used. The geometrical tracery of the panels forming the plinth on either side of the middle arch is of teak and sissu; whilst that of the pilasters on each side of the smaller arches of teak.

Immediately close to the arch are articles of furniture carved from the wood of the Padouk or Andaman redwood tree. The table constructed of one complete section shows the enormous size which this dark red, close-grained and hard wood attains.

On entering into the court the first object that strikes the eye is

The Bamboo Trophy.—Occupying the centre of the Court, and conspicuous by its height, the great object of attraction will undoubtedly be the Bamboo Trophy, which consists of an arch over the central transverse path leading from the Art Ware Courts, and contains one of the most perfect collections of bamboos ever

exhibited. This familiar name of the gigantic grasses has, like so many other terms, come to us through the Portuguese pioneers of European trade and settlement in India. The Trophy consist of a platform raised 12 ft. above the floor on four columns. The steps on either side are covered with split bamboo arranged in geometric patterns which are continued on the floor of the platform. The forty steps of the two staircases exhibit forty different designs and ten species of bamboo. In all, thirty species of bamboo are exhibited in the trophy, for full explanation of which the curious are referred to the index set on the adjacent walls. The number of objects made of bamboo which are hung over the trophy far from exhausts the uses and applications of this, as it may be called, most versatile gift of nature to the Indian and Indo-Chinese peoples.
The solidity of this structure has been well tested by the thousands of visitors who have ascended its steps and descended on the other side. The third trophy in the court is the

Grain Trophy.—All these grains are combined in the structure of the Grain Trophy, the idea of which is taken from the famous tomb of *Itmád-ud-Dowlah* at Agra, the beautiful marble geometric mosaics having been imitated by glass panels of coloured grains. On the outside elevations there are large panels, two of which are devoted to rice, two to wheat, two to Indian corn, one to barley and oats, and one to millets and Job's tear's a curious grain which is cultivated in Assam and among the Eastern frontier hill-tribes. Sixteen smaller panels are filled with the pulses, and the remainder with other edible grains and oil seeds. The interior is filled with grains in ear, and Indian corn cobs. In the four corners of the room are shown commercial samples of the grains, and in the centre a group of three women modelled in clay "grinding at the mill." Near it are cases containing special displays of wheat exhibited by the Bombay Commercial Committee, and collections of rice from Bengal and Burma.

Near the timber trophy are specimens of Indian furniture carved from the wood of the Padouk or Adaman (the Official Guide says 'Cinnamon') red-wood tree, one table being constructed of a complete section of this enormous tree. The rest of the body of the Court is occupied with specimens of fruits and vegetables, nuts, pulses, grains, wheat, sugars, narcotics and stimulants, drugs, fibres (cotton, jute, rhea), paper, oil seeds, oils, extracts and inspissated saps, lac, and models to illustrate the official life and industries of India. From the Official Catalogue I may quote a few extracts regarding some of these:—

Fruits and Vegetables.—A collection, partly of models made at the Botanic Gardens of Saharanpore, under the supervision of Mr. J. F. Duthie and by the Krishnagur moddlers employed by the Government of India, and partly of actual fruits, such as will bear the transport and keep good in the glass cases, is supplemented by a very large collection of preserved fruits, jams, and pickles. With regard to the fruits, it will be a surprise to many to hear that the fruits of the East are, it is believed much overrated in Europe. Many of the best of Indian fruits have been introduced from Europe, Chena, the West Indies, and America. The most characteristic modern fruits of India are the mango, guava, litchi, pine-apple and plantain. Of these the mango is far the most popular fruit in India. Colonel Yule in his Glossary says that theroyal fruit, the *mangifera indica*, when of good quality is one of the richest and best fruits of the world. The origin of the word is Tamil *Mán-kay*, *i. e. mán* fruit. The Portuguese formed from this *manga* which we have adopted as mango. Numerous varieties of jams, pickles, and chutneys, prepared from this celebrated fruit are to be found amongst the exhibits.

Nuts.—Together with the fruits are samples of nuts, a term which in India includes ground nuts and the seeds of the edible pine. The true almonds, which are a sacred offering common to the Hindoo and the Jain, as well as a regular ingredient in cookery, especially in a savoury *pillao*, are imported by the traders of Afghanistan and Persia. The Afghan traders also supply the hazel nut, the walnut, and the pistachio nut, from Afghanistan and Kashmir.

The Singara nut (647) which is grown on an aquatic weed, forms in some parts of the country an important article of food. It is stated that in Kashmir 30,000 persons are dependent upon this wild plant for food, during certain months.

Coconut.—Near the bamboo trophy is a most interesting collection of objects made from the common coconut palm (properly called coco and vulgarly coker), exhibited by Mr. Pereira of Bombay. Eighty-three articles are enumerated. The origin of the name of this well-known and useful palm, which to the early travellers and mediæval writers was known as the Indian nut, is suggested to be the old Spanish *coca*, a shell, although the Portuguese and Spaniards say that it was called *coca* because it looks like the face of a monkey or some other animal.

Vegetables.—The vegetables met with in India are readily divided into two sections of indigenous and introduced. Of the latter it may be said that European fruits and vegetables, though often growing luxuriantly, rarely attain the same flavour as their European congeners. Of these, however, the cabbage, the cauliflower, and radish, alone are eaten by the natives of India, but not until they are over-grown and coarse. From America, the potato and the egg-apple or *brinjal*, have been introduced. As to the indigenous vegetables, India may be viewed as the region of the cucumber and the melon, with a large series of allied plants, all of which yield valuable fruits and vegetables, and furnish a great proportion of the food of the people. It is almost impossible to arrive at any definite idea as to the extent of the internal trade in vegetables. Nothing is more characteristic of the Indian village than its bazaar or market-place, and it would be difficult to find a bazaar where the egg-apple, the melon, the cucumber, the pumpkin, and the radish were not offered for sale alongside of rice, plantains and chillies. The foreign trade in vegetables has increased in the last five years from about £20,460 to £21,963; the bulk of these exports go from Bombay. Nearly the whole of the pot-herbs are wild plants which require no cultivation, and they illustrate one of the most striking features of India, for in few countries in the world are so many edible products to be procured for the trouble of collecting, edible products too which enter largely into the dietary of the mass of the people.

Pulses.—By themselves under the head of "Pulses" will be found the various leguminous seeds which under the name of *dál* and *gram*, the lentils (which furnish the vaunted and really beneficial food for invalids known as revalenta), and others occupy an area of cultivation of forty-eight millions of acres. The grain merchant's shop, in which the varieties of this collection are shown, reproduces one of the most curious and interesting features of an Indian bazaar.

Grains.—One of the most important collections is that of the grains, which may be popularly described as rice, wheat, barley, oats, Indian corn and the various forms of millet. Of these, rice is the most valuable of all the cereals to the inhabitants of India. It is the principal food in Bengal, Burma, Orissa and the eastern portion of Central India, the southern parts of Madras, and the western districts of Bombay. In the Punjab, the North West Provinces, and Oudh, Behar and the northern parts of the Central Provinces, and Gujerat, the poorer classes live chiefly on millets, supplemented by barley and gram, while the rich only use wheat and rice. In the southern part of the Central Provinces, Berar to Bombay, Deccan and the northern part of Madras, the *juar* and *bajra* are the staple foods, and in Mysore the small millet known as raggy or *ragi*, furnishes the principal provision. In Assam rice is the staple with the addition of Indian Corn and Job's Tears. The estimate of the total area of land annually under cereals is 119 400,000 acres, of which nearly sixty millions are devoted to rice. As there are many forms, so there are several crops of this essential grain which is, in truth, the staff of life to at least one-third of the Indian population. For the Foreign trade, which, however, may be said to have been almost ruined within the past few years, the chief supply comes from the

abundant harvests of that most prosperous province British Burma, while Bengal supplies a small proportion. Where rice cannot be cultivated the millets invariably take its place as the staple food crop of the mass of the people. Even in wheat-producing districts this is true. Dr. Hunter is of opinion that, taking India as a whole, it may be affirmed that the staple food grain is neither rice, nor wheat, but millet. Excluding the special rice tracts, varieties of millet are grown more extensively from Madras in the south, at least as far as Rajputana in the north.

Sugars.—The raw and refined sugars exhibited by Messrs. Turner, Morris, & Co., of Calcutta, and Messrs. Carew & Co., are examples of a cultivation and a trade which are more important at present for Indian internal commerce than for the prospects of increased exportation. The 1,922,000 acres of sugar-cane cultivation may be said to yield two million tons of coarse sugar. Besides sugar-cane, sugar is obtained from the date palm, or toddy palm, of Bengal, and the *palmyra*, or toddy palm, of South India, Bombay, and Burma; but the exports, in which the sugar-cane produce cannot be discriminated from other produce, only amounted to one million cwt. as against the two million tons just mentioned. Improvements in the present defective method of expressing the juice, and gradual removal of the prejudice against refined sugars amongst the natives of India, who chiefly consume *gûr* or raw sugar, will doubtless give a large stimulus to the internal trade. A model prepared at Poona in order to show the method of crushing the sugar-cane in the Bombay Presidency, is exhibited in the Agricultural *annexe*. The primitive pestle mill is still the machine most generally used over the greater part of India for the extraction of cane juice. The method of working it is shown in the model village.

Narcotics and Stimulants.—* * * Attention is called to the exhibits of beer produced by the hill breweries, the more important of which are in Madras and the Punjab, and whose ale and beer are of an excellent quality, as may be seen by the fact that the import of foreign beers in 1884-85 was 194,531 gallons less than in the previous year. Another novelty is the exhibit by his Highness the Maharaja of Kashmir of the wines and spirits prepared in his kingdom. The white wine obtained at Calcutta International Exhibition, a gold medal for its purity and superior quality.

Drugs.—There are over thirteen hundred plants reputed by the natives of India to possess remedial properties; and as in all popular herbals which exist unwritten as having been handed down from unknown antiquity by tradition, a great number even of the most highly-esteemed are valueless. The Sub-Court devoted to drugs and medicines contains examples of over one hundred indigenous drugs, which have almost all attained a European reputation, and which most thoroughly deserve to be more extensively used. From Nepal a large series of aconites, accompanied by botanical specimens of the plants from which the roots were obtained, has been sent by Dr. Gimlette. The monkshood or wolvesbane, which grows on the Himalayan heights, from an altitude of 10,000 feet to the highest limits of vegetation, is equalled if not surpassed in its poisonous and its curative powers by its congener the Indian or Nepal aconite. The specimens of cinchona or Peruvian bark numbered 780, bear their silent witness to the success of an enterprise undertaken by the Government of India to acclimatise if possible this invaluable tree, and so to bring within reach of the population of India what up to that time had been too costly a remedy. This was primarily due to the travels and labours of Mr. Clements Markham, C.B., devoted to the examination of the cinchonas of Peru in their native forests, and their importation to and ultimate establishment in India in 1860. The produce of the Government plantations at Darjiling and on the Nilgiris amounted together in 1884-85 to 457,218 lb., most of which was manufactured into febrifuges. Extensive private plantations also exist in Southern India, and the exports in 1884-85 were valued at nearly £100,000.

The specimens of cinchona bark referred to above are good, but of course not equal to the display from Ceylon. Next regarding

Fibres.—We now come to the vegetable fibres of India. The more important of these, such as cotton, jute, rhea, and other commercial fibres and paper materials, are exhibited in separate sub-courts, and require separate notice. But besides these there is an extensive series of fibres which are regularly used by the natives of India, though the large majority are unknown to the textile manufacturers of Europe. The Indian flora contains over 300 fibre-yielding plants, one-third of which afford strong and useful fibres. Some of these will be found illustrated in the 'Rope Trophy,' near which are excellent samples of stair-carpets and door-mats made of the well-known *coir* or coconut fibre.

An article on which a good deal has appeared in your columns and in those of the *T. A.* is:—

Rhea.—One of the first and most important of the commercial fibres, not so much in its present as in its probable future utility, is rhea. The prize offered by the Government of India for the most perfectly successful machine for separating this fibre was, it is true, not awarded, no single machine being deemed able to comply at the time with all the requirements; but strenuous endeavours have within recent years been made to overcome the difficulties of dealing with rhea grass, and the difficulty of the separation of the fibre has been overcome. The high price of the fibre itself, together, with its exceptional strength and durability, unfit it for many purposes. The Glenrock Company, Limited, of the Wynaad, Madras, exhibit an interesting collection of their fibres, showing not only rhea but also two or three of the allied rhea fibres, including the so-called wild rhea of South India. The wild rhea of Assam, and various Nilgiri nettles, and, in addition, pine-apple fibre and Manilla hemp, together with a large assortment of aloe fibre, are also on view.

Regarding paper, I quote the following:—

The art of paper-making in India dates from the time of the great emperor Akbar, and was first practised in Kashmir. Rapidly it spread all over India, displacing the birch bark used by the hill-tribes, and the palm leaves which served the people of the plains as the vehicle on which they incised with a stylus their accounts and written records, and of which examples are shown in the Education exhibits. It is probable that the inhabitants of the Eastern Himalaya, long previously to that era, derived the art of paper-making as practised in Nepal from China. The Nepal papers, of which extensive collections are exhibited, are prepared from the bark of two sorts of daphne, and from the fibre of a plant which grows along the Himalaya, and has recently been found plentifully on the mountains of Manipur, extending to the northern frontier of Burma. The paper manufacture of India, like the paper trade of England, is still seeking for a new material. The paper trophy, as well as the special show case contributed by the Bengal Exhibition Committee, shows the paper materials; the half stuffs, the manufactured papers from all parts of India. The Bally Paper Mills of Calcutta, and the Upper Indian Paper Mills of Lucknow, are the chief contributors; but besides, a large collection of jail and native-made papers from all parts of India is exhibited.

Under oil seeds I read:—

The trade name of the sesame seed, which comes next in importance, is another instance of commercial nomenclature derived from the first Portuguese traders. In Colonel Yule's "Glossary" it is traced step by step from the Arabic *al-jaljulan*, corrupted by the Spaniards into *aljonjoli*, and so gradually transformed into *jinjali* or *gingeli*. It is used in India for culinary purposes, for anointing, and also in soap furniture, and as a lamp oil. It shares with the ground nuts the reputation of being employed by European importers to furnish a sham olive oil. Of the latter the cultivation may be described as a modern industry, the trade in oil as a substitute for olive oil having within the past thirty or forty years developed in an almost unprecedented manner. The value of the exports of ground nuts from India rose between 1879 and 1885 from nearly £17,000 to something over £360,000; and the exports from the French ports in India were but little short of the same amount, the total value being thus just over half a million sterling. The bulk of this seed is shipped for the continent, prin-

cipally to France and Italy. France is said to import from all countries 33 million francs worth of the ground nuts, of which India only supplies 2½ millions, but it is believed that the oil expressed from these nuts, as well as that from *gingeli* seed, finds its way into the markets of Europe as olive oil.

I might quote further extracts regarding oils &c., but refrain from doing so, merely mentioning that a model of an indigo factory shows the process of manufacture of this important product.

Among other objects shown in the Court are ornaments and other articles of rock-salt, a collection of snakes exhibited by Col. Beddome, and some very amusing life-like models of Indian villages. Throughout the Court are grouped life-size models of the various races of India, the different types being admirably shown. Round the walls are many interesting objects, the most important being the index collection in little tin boxes with glass fronts. Then there are the grain and drug bazaars above referred to, cases of stuffed birds and colored drawings of birds, and a collection of very fine photographs and drawings by Col. Lockhart (Mission to Gilgit and Kafiristan) and Col. H. C. B. Tanner of the Survey of India, the latter being chiefly representations of the Himalayan range. The printed labels on these have not been carefully corrected, for on one, "The Yaccam Kunga Mountains" (it should be "Yassana i Hunza"), one reads :– "Behind the peaks in the left of the pictures, is situated the great Ab-i-Nil, or Sar-i-chasma-i-aba-sind, the northern source of the *Trans* river *decorated* in 1881 by Pin Mukhtar Shah, *Emperor*." The three words I have underlined should be *Indus*, *discovered*, and *explorer*! In this Court are also shown a fine collection of minerals and ores exhibited by the Geological Survey of India, and illustrated by maps; and in an adjacent annexe are a large number of maps shown by the Survey Department, there being also an 'over-flow' assortment of models, grains, &c. In the adjoining Burma Pavilion the Bombay Burma Trading Co. have a fine exhibit of teak logs and manufactured articles, including lattice archways made of small pieces bolted together, showing how such 'waste' bits can be utilized. The Court of Private Exhibition (4) is separate from the Ceylon Court by a passage running north and south and contains a variety of articles, mostly of the class well-known to your readers as sold by the 'Delhi men' such as jewelry and carved work, shawls, &c., and also jams, pickles, chutneys, curry-powder, &c. The Crown Brewery Company of Mussoorie show samples of their beer in bottle and cask. Down the middle are specimens of native and European carriages, a handsomely carved billiard table, and Baroda pigeon-house. Lastly, I must not omit to mention that at one of the ends nearest Ceylon is shown the method of reeling silk from the cocoons by the 'Tavelette Consono,' an ingenious invention, which is a great improvement on the native method. The Tea, Coffee, and Tobacco Court I have before referred to in connection with the Ceylon Tea trophy, so I shall pass on to the Administrative Court, (6) which is situated in the galleries to the right of the Indian Hall and the southern part of the Eastern Arcade. Here, to quote from the succinct description in the Official Catalogue :—

The Survey of India Department contributes illustrations of the various processes by which the results of the surveying operations are transferred to maps, and the maps themselves, in which are made accessible to every one the exact knowledge collected by the labours of science, and the observations of dauntless and patient explorers. The Revenue Settlement Maps and charts showing the internal trade and the emigration are both worthy of study. Everyone will be interested to learn of the large and constant emigration of Indian labourers to the tea-gardens of Assam, the Island of Mauritius, and to the distant labour fields of the West Indies and Demerara, and even to our young but vigorous colony of Fiji. Some return after their contract of service expires, with their savings. Others remain as settlers.

In the divisions of the Department of Finance and Commerce, besides the printed reports, there are exhibited specimens of the coinage of India, and the processes of the Mints. Patterns of all stamps used which make up a revenue of over three million pounds, are shown by Messrs. De la Rue. The Post Office shows from the different Presidencies models illustrating the peculiar means of carriage which are needed in distributing the 184 millions of letters, cards, &c., delivered throughout India in one year, models of mail runners and riders, &c. Specimens of buffalo horns sounded to scare away wild beasts in Assam, or bows and arrows carried for defence in Rajputana, carts, coaches, boats and rafts are ranged according to the particular provinces. Our printers and bookbinders can compare the tools and work of their Indian fellow-craftsmen.

The Home Department sends a most curious and complete illustration of the means and appliances employed in the 111,237 schools with their 2,790,061 pupils inspected in 1882-3. The indigenous schools of the Punjab, and all schools not inspected are of course omitted. The model of an indigenous school in Bombay is well worthy of examination.

The models shown by the Public Works Department, illustrating the Indian railway carriages, the public buildings, and the great works constructed for irrigation, on which the lives of millions constantly depend, can only be pointed out as claiming much more than a passing glance.

The Military and Marine Department, in addition to the portrait models which stand round the vestibule, contributes, not only descriptions but various models illustrating the internal economy of the army, and the soldier life and work in barracks. The medical ambulances, the war material, elephant *kheddahs* for catching the wild elephants, which become the most useful and docile servants, and other instructive exhibits, will be found illustrated in the somewhat confined space available.

Besides the objects specified above, I may mention a case of books published by the Christian Vernacular Education Society, and one of Messrs. Trubner & Co.'s revolving book-cases, containing their latest publications relating to India, including a volume of the *Tropical Agriculturist*. I now come to the Indian Palace (7) and its connected courts. Of the Palace itself I need say no more than that it gives an admirable idea of the Indian style of architecture. The little bazaars, where weaving, metal work, confectionery &c. are carried on, prove sources of great attraction to the crowds who are always to be found in front of them, and I expect a good trade is carried on in the articles manufactured. Round the bottom of the Garden Vestibule of the Palace is the Silk Court, which is hung all round with silks of various hues, while in cases are shown moths, worms and cocoons of Tusser and *rcnia trifenestrata* from Ranchi, Chota Nagpore, the latter new to Europe. This completes the Indian section, and I must leave the other Courts for future letters.

THE WEST INDIAN, JAMAICAN, TRINIDAD AND BARBADOS COURTS.

The Handbook and Catalogue to the West Indies and British Honduras, issued under the authority of Sir Augustus Adderley, K.C.M.G., the Royal and Executive Commissioner, is, as you will see from the copy I send you herewith, a work on the preparation of which a good deal of labor and considerable expense have been spent. It is hand-

somely bound in cloth with a design in gold on the cover showing some of the typical vegetable products of the West Indies, while the contents are as follows:—

Principal Entrance to the Court (Coloured Illustration) West Indian Gallery; Picture Gallery—West Side (Coloured Illustration); Picture Gallery—East Side (Coloured Illustration); Jamaica (with illustration); Trinidad (with illustration); Barbados (with illustration); Sugar Canes by Anglo-Continental Guano Company (Ohlendorff) (illustration); Grenada (with illustration); St. Vincent (with illustration); Tobago (with illustration) St. Lucia (with illustration); Antigua (with illustration); St. Christopher (with illustration); Dominica (with illustration; Montserrat (with illustration); Virgin Islands (with illustration); British Honduras (with illustration); A Group of Exhibits (illustration); The Bahamas(with illustration);Diagram showing the respective Values of the Imports to the United Kingdom, &c. &c. List of Exhibitors Map of the West Indies and British Honduras.

The account of Jamaica is written by Sir A. Adderley; that of Trinidad by Mr. C. A. Harris; Barbados by Hon. C. C. Knollys, Colonial Secretary; Grenada by Mr. J. Wells, editor of the *St. George's Chronicle*; St. Vincent by H. E. A. F. Gore, C.M.G.; Tobago by Hon. L. G. Hay; St. Lucia, Antigua, St. Christopher and Nevis by Mr. C. A. Harris; Dominica by His Honor J. S. Churchill; Montserrat by Hon. J. S. Hollings, C.E.; Virgin Islands and British Honduras by Mr. C. A. Harris; and the Bahamas by Sir A. Adderley, who contributes an introduction to the work as a whole. But, besides this, Mr. Eugene Rimmel, the well-known perfumer, has taken the opportunity to advertise his wares by getting up a little brochure in colored cover, which is sold in the West Indian Court, and which contains, besides a reprint of certain details given in the Handbook and Catalogue, some interesting remarks (with illustrations) on "The Fragrant Products of the West Indies." I send you a copy of this, as it contains matter which will be useful as well as interesting to the readers of the *T. A.* Proprietors of land in the lowcountry of Ceylon should take a hint from what is said regarding the distillation of "rose-apple water" from the jambu and "oil of ben" from the murungai. The illustrations in the Handbook will give you a fair idea of the artistic and tasteful manner in which the West Indian Courts have been arranged, but, as has been said above, some of the effect is due to the employment of articles which have little or no connection with the West Indies. I would only instance the portraits of the royal and other notable personages in the Picture Gallery and especially the fountain in the centre, which attracts so much attention but which has, so far as I know, not the slightest connection with any of the West Indian colonies. (Perhaps it has been placed there to counteract the effect on teetotal minds of the numerous bottles of rum in the adjacent courts.) But lest I should be thought to be trying to depreciate the West Indian Court I shall at once say that a very considerable part of the artistic effect is due to perfectly legitimate means, For instance, to quote from the Handbook,

In order to fully illustrate the Flora of the West Indies—indigenous and acclimatised—Mrs. Blake, the accomplished wife of the Governor of the Bahamas, has most kindly painted, expressly for the Exhibition, a series of 104 large water-colour drawings, copied from nature. These drawings are nearly all life-size; they are very carefully finished, and are, for the most part, without being botanical studies, faithful representations of the plants they illustrate, besides being artistically beautiful. Mrs. Blake, in the majority of her pictures, shows us the plant, its foliage, fruit, and flowers. Sometimes she adds, as a background, a landscape; and now and then she has included one or two specimens of insects, butterflies, and moths.

The picture which appears to attract most attention is that shown in the colored illustration in the Handbook of the west side Picture Gallery. It is thus described in the catalogue:—

In the centre is an immense painting of "A Wave breaking upon the Bahamas Coast." The transparency of the water, the brilliance of the colouring, and the perfection of every detail reflects greatly upon the exceptional powers of the artist, Mr. Bierstadt.

Mr. Albert Bierstadt is called "the Millais of America": whether this title is deserved or not I cannot say; but certainly to the unartistic eye the painting seems wonderfully well done, and I should not be surprised to learn that it has been sold at the high price (£1,000) affixed to it. The old maps and books and specimens of Carib pottery &c. shown in cases in these Courts are all very interesting, especially to the student and antiquarian. The Jamaican Court shows "the touch of a vanished hand," that of Mr. Morris, whose labors on behalf of Ceylon, St. Helena and Jamaica have been recognized by his appointment as Assistant Director at Kew. To his energy are largely due the various exhibits of the Botanical Department, including cinchona, spices and drugs of all kinds, oils, woods, &c. Some very fine samples of coffee and cacao are shown, among the former being several from Arntully estate, with which Mr. W. Sabonadière is connected. Mr. J. Hart exhibits some "Assam tea, prepared from plants growing on the Government Cinchona Plantation, Jamaica:" of course this is simply an experiment, and Ceylon planters need not fear rivalry in that quarter. In the Trinidad Court the chief exhibits are the products of the sugarcane, cacao coffee and chocolate and asphalt bitters. There is a large collection of wood by Mr. S. Devenish, who has compiled a list giving the English, French and Spanish names as well as the scientific names and families of each. A model of a cacao-curing house is shown, illustrating the mode in which the beans are dried in the sun. Before passing on, I should note, that, as the Handbook states,

Opposite the Trinidad Court the Anglo-Continental Guano Works (late Ohlendorff's) exhibit a collection of Sugar Canes from all parts of the world. Here, side by side, may be contrasted the different varieties from West and East. Statistics of production and imports, tools used in sugar cultivation, and specimens of the rat-killing mongoose, cane-borers, &c., make the exhibit a very attractive and interesting one In the Barbados Court the predominant feature is sugarcane and its products. Samples of bituminous coal are shown, which testify to volcanic action in this coral island; and the sight of a model house with 'hurricane cellars' makes one appreciate being out of the range of such destructive natural agencies in Ceylon. The exhibits from the other Windward Islands are of much the same character as those above specified. I would only mention plantain meal, as it struck me that a profitable industry might be created in Ceylon in this direction, as well as in dried plantains sliced. Of the Leeward Islands, Dominica has some interesting exhibits, especially those of Dr. N. A. A. Nicholls; and from Montserrat the lime-juice industry is well exhibited, not only in this Court but in the eastern gallery where there are 'tasting bars' at which this refreshing drink can be had gratis (by a certain number) and lime juice cordial, tablets &c., can be purchased. British Honduras has a fine collection of woods, fibres, fruits, arts and manufactures as well as natural products, and also some Indian antiquities; and the exhibit from the Bahamas is small but interesting, the bonnets made from gorgonas or sea-ferns being very attractive to the lady visitors.

A NEW INDUSTRY—MINOR BUT USEFUL FOR THE NATIVES OF CEYLON.

We learn that there is a good demand in England for "crocodile leather," which is being used for fancy bags, purses, &c. In view of the large number of crocodiles to be found in our Eastern, Southern and Northern tanks and on the margins of other waste waters extending from Anuradhapura to Jaffna, it is a question whether their capture and the conversion of their skins into leather would not pay handsomely.

The skins, as exposed for sale, are stripped of the hard scaly covering and present the color of ordinary leather stamped with the figuring of the outer scales. The price offered per skin is at present we are told enormous, and none but the choicest articles are made of this newly developed material. We think therefore that the authorities of the Colombo Museum should prepare a few specimen hides as used and sold in England, and that the Government Agents in the districts concerned, should exhibit the same with a view to the development of an industry which would put a good many rupees into the hands of the poor half-fed villagers of the Vanni districts as well as prove a benefit to many natives in the Eastern, Southern and perhaps North-Western provinces.

THE ORCHIDS OF CEYLON.

A friend writing from home tells us that on the occasion of a recent visit to the magnificent Botanical Gardens at Kew, he was struck by observing that there was an absence in the houses there devoted to *orchideæ* of many specimens with which he had become acquainted while resident in Ceylon. So much attention is now directed—not by botanists alone—but by home floriculturists to this family of the plant world, that it is certainly desirable some effort should be made to have every member that can be discovered, represented in the national collection.

Not very many years back, while travelling through the dense forest towards Batticaloa, the gentleman already referred to, saw for the first time forms of orchids which had, to that time, been altogether unknown to him. Of one of these varieties he sent specimens to Kew, where it was pronounced to be of a new kind and was gladly accepted and propagated. There is no part of Ceylon where orchids grow in such profusion, or in such variety, as they do on the forest trees in the neighbourhood of the Rugam tank, only a few miles distant from Batticaloa. Doubtless great havoc has been made thereabouts by the clearing of the land recently brought under cultivation through the execution of the irrigation works, but it is exceedingly improbable that having once flourished in the district, there should not remain many undisturbed spots where these lovely eccentricities of nature do still abound. We are asked to suggest that those whose business or pleasure take them into the recesses of the forests we have referred to, or to others equally favourable and remote, should endeavour to secure specimen plants of any varieties which may appear to be new or rare. Their value as regards their transportation to Kew can be determined by a reference to the *savants* of Peradeniya; but so great, is the production and wealth of orchid life in the forests between the foot of the hilly ranges and the Batticaloa lake that—notwithstanding all that has been done by the plant collectors of Dr. Thwaites and Dr. Trimen—it is just possible that careful search will reveal varieties which may not yet have been named or catalogued. In the paper which Dr. Trimen read before the local branch of the Royal Asiatic Society a few months ago, he mentioned that there were in Ceylon of *Orchideæ*, 155 species of which 74 species (or 47·7 per cent) were endemic, that is orchids peculiar to Ceylon. It ought to be an object of interest and ambition—apart from profit—with travellers, sportsmen and others to add to this list.

The wonderful and endless changes in form and colour which the family of the *orchideæ* present to us are, to a great extent, the results of hybridism. This, which is artificially induced in the greenhouses of England, may be presumed to go on naturally among surroundings specially favourable to growth such as are presented in favorite localities in Ceylon. Now in England it is no uncommon thing for sixty or seventy guineas to be paid for a single new hybrid of special beauty or eccentricity in form or colour. It might prove far from unremunerative therefore, for search to be made in the favorite *habitat* of the plants for such hybridism as may have occurred naturally. It may not be far-fetched to assume that by encouraging hybridism in such a vast storehouse of the plants as we possess here in Ceylon, a new and paying form of industry might be opened out. We are all accustomed to laugh at the tulip-mania which wrought through the speculation to which it gave rise, so much ruin among our countrymen in the time of William and Mary, and again also at that for 'crotons,' favorite kinds of which sold in Java a very few years ago for from £10 to £20 cash. But the craze for orchids is scarcely less strong in its present development than was that for the flashy bulb of the Hollanders and more permanent than that for crotons could be. If, as we learn is the case, any new and strange variety of orchids bring prices running up almost to 100 guineas the plant who can pretend to say whether our eastern forests might not prove well worth a careful examination. There, at all events, the plants abound among conditions most fostering to their growth. A little art employed to aid nature, and there need be no limit to the fantastic forms and brilliant colours which a skilful operator might produce and if he can bring these under the notice of the connoiseur at home, he will scarcely fail to reap the fitting pecuniary reward of his labour and skill.

CINCHONA IN JAVA: OPINION OF THE CHAMBER OF COMMERCE OF BATAVIA.

We present our readers with the first answer received to our several enquiries addressed to well-informed quarters in Java. The following letter is a formal one from the Chamber of Commerce, Batavia, the office-bearers of which have promptly and courteously responded to our enquiry. It will be seen that these gentlemen consider the estimate (in our "Handbook and Directory") of a total of 15 million cinchona trees for Java as above the fact, while they very properly remark on the discouragement to cultivation in the prevalent low prices for bark. Altogether this report will be regarded as reassuring by cinchona owners in Ceylon who ought

to say to Messieurs the President and Secretary of the Batavia Chamber of Commerce,

For this relief, much thanks—

(Kamer van Koophandel en Nijverheid, No. 45. Getal der Bijlagen:)

Batavia, 4th Sept. 1886.

Messrs. A. M. & J. Ferguson, Colombo.

In reply to your letter of 26th July, we beg to inform you that, according to the Colonial Report issued by the Dutch Colonial Department in September last year, Government's plantations of cinchona for the year 1884 amounted to 1,516,500 plants in the nursery-gardens and 1,753,900 trees is the open air.

Private planters are very much against giving publicity to their operations and therefore we regret not to be in a position to give you any reliable informations regarding the area under cultivation with cinchona trees on private estates.

We suppose, however, your estimate of 15 million trees of all ages given in your Handbook, as you say, as the extent of the cultivation in Java, is rather more than the real quantity. At all events when prices remain as low as they are now, many plantations, in so far as they are not of the best kinds of Ledgerianas, will hardly cover the cost to gather the bark.—The Chamber of Commerce of Batavia:

W. Suermondt, *President*,
F. Ader, *Secretary*.

TEA CULTIVATION AND LAND REGULATIONS IN NATAL

are thus noticed by the London correspondent of the *Indian Tea Gazette*:—

At last the Natal samples promised some time back have come to hand, but they have yet to be soldered up I see, which means that they will not arrive at your end till possibly a fortnight after this. I send them merely as curiosities of interest from a new tea growing colony which has already 400 acres under tea and is planting out 200 more. The climate, or rather climates, for with their hills in Natal they have several climates, are excellent, and altogether the life is enough to tempt anyone, who has had enough of jungle life and discomfort, to start for Natal to begin afresh. To do so, however, upon no capital and without a certain appointment to go to, is to drop the bone to snap at the shadow, and a very long march to disappointment, which may be found at far less cost close at hand if sought for. The following extract from the land regulations of Natal, dealing with lands likely to be required by a tea-planter, as there are other regulations for grazing and other classes of land, may not be amiss here. All Crown lands otherwise unappropriated are open for sale in freehold (except those referred to in the regulations) in lots of not over 2,000 acres each, payable in ten annual instalments without interest, but subject to certain servitudes connected with roads, railways, minerals, and outspan, and subject also to compulsory occupation. The definition of occupation is expressed as follows:—"To constitute such beneficial occupation, there must be continuous personal occupation by the purchaser or by his agent, duly approved of by the Surveyor-General, during nine months in every year of the period for which the occupation certificate is issued, and the erection of a suitable homestead or dwelling-house, and the cultivation, where the lands purchased are 100 acres or more in extent, of not less than one acre in every 100 acres." The process laid down is as follows:—A person having selected the lands he wants, makes application to the Surveyor-General, depositing certain fees. The survey (at purchaser's expense) is then completed and the lot is advertised for sale by auction at an upset price of ten shillings per acre. The intending purchaser must watch this: if he buys the lot, he must pay down one-tenth of the purchase price in each, and a further tenth each succeeding year till the whole is paid, but is charged no interest. He can then obtain clear title, having first satisfied the Surveyor-General that the conditions of occupation have been complied with, and on payment of a further sum of 40s. Should any purchaser wish to pay for a lot, not exceeding certain limits, at once, he can do so; but an auction sale must take place. The upset price in that case is 20s per acre, and the occupation clause is inoperative. I need hardly add that the purchaser of land in a country of varied soils and diversified physical conditions as are to be met with in Natal, needs to take every precaution, and should bear in mind that a small estate of good soil and aspect, well looked after, is far more profitable than a large, unwieldy property, though bought at a cheap rate. Over and above the large amount of Government lands still available—though not by any means all suited for tea—there are doubtless numbers of private owners of grants in excess of their needs, who would be willing either to sell land to new comers on terms of credit, or to lease it with right of purchase at a date to be fixed. At the present time the usual prices are, on the coast, where sugar and tropical products are raised, from £1 to £5 per acre; in the midlands from fifteen to thirty shillings; and in the up-country or pastoral districts, capable likewise of producing cereals, from 12 to 15s per acre.

CEYLON UPCOUNRY PLANTING REPORT:

A NOVELTY IN TEA: MANUFACTURING THE FLOWERS—THE NEW PRODUCT COCA.

13th September 1886.

I have been shown a novelty in tea. The sample was made from the flower instead of the leaf, and while it had all the fragrant aroma common to high-class, well-made teas, the color was bright orange. This, I should fancy, would prove a delicate enough article, and meet the wants of the most fastidious. As to how it tasted that I cannot say. I question if, up to the time I saw it, it had been liquored: my opinion is that it had not. Perhaps the owner of this dainty article was not quite sure what its effects might be—in the tea seed there is said to be poison, so there may be also in the flower—and it is possible that he was waiting for a friend to come around on whom it might be tried. If the selection were judiciously made, that friend might remember him all his life. I knew of one manager whose memory will ever remain green in consequence of his zeal. He was so determined to get a strong liquor for his teas, and succeeded so well, that a cup of it—taken in ignorance when it was new—almost killed the wife of the proprietor, and was likely to lead to a change in the management!

Whatever may be the effects of the flowery tea, there is no doubt it would be a boon to estates with a bad *jat* if the flower could be utilized, and it has been utilized. I heard of one place where the flower has been regularly plucked with the leaf rolled together, and the tea has realized a fine price. Whether it be that the high average got by this estate has been owing to the presence of the leaf of the flower having been mixed with the other, or in spite of it, I cannot say, but that the flower can be manufactured, is something to know. It is a puzzle what to do with those plants which *will* flower, few finding that to pluck the flower off is a thing that pays. To get however some return for that labour, would put a different complexion on things, and benefit in more ways than one.

The new product Coca which was run after a year or so ago, is not receiving much attention, although there are some people who are now planting it. That the export of its leaves from Ceylon will ever be very great is not a likely thing, but those who know about it, and what weight of leaf it is likely to yield, incline to think that even at the present price—8d. a lb., I believe—it will pay to grow. If I remember aright,

when we first had a trial of this plant and agonized over the few seeds supplied by the Royal Botanic Gardens, Peradeniya, seeing in them the potentialities of future fortune, the price for the coca leaf was said to be 13s a lb. and now,—well it is down to 8d. I suppose it was because we threatened to grow it, that there was this truly characteristic Ceylon decline. Had we done it, we would have had to give the leaves away for nothing. PEPPERCORN.

MANILA NEWS.

(*Translated for the Straits Times.*)

In the Philippines, too, the prospects of sugar growers are far from encouraging. The future gloomy enough already owing to low prices has become more unpromising still by the Home Finance Minister directing that sugar imported from the Philippines into Spain should be saddled with a duty amounting to seventeen *pesetas* and a half on every 100 kilogrammes. This rate comes to $1·61 per picul. The average price of the sugar forwarded to Spain is $4 per picul, so that the duty is almost 40 per cent on the value. Under these conditions, the sugar trade with the mother country will become impracticable. A congress of sugar-growers is shortly to meet in Spain. It is expected that they will take steps to secure greater liberality to their Philippine fellows in fiscal matters.

PLANTING IN THE WYNAAD.

Rain, rain, rain for six continuous weeks, and still rain, and yet all the difference one notices is that the streams run through the *sholas* a trifle more noisily, and the cataracts leap down the distant Neilgherries a trifle more furiously, so that one ponders as one paces the verandah, how many inches might have been registered during those memorable forty days some six thousand years ago. Still this weather is not to be grumbled at, for up to now it has been perfect for planting, but as nearly all the young plants are out, a few warm, sunny days would be most acceptable. Another great advantage of this weather is the necessity for fires; for what is more pleasant than after a hard day's work trudging about ankledeep in slush and mud, with water spouts bursting over you and a bleak sou'-wester howling round you, than to throw yourself into a long arm-chair before a blazing fire and give yourself up to the pleasures of a cheroot and the latest *Indian Planters' Gazette*. At such time the most truculent coolie might cheek you and fear not, and the distant belling of a sambhur, as he invites his mate to come and browse off your choicest child cinchonas, merely causes you to remark with the Newmarket tout, "Another little trial sent for my good."

Coffee is beginning to look up again, the latest quotation being M. P. 70s. and lucky are they who have not yet sold. Though some of the first shipments fetched good prices, one small lot of twelve tons we heard of averaging 71s which means at the present rate of exchange R600 per ton net on the estate. The estimates for the coming season are in the majority of districts below the average, owing to the failure of the early rains, but the bushes themselves are in good fettle, so if the clerk of the weather will only prove propitious next March and April, 1888 ought to find some of us smiling

Our cinchona trees continue to grow and grow fast but alack a day (wish we had one) the unit eve, sinks, sinks faster, but being planters we hope for better times, for a planter without hope is as a preacher without charity, and besides Peruvian bark has lately been discovered to be an antidote to alcohol, and forty-two diseases, and they are daily discovering more, are attributable to alcohol, therefore if the statistics given at Blue-Ribbonite meetings are the truth and nothing but the truth, the demand for cinchona in some form or other ought to be on the increase.

A young planter of an enterprising but economical turn of mind is opening out an estate this season on a rather novel plan. He has planted up fifty acres thusways,—cinchona, six by six, coffee five by five, tea four by four. Where to put each plant causes the thoughtful coolie more heart searchings than would the puzzle 15. When last heard of, our friend was meditating, seeing there are still some five inches of bare soil left, whether it would not be as well to put down ground nuts or ginger to keep down the weeds; and as he pursues his trivial round, his daily task, he may be heard chanting this roundelay:—

Weeds, weeds indeed!
I am going to do without them;
Won't have them any more,
I am going to do without them,
As none have done before;
I am going to be a planter
On a very novel plan,
And agents and neighbours all will say
Oh! what a 'cute young man!!!

May we for weeds never have to read coffee, tea, cinchona, ground-nuts, &c. &c.—*Indian Planters Gazette.*

THE SIKKHIM CINCHONA PLANTATIONS.—We find the following notice in the *Madras Mail* :—"The Government cinchona plantations in Bengal now contain upwards of five million trees, of various ages, of which the red Succirubra and the yellow Calisaya Ledgeriana are the most numerous. A considerable addition was made to the number of plants last year, upwards of 400,000 of the yellow varieties being planted out. The yield of the plantations amounted to 205,410 lb. of dry bark, principally red, and the bulk of it was made over, as usual, to the febrifuge factory. The expenditure on the plantations amounted to R79,728, and the receipts to R93,476. The capital account now amounts to R10,96,255, but this has been recouped by the saving effect by the substitution of cinchona febrifuge for quinine in medical institutions."

GERMAN EAST AFRICAN PLANTATION COMPANY.—This company has been formed in Berlin, the promoters including Count Behr, Dr. Grimm (Karlsruhe), Rear-Admiral Count von Hacke, Karl von der Heydt (firm of von der Heydt-Kersten and Sons, Elberfeld); Dr. Otto Kersten, Vice-Admiral Livonius, Captain von Luck, Dr. Karl Peters, Herr Paul Reichard, Dr. Schroder, and Dr. Zentzytski. The capital is to be 2,000,000 Mks., of which only a quarter will at present be called up, the remainder being called up at the rate of 25 per cent. yearly. The company will cultivate tobacco on lands to be acquired for the purpose in East Africa. German growers, trained in Sumatra, and coolies will be employed. The German East African Company grants to the company 25,000 hectares of land, receiving shares to the amount of the purchase money, viz., 4 Mks. per hectare.—*Kuhlow's German Trade Review.*

THE PLANTING OF GUTTA-PERCHA.—We hear that the Netherlands Government has caused experiments on a large scale to be made in the gardens of Buitenzorg in the cultivation of the plants which yield Gutta-percha, and thus far the planting of the following varieties has been attended with favorable results. Palaquium Gutta (Isonandra Gutta Hookerii) from Singapore; Palaquium Oblongifolium and Payena Leerii, of Sumatra; Palaquium Treubii and Palaquium Parrifolia, of Banca and Palaquium Borneese, of Borneo. The plantations are at an elevation of about 2,000 feet above sea-level; where fully 1,000 plants are growing so well as to leave no doubt as to the success of the experiments.—We have had the above translated for the *Observer* from the *Indische Mercuur* of the 18th August, 1886. Have experiments been made in Ceylon with these varieties?

THE TEA PLANTER'S MANUAL.—The publication of this book has been somewhat delayed but we are happy to state it is now nearly ready and the 14th of this month will we hope see copies in the hands of those whose orders have been registered. We may mention that the two large factory plans have been lithographed at the Surveyor-General's Office, Colombo, and they are as well done as they could have been in India or even the old country. The way in which this work has been executed speaks very highly for the quality of the work turned out by the Surveyor-General.

MANGOSTEEN TREES IN CEYLON.—I learn that there are several very fine mangosteen trees at Galle which have been in bearing for at least 20 years past. Durians also bear at Galle. I hear at Baddegama there are mangosteens planted on a cabook hill, but these probably have been manured. They are bearing heavily this season. A day or two ago I heard of a lot of trees at Ratnapura doing well, and if my recollection serves me there used to be mangosteens on the old Nillambe nutmeg estate which was abandoned over 20 years ago. Some of your correspondents might tell us the history of those nutmegs and other spices which were tried at Nillambe, I think, by Sir John Cheape.—*Cor.*

VALUE OF TEA PROPERTY.—Our Upper Lindula correspondent—an old and experienced planter both as proprietor and superintendent,—starts a discussion on this subject, by showing that a certain favourite property if it gets 600 lb in tea per acre as is expected, should at seven years' purchase, be worth over R900 per acre when in full bearing. We do not at all quarrel with the calculation in this particular case; but if we were asked for an average valuation of tea properties coming into bearing in Ceylon, we should be inclined to fall back on what was at one time the old standard rate for coffee namely R400 per acre—basing our estimate on an average crop of 400 lb per acre and 10 cents per lb. profit at 10 years' purchase. Of course a very much better return can be shown, and is expected, from the majority of tea gardens in Ceylon; but there are exceptions already and these will probably increase as tea fields on old coffee land begin to crop.

THE CINCHONA OF NETHERLANDS INDIA.—We had occasion some time ago to notice a paper read by Mr. Brady at a meeting of the Pharmaceutical Society, in which he gave an account of a visit he had paid to the Government Cinchona Plantations in Java. We gathered from his remarks that, for some years to come no considerable exports of bark was to be expected from that island, as nearly all available trees had been uprooted to make room for the more valuable kind of "ledgers," to which species the local authorities had decided to devote all their attention. The fact of old ground having to be cleared to make room for the new plantings did not look as if suitable land was abundant, and the total extent of the Government's estates, which have usually been supposed to be the principal source of the Javan bark export, was then only 1,200 acres. * * * Mr. Mundt's 175,000 acres of cinchona will probably come into yield about the same time as that right good fellow Allan Quatermain revisits Leu, and swamps the diamond market with his discoveries in "Solomon's Mines." One phase of this question has apparently escaped the attention of the Ceylon planters, who by the last accounts, are still somewhat alarmed about the Javan ledgers, namely, what effect the approaching largely increased Indian export is likely to have upon them. Hitherto the bark trade from this country has been comparatively insignificant, but were statistics available, it would be found that the five years' exemption from taxation conceded by Sir M. E. Grant-Duff's Government in 1882 has startlingly increased the acreage under cultivation. Our planting districts cannot show 175,000 acres of cinchona; and the Forest Department will probably see that they never do so, but there is enough growing—and growing remarkably well too—to make a very fair show even besides the Ceylon export of the last two years; not that that inflated state of things is likely to be maintained. Even if the 20,000 acres which it is just wildly possible may be in existence in Java, should ever come, into maturity, the competition will not be enough to hurt the Indian planter. It appears that in Java the custom is not to harvest bark from trees less than six or seven years of age,—a fact that will perhaps raise the old controversy as to the relative profits from growing these expensive and delicate varieties as compared with the commoner sorts which yield less quinine, but can be worked earlier, and give more bark. On the whole, the opinion of large owners who can afford to wait some time is in favour of planting ledgers.—*Madras Mail.*

TEA IN UPPER DIMBULA: VALUE OF TEA PROPERTY.—Upper Lindula, 11th Sept.—No change in the weather: it still continues to rain every hour of the day. The sun peeps out between the clouds for a few minutes at intervals to let us know he is there, and to let us know he will "give it us hot" by and bye. Everyone is taking advantage of these September rains to get another round of tea supplying done, and splendid weather it is for that work. I had the pleasure yesterday of a long walk with the proprietor, over one of the most promising, perhaps *the* most promising of the young tea estates in the whole of this district. Lippakelle is well-known to be a property of exceptionally good soil, good aspect, and very favourable in lay of land. Its grand expanse of coffee in days gone by encouraged its former proprietors to pay £18,000 sterling for it; that figure was not considered too high in those days when prices of coffee were good and the estate gave regular crops. That coffee is gone, and the beautiful fields of young tea springing up where the coffee used to be, give promise of giving as good returns as the old product did in its former days. Every care has, and is being taken to have none but the best jât of plants in the ground. The great advantage that this estate and most estates in this district have, is, that the soil is not worn out, and no wash of soil has occurred, the land having been well drained from the year of clearing the forest. On the property I am referring to, the rotten bark of the old forest-trees and stumps is still to be seen scattered on the surface of the ground. Mr. Maciver, the lucky proprietor of Lippakelle, is commencing the conversion of the coffee store into a tea factory. In another eighteen months' or two years' time, this fine property will be in full bearing, and judging from the vigorous growth of the bushes, a regular return of 600 lb. the acre will not be too much to expect from it. It is not easy to get at the value of a tea estate. How many years' value to place on it? Say seven years after the fourth year from date of planting. At seven years' purchase, giving 600 lb. the acre at 62 cents a lb. and say 40 cents for all charges would leave 22 cents profit or R132 per acre value of estate R924 per acre. But how about those who take their estates at ten years' purchase and calculate a yield of at least 800 and 1,000 lb. per acre? It makes one's hair stand on end to think of such figures, and to make such calculations will do more harm than good to the tea enterprise of this island. The lucky owner of Lippakelle need not fear short returns from such fine soil and fine jat of tea. Beginners in tea would do well to take a walk over this property. I will undertake they will get a hearty welcome, and, what's more, a rare glass o' whiskey into the bargain.

AUSTRALIAN FORESTS.

BY HENRY F. MOORE, FROME, SOMERSET.

So much of the Australian continent remains unexplored that the approximate area of its forest lands cannot be even conjectured. One thing is certain, however, and that is, that a much smaller portion of its surface relatively speaking is wooded than was the case on the North American continent when it was first colonized by Europeans. Nevertheless, it and the neighbouring islands of Tasmania and New Zealand contain immense forests of valuable timber for both constructive and ornamental purposes. These are described in a recent report to the American Government. There are 150 varieties of the *Eucalyptus* or gum tree, some of them attaining a gigantic height, as, for example, the *Eucalyptus amygdalina*, which has been known to reach an altitude of 480 feet. The specific gravity of the *Eucalyptus rostrata*, or red gum, which is largely used for railway sleepers, nearly equals that of the oak, while it is capable of sustaining a much greater pressure to the square inch than either oak or teak. In point of durability the harder varieties of the *Eucalyptus* will last four times as long as the former. Many of the Australian trees, as, for example, the *Eucalyptus botryoides* the *Cedrela toona*,* the black-wood, and the *Frenela endlicheri*, or Cypress pine, and the numerous indigenous cedars, are beautiful in grain and colour and take a fine polish. The Kauri pine of New Zealand, which, with a diameter at the base ranging from 10 to 20 feet, attains to the height of 160 feet, and often presents a columnar trunk of 100 feet without a branch, is much prized for its timber by the shipbuilder, the miner, the railway engineer, and the cabinetmaker. What renders it exceptionally valuable is that it exudes a gum almost equal to copal, the choicer qualities of which will sometimes command from 584 to 730 dollars per ton in the London market. The *rurin* or red pine, an ornamental as well as useful timber, some of it resembling rosewood, though of a lighter brown colour, is largely used in the manufacture of furniture. With the *totara*, a durable and clean-grained wood, not unlike cedar in appearance, the Maoris made their largest canoes, and almost invariably constructed the palisading of their "pahs." The forest trees of Western Australia claim special attention on account of their useful and valuable properties. Among these may be mentioned the tuart (*Eucalyptus gomphocephala*), an extremely hard heavy, and close-grained wood, which furnishes the strongest timber known, its transverse strength per square inch being 2·701 as compared with the English oak, which is 2·117, or the Indian teak, which is 2·203. Hence it is extremely valuable for shipbuilding purposes. The karri (*Eucalyptus diversicolor*), also highly prized for its timber, attains to colossal dimensions, sometimes measuring 60 feet in circumference at the base, while its tall and shapely trunk rises to the height of 300 feet without a single limb. The jarri† (*Eucalyptus marginata*), which resists successfully the attacks of both the white ant and the Teredo navalis, is unsurpassed for the durability of its timber. Specimens of jarrah piles, after being exposed between wind and water for over forty years, are still found to be in an almost perfect state of preservation. According to the Director of the Botanical Gardens at Sydney, no country has been favoured by nature with a greater variety and abundance of trees yielding strong, beautiful, and durable timbers, than the colony of New South Wales. Its magnificent forests contain woods valuable alike to the cabinetmaker and the shipbuilder, including such timbers as the different species of the *Eucalyptus*, the red cedar, turpentine, rosewood, mountain ash, and tulip-wood, most of which are beautiful in grain, rich in colour, and susceptible of a high polish. Queensland is richly endowed with immense tracts of forest lands, furnishing large quantities of valuable timber, and indirectly supplying the soil with an abundance of rain.* The enormous fig trees and gigantic *Eucalypti* tower aloft and spread out their great arms, festooned with vines and flowering parasites, which throw themselves over every spreading branch, and deck it with their varied and brilliant colours; the tall pine trees, the cedar, the myrtle, the rosewood, and tamarind trees are also forest representatives.—*Journal of Forestry.*

* What is known in India and Ceylon as the Toon tree.—ED.

† Jarrah.—ED.

THE CULTIVATION OF TOBACCO IN IRELAND,

In an article on this subject in the *National Review* Mr. R. Staples says that upon the revolt of the American colonies, for the double purpose of punishing the Virginia planters and trying to win the affections of the Irish, the Government of Lord North made it lawful to grow and cure tobacco in Ireland. There can be no question that in certain districts where the soil was suitable large profits were earned. The county of Wexford, and the neighbourhood of Enniscorthy in particular, was the most favoured spot in this respect. A young man from Enniscorthy had been over to Maryland, and on his return brought with him some seed, and encouraged his brother to venture on it, and from half an acre 100*l.* had once been produced. Holding a farm of sixteen acres this man made a profit of 1,200*l.* in seven years. It is frequently asserted that the climate is unsuited to tobacco, and that it cannot be profitably cultivated, but in face of the weight of evidence existing to show that a profit used once to be obtained from its growth this objection cannot be considered of much value. In any case, the abolition of an artificial restriction would soon prove the truth or fallacy of this assertion, for, if it cannot be produced at a profit to compete with foreign tobacco on equal terms, tobacco, like wheat, would again cease to be cultivated. The farmer would soon prove to be the best judge of the profit or loss derived from the transaction. One objection, no doubt, is that it is an exhausting crop to the soil; but the same objection, only in a lesser degree, applies to flax, which has been for many years past the mainstay of industry in Ulster. And, as tobacco can now be cured by steam, the influence of the weather on the process of curing is of less importance than formerly. The climate and soil appear to be as well adapted to it as they are to the potato, which was introduced at the same time and from the same source. Some short time since an interesting paper on the subject of the cultivation of tobacco was read in Dublin by Mr. J. A. Walker, at a meeting of the Statistical and Social Inquiry Society of Ireland. The writer of that paper, who, like many others, is fully alive to the necessity of finding some new employment for the unoccupied agricultural population, had taken the trouble to communicate with several gentlemen, both in Ireland and America, who are intimately acquainted with the conditions necessary to the successful growing and curing of the plant. According to the testimony of one of his correspondents a statute acre should produce two and a half tons of dried tobacco, and if, after paying all expenses, the farmer should only realise a profit of 2*d.* per pound, it would amount to over 40*l.* per acre. Another estimate placed the profit to be derived at not upwards of 25*l.* per acre, but all accounts agree that a good and substantial profit would be realised. In France the expense of cultivating a hectare of land, nearly two acres, with tobacco, is stated by M. Joubert (Tabac) to be about 32*l.* 1*s.* 8*d.*, and the average produce to be 86*l.* 5*s.* leaving 54*l.* 3*s.* 4*d.* for profit to the French farmer, while even more can be made in successful seasons. The collection of the excise duties in France is not surrounded with any special difficulties, and it is not easy to see why it should be otherwise in Ireland. In the year 1870, the latest for which there is any

* The mountains have more to do with the rain than the trees, amongst which the Toon (red cedar) and the *Auracaria Bidwillii*, the latter preserved for the sake of the cones, on which the natives fatten, ought to have been specially mentioned.—ED.

special return, the importation of unmanufactured tobacco into Ireland amounted to 634,632 lb. This is of unmanufactured tobacco alone, and mainly for the use of the poorer classes, and exclusive of cigars, which are a luxury for the rich.—*Overland Mail.*

AUSTRALIAN WATTLES.

AN INDIAN POSSIBILITY.

It is not long, since the planting craze throughout India was "*divi divi*" as a source of tannin destined to bring wealth to some and benefit to many by creating a planting industry which it was asserted would meet a world-wide demand. Time, however, has nullified these expectations, and now the question often asked is "what has become of the *divi divi*." This negative result has been simply induced by exaggeration, which did harm by raising hopes through promises purely speculative and outside domain of the feasible and practicable. There can be no doubt that there are various part of India well adapted by nature for the production of this variety of the botanical family called "Coriaria" and the pity is that they have not been utilised for the production of a commerical substance of great value in the arts, commanding a high price everywhere as tannin matter. Had *divi divi* received three or four years back the attention it needed for development as planting industry, with rumunerative aspects, the Australian Colonists would not at the present period be going in for the cultivation of wattles for bark which likewise yield the same material as the *divi divi* pods, and for which, owing to the falling off in the supply of tannin barks, there is a brisk demand in the markets of Europe. It is stated on good authority that the Australian wattle yields the best material in the world for the purposes of the tanner. The trees known as "wattles" in Australia are indigenous species of *acacia*, and it is only since past improvidence in regard to this natural product has commenced to tell unfavourably upon the present supply that attention has been devoted to the physical predelections of the plants with a view of cultivating them on a commercial scale. We learn from a Government Report issued under the auspices of the Executive of South Australia—which is the principal habitat of the wattle—that two species are available for cultivation, and that outlay in this direction would give a return for in excess of that which is realized in ordinary industrial channels. The first of these—*Acacia pycnantha*—commonly known as the broad leaf or golden wattle, is the best of the many varieties. It is hardy and quick-growing, flourishing in localities where the rainfall averages 15 inches per annum. According to the South Australian Official Report—due to Mr. T. E. Brown, the Conservator of Forests—"this species will grow readily in almost all kinds of soils, but its rate of growth is most rapid in those of a sandy character while at the same time the largest trees and the best bark is produced on sites where the soils is sandy on top and of a good retentive clay in the sub-soil. Mr. Brown adds, that "with this tree we have the means of making our poorest soils yield valuable crops, instead of their lying idle and worthless." For of all the *Acacias* the bark from this variety yields the largest percentage of tannic acid. The other of two species referred to *Acacia decurrens*, called the Black Wattle, "delights in sandy soil with clay sub-soil; but it attains its largest dimensions upon a black alluvial soil of great depth, and where there is great percolation of moisture." It will even grow in situations where the soil is almost pure sand. The cultivation of this variety can, however, only be recommended in more moist and temperate regions than those which favour the growth of the broad leaf or golden wattle. In other words, it will not grow satisfactorily and as a payable crop in places when the rainfall is below 15 inches annually. This variety is not so rich in tannin as the broad-leaf wattle, yet it is three times more valuable as a tanning agent than English oak bark. These two species of the Australian wattle, therefore, offer the best recommendations for Indian cultivation. The broad-leaf wattle only attains a height of 25 feet and 12 inches in diameter, whereas, the black wattle grows to a height of 40 or 50 feet and to diameter, of 20 inches. The latter is therefore sooner available for stripping, which, in either case, should not be attempted before the expiration of seven years from seeding. The bark now sells at £87 per ton; and, since 10 lbs. of bark is the lowest yield per tree, and 1,000 trees may be easily planted to the acre, the profits derivable from wattle cultivation are therefore found to be highly remunerative. We have no doubt that wattles might be profitably cultivated in India. Considering the vast extent of wasteland suitable for the purpose in the country and facilities it affords generally for this class of industry, the possible becomes very probable that not only the European planter but the Indian ryot would find this a good field for investment.—*Indian Agricultural Gazette.*

Surface Culture in Fruit Farming.—According to Mr. Kruse, of Yew Tree farm, near Maidstone, fruit-growing best succeeds when the roots not interfered with are left to multiply and interlace, and so take advantage of the upper and more nutritive soil. So he practically uses only the common garden hoe and the pruning-knife, aided by an abundant top-dressing, mainly of bones crushed to quarter-inch size. As much as from £10 to £13 per acre is yearly spent on manure which is simply placed on the surface of the soil. According to a correspondent of *The Field*, the results have this year been very gratifying, as regards strawberries, gooseberries, black currants, as well as apples, cherries, and damsons.—*Journal of Forestry.*

Lord Tollemache's Estate Management.—On these extensive domains in Cheshire and Suffolk extending to about 33,000 acres, there are 250 cottages each with three acres attached, so that the occupant may keep a cow. There are also fifty-one farms averaging 25 acres, some of which are in the hands of carpenters, blacksmiths, and other artisans residing on the property. There are besides fifty houses built by other resident tradesmen on ninety-nine years' leases. This admixture of large and small holdings yields the happiest results.—*Journal of Forestry.* [And will continue to do so while the tenants are intelligent, sober, provident and industrious, conditions which would beneficially affect even the wretched Hebridean crofters. —Ed.]

Coconut Toilet Soaps.—Some interesting information on the preparation of *cheap coconut toilet soaps* comes to us from Herr Eichmann, who discusses the so called "filling" of soaps made from coconut oil. Soaps charged with soluble glass, although at first presenting a fine, transparent appearance, gradually dry up to and become coated with a solid crust. Moreover, he assures us that such soaps are apt to act rather injuriously upon the skin of the persons who use them. Salt solutions, having a specific gravity of 15° to 20°, Baume, are occasionally used in conjunction with soluble glass. The behaviour of potash solutions is similar to that presented by soluble glass. Talc is used either alone, or in admixture with soluble glass, for the "filling" of inferior toilet soaps. Where it is employed, it is mixed with a small quantity of coconut oil, and then added to the whole charge of oil. The same writer offers some remarks on *curd soaps*, from which we glean that for the preparation of a good curd soap with a silvery fracture, we should boil 700 kilogrammes of tallow with soda-ley of 15° B. to a clear jelly, and introduce 450 of palm nut oil, and 100 kilogrammes of coconut oil with the requisite quantity of caustic ley at 23° B. The mixture is then boiled until a clear jelly, free from froth, is obtained. After the laps of two hours, any scum that may have found its way to the surface is removed, and the product is salted or precipitated respectively with salt solution of 20° B., or caustic soda-ley of 40° B.—*Burgoyn & Co.'s Monthly Export Price Current.*

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special Letter.)

PARIS, Aug. 7th.

M. Peligot announces some interesting facts about sugar beet, and the influence of atmospheric humidity and rains, on the quantity of sugar contained in the bulb. According to him, M. Girard experimented with beet from the 19th June, to the 1st October last. Every twelve days he analysed roots, simultaneously recording the meteorological condition of the atmosphere. Excepting the water and sugar contained in the root, the other matters never changed; the water varied from 83, to 89 per cent, while the sugar fluctuated from 5, to 18 per cent; but the water and sugar together, strange fact, uniformly represented 94 per cent of the bulb. The sugar augmented, as the water declined, both compensating exactly. However, once the sugar became deposited in the root, that is, stored up, it there remained unaffected by the conditions of vegetations or the action of rain.

M. Gagnaire confirms his experiments, that sulphuret of carbon is efficacious in the destruction of wire worm, moles, beetles &c., whether in garden or field; half an ounce per square yard dug in the soil with a spade, will get rid of the vermin.

ERYTHROXYLON COCA.

BY J. B. LILLIE MACKAY, A.K.C.

Formerly Professor of Materia Medica to the Birkbeck Institution, London.)

Coca, or the "narcotic of the Andes," as it has been called, has for some time past created a good deal of interest both to medical men and pharmacists, who in late years have devoted no little attention to the properties and uses of this remarkable drug.

It consists of the leaves of the *Erythroxylon coca*, a plant, indigenous to South America, which thrives most in the valleys to be found on the eastern slopes of the Andes chain, in that continent. It grows best at an elevation of from 5,000 to 6,000 feet above the sea level.

The plant belongs to the natural family *Erythroxylaceæ* nearly allied to the *Malpighiaceæ* or Barbadoes cherry tribe; and must not be confounded with *Theobroma Cacao*, which yields cocoa, nor with the coconut tree (*Cocos nucifera*), species of palm. It is, however, from the cultivated shrub, and not the wild plant, that we obtain the sun-dried leaves which constitute the *coca* of commerce.

Some description of coca plantation may prove interesting to the readers of this journal. The plant, a bush attaining a height of seven or eight feet, abundantly covered with green foliage, and bearing small white flowers, is raised from seed sown in December and the early months of the year, just before or after the commencement of the rainy season which prevails in these tropical regions. A mean temperature of 66 deg. Fahr. is most conducive to its healthy development. During growth the young seedlings require much watering, as well as protection from the sun's rays. The latter is frequently secured by the erection of thatched roofs over the nursery grounds where the plants are reared. Sometimes, however, shade is procured by the interplanting of palms or Indian corn. The plants are generally grown in terraces on the slopes of the hills in a similar manner to that carried out in the vineyards of Palestine and Southern Europe. After eighteen months the harvest begins, and may be continued at the proper season, for forty years, from the same plant. The average crop from each bush is about 2½lbs., or 30 *arrobas* (800 lb.) from an acre. Three pickings are got from the shrubs in the twelvemonths, but if irrigation is well carried out, no less than four harvests *per annum* may be obtained.

Almost as much care is required in the selection and drying of the leaves as in the case of tea plant cultivated in China and India. If the gathered leaves are too moist they are liable to decompose, while if over-dried they lose their agreeable aroma and peculiar flavour.

The exact time for collection is when the green leaves are mature enough to break on bending. They are then pulled from the branches by native women and children. The subsequent exsiccation has to be gradual, and is effected by exposing them in thin layers to the heat of the sun.—*Chemist and Druggist.*

COFFEE PLANTING IN SOUTHERN INDIA AND CEYLON.—No. II

(REVIEW OF "WRINKLES AND HINTS ON COFFEE-PLANTING" WITH DIAGRAMS AND SPECIMENS OF FORMS BY GEORGE WILDES; MADRAS, ADDISION AND CO., MOUNT ROAD.)

(Continued from page 205.)

ESTIMATES.

An experienced planter can make a pretty accurate estimate of the expenditure necessary under his own system for any given operation, and he may make a tolerable approximation to the quantity of crop on an estate he knows well if he takes pains, but no dependence can be put on any estimate that proposes to go deeper.

I recollected a case in which the necessity of local experience in estimating crop on the trees, was clearly illustrated. Two estates were situated on each side of a dividing stream. The older of the two had always been pretty-well cultivated and the other had been awfully neglected, but under a new agency and a new superintendent a change was wrought that brought out latent powers of the soil, and the repressed vigor of the trees which developed in heavy and brilliant foliage. Planters from other districts passing through remarked that the old *shuck* place was greatly improved, but had gone too much to leaf; but every one talked of the magnificient crop on its neighbour. The two superintendents both estimated 10 cwt. The agent for both (no red tape planter, but a sound experienced man) added one to the estimate of the one, and deducted two from that of the other. When the crops were despatched and cleared out, the one that made the noble display had given 44 parchment bushels per acre; the one that had modestly hidden its treasure in its foliage, gave 55.

On the first occasion I had to estimate a crop, I confessed to my superior, my distrusted powers and he undertook it himself, mentioning as a proof of his ability, that his estimate of the crop of another estate the pevious year had turned out correct within *three bushels*. His estimate was made and booked, and would have turned out very nearly the truth if he had not omitted to divide it by two. I suppose no such wild estimates of crop takes place nowadays, yet we do hear of crop estimates being revised after the gathering has been going on for six weeks, of longer.

ACCOUNTS.

In Ceylon forms are generally supplied, so that it is no part of a superintendent's duty either to make or select a system for himself. Weekly reports never have taken root in Ceylon, and are not likely ever to do so, being to those who send and those who receive them alike a bore.

I never knew a really good planter, who loved desk work; who did not work with dislike on the materials of his monthly accounts; and who did not defer the uncongenial labour to the last moment. It is sometimes, but not generally, incapacity or self distrust that lies at the root of the planter's reluctance to tackle the accounts, and that renders the time devoted to them the most disagreeable of his month, but the same habit seems to grow even on those who were good accountants, before they became planters.

The planter of earlier times contracted rust from paucity of social intercourse, and plodding in his own groove till any change of habits or duties became a terror to him. He would do his possible to avoid meeting strangers, and, alas! in too many cases he took to solitary tippling ending in D. T. and death. The old Ceylon planter can tell many a sad tale of the neighbours, acquaintances and intimate friends of from thirty to forty years age, and can never feel thankful enough that he himself escaped the dangers to which the life he was obliged to lead exposed him in common with those who succumbed.

Yes, truly, it is an unmanly and ignoble thing for one who has been taught some tincture of letters and the habits of the civilized society to become degraded into a sloven or a sot or even one who defers as long as possible a disagreeable duty. But send society's brightest ornament into the jungle five miles from a neighbour, and compare him with his old self at the end of four or five years: you will probably find that he has deteriorated not a little. The planter's safeguard in a new country or a new district is a taste for science or literature, or art, or a good stout Hobby on which he can mount at will and gallop away into the brightest regions of Utopia.

FRUIT AND VEGETABLE CULTIVATION IN THE WEST INDIES: A TRIP TO CHIRIQUI.

On reaching that portion of our route where the surrounding districts consisted of flat alluvial, we noted several extensive Banana plantations. I was informed on reliable authority that from the time of planting to the production of fruit only some nine or ten months were required, and the plants from their thriving and luxuriant appearance would assist to bear out this statement. They were planted in straight rows some 10 to 12 feet apart, and were producing enormous bunches of splendid fruit at the time of our visit. So productive are these plantations becoming on this and other rivers in the locality that large steamers begin to come in regularly to load for the American market, and when it is considered that the depth of water in the lagoon is sufficient to allow them to come to within easy distance of an hour or an hour and a half's journey by canoe, it will easily be seen what a profitable business it is likely to become in the near future. The transit of the fruit from the plantations to the steamers is all performed by large Cedar canoes similar to the one in which we were travelling, or in larger ones dug out from the enormous Cotton trees. Rice was growing wild on the river banks, and appeared to be of good quality. Several large Cane fields were also seen, and Canes 15 to 20 feet high were common objects.

Near the house was a large leguminous tree, which was here known as the "Guanga," but though it bore considerable resemblance to the tree known under that name in Jamaica, it was not the same. It is a tall umbrageous tree, with bijugate leaves and brown hairy pods, somewhat falcate in outline, and 6-8 inches in length. These, when open, are found to contain a sweet mucilaginous pulp, which envelopes the seeds, which when freed from their covering were of a chocolate colour. The pulp much resembles that covering the seeds of Theobroma, and has a pleasant sub-acid taste. There were also plenty of Coconut trees, which found a congenial home in the sandy soil of the beach, but on tasting them as "water Coconuts" we found that they were much inferior in flavour to those grown on the islands in the lagoon, but the ripe nuts are equal in size and quality to those grown in other places.

We also procured seeds of "Samba Gum" tree. These were about the size of small Nutmegs, and, like them, were covered with a reddish arillus, or fleshy covering, much resembling the Mace of commerce. The "Samba Gum," when first produced from the tree, is a yellowish creamy-looking liquid, which after a time becomes hard and somewhat resinous, and when in that condition resembles the "Hog Gum" of Jamaica, the produce of Symphonia globulifera, if, indeed, it is not the produce of the same tree, for it has not yet been our fortune to obtain seeds and botanical specimens of the Jamaica plant.

The remaining days of our visit were spent mostly indoors, on account of the very inclement weather which prevailed at the time; but even during this time I was fully occupied in drying and properly preserving the specimens I had already secured. One of the specimens thus brought to us was the fruit of a Passiflora, called the "Wild Granadilla" locally. It was a ripe fruit 1 inch in diameter, bright scarlet in colour, having a very thin papery pericarp with light coloured transverse and longitudinal markings. It contained a very pleasant sweet pulp, and, being fully ripe, seeds were duly secured, and I am glad to say safely transported to this island, where they are now growing freely. It is a pretty species, and was found on a small island called Careening Cay, forming the tongue of the Bull's Mouth. Another plant of interest of which seed was brought to us was Elais guineensis, or the African Oil Palm, which has probably been introduced in a similar manner as it was into Jamaica from the coast of Western Africa. We also had a fruit of the true Passiflora quadrangularis brought to us under the name of "Granadilla." I had not seen the fruit of this plant for some twenty years, but it has often occurred to me that the name "Granadilla" was probably applied indiscriminately to the two kinds, *i.e.*, Passiflora macrocarpa and P. quadrangularis, the former of which is known and grown in Jamaica as the "Granadilla." The difference between the two varieties is not so much in the size and shape of the leaves, which are very similar, but in the different form, size, and flavour of the fruit [and specially in the construction of the flower. Ed.]. The fruit of P. quadrangularis is in size about one-third less than that of P. macrocarpa, more oval in shape, and of a darker green colour. It is much superior to the ordinary fruit known as the "Granadilla."

The fruit of Bromelia pita was also brought to us. This is the "Silk Grass" of the district, and is the plant from which all the Indian hammocks, bags, &c., are manufactured. It has leaves sometimes over 10 feet in length, in appearance not unlike those of the "Penguin" of Jamaica, but the fruit of the plant is much more like the Pine-apple, as it rises on a stem 3 or 4 feet long from the crown of the plant, and the pips, are aggregated together, in a similar manner to that fruit. The bracts are much more distinct, bright scarlet, and close together, and the pips are much smaller than those of the Pine-apple, and not of such succulent nature. It is very handsome, and were it not for the somewhat unwieldly proportions of the plant producing it would be of some interest as an ornamental fruit.

The bread-fruit was a tree we found abundant in all the islands, and was tended in every place with much care, as it is one of the favourite plants selected by the "We We" and for the display of its depredatory powers. It nevertheless thrives well, and produces fruit in abundance. "Cassava," as a rule, is not so prolific as in some of the drier districts in Jamaica, but it is generally cultivated by both Creoles and Indians. Tobacco is grown, but is of very inferior quality. Limes are plentiful, but Oranges are scarce, rendered so by the constant attacks of the "We-We" upon the leaves of the tree.

The Star-apple was fairly common, and several trees of Blighia sapida, the "Ackee," were in cultivation near the settlements.

There is one variety of Coconut which is deserving of special mention. It is called the "green-skinned," and though to all outward appearance it is smaller than the ordinary kind, it is found that when denuded of its husk the nut is very much superior in size. It is apparently quite as prolific, the trees are as quick in growth and quite as hardy as the ordinary variety. The nut when ripe is about one-third larger, and is much handsomer than the common one. As water Coconuts they contain a very large quantity of liquid; one we had given us produced sufficient to fill a soda-water tumbler once and a half, and we were informed it was not selected for its extra

size. It would be well for those who intend cultivating the Coconut in Jamaica if they were to seek a supply of this special kind, as without any doubt it is very much more valuable than the common variety, and would command a much higher price in any market.

A destructive animal in the provision grounds is the sloth, which is fairly numerous. It is a disgusting looking creature, and specially adapted in form for living in the branches of trees, &c. It is to be seen occasionally at mid-day perched upon the top of a bunch of Bananas or Plantains, leisurely eating them without any apparent regard to external objects, never leaving the bunch until it is entirely consumed.

Pine-apples of the several commoner kinds are in cultivation on the provision grounds; but just as we were leaving we were presented with two enormous fruits of a superior variety. I immediately recognised this as being the true Smooth Cayenne, a variety which I have not as yet seen in Jamaica. Inquiring into the history of its introduction into the islands, we were told that the plants were introduced from Jamaica. It is one of the best varieties that can be grown, and is highly esteemed, even when produced under artificial cultivation in English hothouses. I cannot take leave of this district without mentioning the immense tract of land on the interior mountains, which without a doubt possess a climate somewhat similar to the Jamaica hills. Hence it follows that there is plenty of room for the cultivation of such products as Cinchona, Coffee, Tea, &c., while the coast districts are suitable for the growth of nearly all tropical products, &c. Cacao is at home in the tracts near the coast, and produces much finer beans naturally than can be exhibited by many other countries which expend a large amount of capital and labour in its production.—J. Hart, Jamaica.—*Gardeners' Chronicle.*

INDIAN AND CEYLON TEA AND COFFEE, AND THE TERRIBLE ADULTERATION OF THE LATTER.

[A mercantile correspondent in expressing the wish that the following article should be republished, says that Messrs. Gladstone and Bright are largely responsible for the adulteration of coffee as sold to the English working classes, but so, in fact, are all M. P.'s who are silent under the present iniquitous system of allowing mixtures of coffee and foreign substances to be sold.—Ed.]

Nature has prepared, in Ceylon and Southern India, a special home for the plants from the leaves of one of which and from the seeds of the other come an average Briton's morning and evening draught. China may be proud of her Pekoe and may set aside her choicest Bohea for the cultivated throats of Mandarins, but events seem to hint that it is no longer her destiny to fill the breakfast urns of "foreign devils" with those sun-dried leaves that have for so long formed her staple trade. In Assam, to the South, and farther down yet in Hindustan, where the black Deccan soil dips away in noble terraces, to the teeming plains of the Madras lowlands, there are districts where the tea shrub can be, and is, as well and successfully cultivated as it ever was beside the canals and willow trees of the Celestial kingdom. Ceylon, again, a little thrown back by her short coffee crops, now finds she can grow good tea, and, what is equally important, can dry and cure it to suit the curious and difficult tastes of Europe. The industry is rising rapidly within the limits of that brightest jewel of the English Crown, and the island hillsides, where the disease-swept miles of coffee bushes stood a year or two ago, have now put on a new livery of verdure and prosperity, and the "flush" of new leaves which marks the commencement of each season finds a counterpart, we must hope, in the cash-account of Englishmen who have been down to the very bottom of the well of despondency till this new enterprize rescued them.

This Ceylon tea is not a mere fancy article. It is good sterling "stuff," commanding a high price in the open market, of recognized strength, cured with the best knowledge of modern times—as regards the best samples, at least—packed judiciously in well-chosen wood, and to be had for the asking in a steady and constant stream. Only two things are necessary to exalt Indian tea to the pinnacle of good repute and fashion—the stern suppression of adulteration in every form and an encouraging initiative patronage by all those who wish well to British trade and enterprize. While dark arts are in certain quarters practiced to a lamentable extent in disguising and weighting teas, coffee suffers even more from this cause than the alternate drink. It is an open secret that consumers at home very rarely obtain a genuinely good cup of coffee untampered with and prepared as it should be. Here, in these stalls at South Kensington, may be seen the bean in its natural state, just as it comes down Indian Ghauts on the backs of a long file of white bullocks, when the "pulp" and "parchment" that composed the cherry-like fruit have been crushed and washed off. Again, we see it here roasted as it should be and ground finely, an operation that should not take place until just before the coffee is needed, as if kept roasted and pulverized long, much of the delicate strength and pungency is lost. When visitors have had a hasty and superficial education in the variety of beans from Mysore, Coorg, the Wynaad, the Neilgherries, Travancore, or whatever territorial designation the sample may bear, they may put their ideas of goodness to a practical test by stepping down to the neighbouring coffee-stalls and sipping there with judicial acumen a genuine cup of coffee, such as that with which Fatima solaced the thoughtful moods of the Prophet, and which to-day serves Afghan and Arab, Nubian and Turk, for meat and drink combined. Coffee is an invigorator for work and a restorative for strained nerves and faculties. It must be owned that the sovereign good qualities of this coffee, grown under the shadow of the British flag, may not strike every one as a happy revelation. English taste is vitiated by long abuse. People have drunk noxious compounds so long that they hug their delusions and hardly recognize anything but a foreign smack in the genuine article when the allied planters and the Exhibition thrust it under their unappreciative noses. In the United Kingdom its consumption hitherto, unfortunately, has been hindered to a great extent by many and shameful adulterations, carried to such lengths that large classes of the population hardly know the flavour of genuine coffee. Chicory is the chief ingredient in the cheap mixtures, because it soon makes hot water black, thick, and bitter, and so gives apparent strength to what may contain little of the coffee-berry. Among many other substances used to adulterate coffee are burnt sugar, roasted and ground roots of dandelion, carrot, and parsnip, together with beans, lupin and other seeds. These are mixed in varying proportions, the only "vegetable matter consistently in the minority" being the substance that gives a *nom de guerre* to the miserable preparation. An analysis of forty-three samples of coffee and coffee mixtures purchased in London during March and April, 1886, shows an average proportion of coffee in these samples of just fifty per cent., added to fifty per cent of burnt sugar and various vegetable substances. Nine of those samples contain from 62 to 93 per cent of chicory, &c., averaging 70 per cent of other substances than coffee. Those mixtures are sold at prices ranging from 10d up to 1s 4d per lb. The price of the pure Indian coffee sold in packets at the Royal Commission's stalls is 1s 4d per lb. Upon a moderate calculation the vendors of many of the compounds just mentioned must be realizing profits of something like 100 per cent., and the worse the mixture the greater the gain; but from the report of the Local Government Board for 1884-5 on this subject we may call a story which shows adulteration *in excelsis*. Coffee, says the evidence, continues to be one of the chief subjects tampered with, and about one-fifth of the samples examined were condemned. "The peculiarity

in one case was that the berries were actually shown to the inspector and were ground in his presence, so that there seemed to be no likelihood of an adulteration. Chicory, however, was found on analysis to be present, and the vendor was fined. It is possible that this fraud was due to the revival of an old practice of compressing chicory by machinery into the size and shape of coffee berries. These sham berries are mixed with real ones, and the purchaser who sees what he believes to be coffee being ground before his eyes, is hopelessly deceived. As chicory only costs threepence or fourpence per pound, the fraud is very profitable. It is no rare thing for so-cal'ed "coffee" to be sold which proves on analysis to be composed of one-fourth part of coffee added to three-fourths of chicory,"

There is no reason whatever why such deleterious stuff should be drunk to the enrichment of unscrupulous dealers and the prejudice of a fine industry; a real article is perfectly accessible if we go to the right quarter for it, and all that remains to be done when we have qualified ourselves to judge by a cup of the Commissioners' coffee is to secure our "Ceylon plantation" or "Mysore"—the older in bag the better, for coffee improves with keeping—and then roast it with skill. A modern Brillat Savarin is, however much needed to teach the true manipulation of the bean. The main care should be to roast the material freshly, as it is needed, and the work may well be done in a dry, shallow frying pan, afterwards storing it only in stoppered glass bottles; having it ground according to the prevailing fashion, or better still to pound it in a mortar as Turks do just before using. Then if the Briton allows himself two ounces to a pint of boiling water poured upon the crushed stone —to boil coffee at any stage is rank heresy—he will have a beaker of healthful and dietetic drink such as too seldom graces the table of any but a wise and select few, and of which Pasquet Rosee himself the first who made and sold good coffee in London, would not have been ashamed.

Half an hour may very well indeed be spent in this Indian room, containing not the least worthy of the many curious and varied collections of this year's show, epitomizing, as all do, the wealth, industry, and endless capabilities of that realm upon which the sun never sets. It matters little that one branch of planting has suffered and succumbed under a widespread blight in Ceylon. Already its place is taken and filled by more than one new and promising enterprize. In India neither tea nor coffee is yet within measurable distance of the limits of production; both stand high in the world's favor, and, though appreciated today, ought to be still more popular to-morrow. With their success is linked a wide field of usefulness for adventurous younger sons, as well as the very desirable flow of English capital to English territories, and the securing of a wholesome and cheap drink to replace the decoction of the cabbage-stalk and burnt sugar, which has hitherto passed by the name of coffee. For many reasons "the planters" corner of the Indian and Colonial Exhibition and the moral it teaches deserve, therefore, public attention and reflection.—*Daily Telegraph.*

TOBACCO CULTIVATION IN LOWER BURMAH AND JAVA.

We are indebted to Mr. H. Caine for the following interesting report, dated 1st June 1886, submitted by him to the Chief Commissioner of the Andaman and Nicobar Islands on the cultivation of tobacco as pursued in Lower Burmah and Java:—

I have the honour to submit the following report on the cultivation of tobacco as pursued in Lower Burmah and Java.

Leaving Port Blair on the 23rd of February, I arrived in Rangoon on 26th instant, and having a little time at my disposal, pending the departure of the Straits steamer, I decided to go further inland, and visit the tobacco districts under the charge of Mr F. Cabaniss, Assistant Director of the Agricultural Department. With this object in view, I left Rangoon as soon as I had informed Mr. Cabaniss of my intended visit. I met this gentleman at Myanoung, on the Irrawaddy river; we started together for Thayetmyo, from which place we proposed dropping down the river in a small boat to see the tobacco on the banks of the river. The following is a summary of the tobacco cultivation which I noticed in the Prome and Thayetmyo districts.—

The tobacco grown by the Burmese in Lower Burmah is usually planted in alluvial deposists without any preparation of the soil. The seed is sown broadcast on the damp mud, and thus allowed to germinate, which usually takes about eight days. When the plants are well up, they are thinned out here and there where crowded, and the surplus plants disposed of at the rate of R1 per hundred plants. The remaining plants are left pretty much to themselves; very little (if any) hoeing or harrowing is done.

Mr. Cabaniss has instituted nurseries for transplanting at his own farm. A better crop could be secured if the same plan were resorted to by the Burmese themselves. The plants could then be planted out at regular intervals, each would have its own area of land to grow upon, and a more regular crop would be the result. Where village upland is used for tobacco cultivation, the soil is ploughed up three or four times, also partly broken up by wooden rollers and five-pronged wooden harrows; in these lands the seed is also sown broadcast, the plants coming up very irregularly. The soil is not pulverized as in Upper India, but broken up into small nodules or lumps.

Curing.—I saw some of the tobacco cured by the Burmese themselves after their own method, which, however, does not differ materially from that of the natives of Upper India, only less care is taken over it: the plants are cut when ripe and left to cure in the sun, exposed to rain and night dews. The samples I saw were dirty and badly cured. Mr. Cabaniss has induced a few of the Burmese to try shade-curing, which would greatly improve the quality of the leaf; he also says that shade-cured tobacco fetched R. 40 to 50 per 100 viss, about 350 lb., which would be one anna and ten pies to two annas three pies per lb. Sun-cured tobacco fetches some R.10 less per 100 viss.

The seed is sown in December and January, and takes about eight days to germinate.

I much regret that owing to my time being limited, I was unable to visit the curing sheds at Myanoung under the supervision of Mr. Cabaniss. However, there was no tobacco-curing at the time. I left Rangoon on the 13th of March and arrived at Singapore on the 20th instant; from thence I crossed over to Batavia on the 23rd instant, arriving at the latter place on the 25th instant. From information received from the British Consulate at Batavia, I decided to go to Sourabaya to see tobacco grown in the Probolingo and Passoerean districts. I arrived at Sourubaya on the 4th, and from thence set out for Probolingo on the 7th. I received letters of introduction to one or two planters from Messrs. Fraser, Eaton and Company, of Sourabaya; these gentlemen were very civil and obliging. I engaged a native cart of Probolingo to take me to Lomadgong, a distance of 40 miles. The roads were in fairly good order, lined by teak and tamarind trees. There were vast tracts of land under rice on each side, also a good deal of sugarcane planted some four feet apart in ridges, allowing free currents of air to circulate between the rows. A fine grade of indigo is also grown in this district. Jack fruit and rambutans (a sort of lichee with a shell like a horse-chestnut) grown in abundance. I arrived at Lomadgong on the 8th, and left this place for the tobacco districts on the following morning. The first planter I visited had finished curing, and was engaged in sorting his tobacco leaf for the Amsterdam market. He showed me his sheds and system of bulking and prising.

Curing sheds in Java.—These sheds are built very large and roomy, made up of bamboos and palm-leaf thatch with plenty of space, so as to permit free circulation of air and to prevent house-burning,

while allowing the plants to hang free of each other These sheds are 300 feet long, 60 feet high in the middle, by 60 feet broad, and would contain 30,000 lbs. of leaf hanging up. In this part of the district the planter grows his tobacco on much the plan as that pursued by the tobacco farm at Poosa, Tirhoot, namely, the cultivator receives so much advance on his land which he cultivates himself receiving the seed from the planter. The seed beds are 30 feet × 3 feet in size. The exact proportions for sowing the seeds are as follows:—

With 1 ounce of seed mix 4 ounces of ashes (wood) and 1 ounce of dry sand, then scatter over the beds and rake over. When the plants are ripe, they are bought by the planters at rates of 9 to 10 guilders, and sometimes when very fine plants, as much as 20 guilders are given for 1,000 plants. These rates vary according to the weight, size, and texture of the leaf.

Planting.—The seedlings are planted out at a distance of $2\frac{1}{2} \times 2\frac{1}{2}$ feet apart from each other, they are topped when 8 to 10 feet high. The plants grow tall with long narrow leaves, and about 20 leaves are allowed to remain on each plant.

In the Kedirie districts the planters in most cases possess the land, and then can make their own arrangements about growing their crops. 4 to 500lbs. is the average turn-out per beegha.

Curing.—When the plants are ripe they are cut off close to the ground, and then hung up in the sheds with twine or some fibrous roots. No splitting of the stalk is permitted, as the object of the planters is to cure slowly.

The curing of the leaves usually takes about 24 days if the weather is moist and favourable. The colour turns out a light brown which becomes a darker shade through fermentation. If the weather is hot and dry, the leaves cure quickly and become more or less yellow which is a bad colour, and unsuited for the manufacture of cigars. Otherwise the curing process is the same as pursued in shade-curing in India.

Fermenting.—When ready cured, and when the leaves come in order, *i. e.*, become moist and limp, the tobacco should be taken down and bulked, the leaves having been first of all stripped from the stalk. The leaves are bulked in three bulks of some 4,000 lbs. each, ends outwards. Some planters fasten a thermometer on to a thin stick, which they insert into a hollow bamboo previously placed, so that the thermometer reaches and remains in the centre of the bulk. When you require to test the temperature, the stick is drawn out, the hollow bamboo remaining fixed. There can be no fixed rule as to the number of degrees you should allow the tobacco to ferment, as some leaves are of finer texture than others and should not be allowed to heat so much as leaves of a coarser kind. However, leaves of the finest sort should not be permitted to exceed 105°, and those of a coarser texture might rise up to 107° or 108°. The object of the thermometer is to let you know the degree of heat, so that the bulk may be opened in time to prevent the leaves from over-fermenting and rotting.

After the tobacco has been bulked a few days, it will have to be cooled. The bulk is then opened, and the hands of tobacco well shaken and cooled. After the cooling process is finished, two of the bulks are made up again into one, taking care, however, that the hands of tobacco forming the outward sides of the first bulks should now be placed more in the centre, and those previously inside now form the outsides. In a few days the bulks will heat again, and must be opened and treated nearly the same way, except that the light colors should be placed in the centre, and darker ones bulked all around them. Three bulks of as near as possible the same degree of temperature should now be made up into one large bulk of 10,000 lb. or so. Some of the bulks I saw contained as much as 40 to 50,000 lb. of tobacco. Each bulk receives as it were three heatings. The bulks are raised three feet off the ground on platforms; this is to keep off the damp as much as possible.

Several of the planters in Java dispense with the thermometer altogether, and simply ascertain the heat by thrusting their hand into the bulk.

Sorting.—The tobacco seldom heats after the third time, if it should, however, still continue to sweat, the bulks must be opened and treated as above explained. As soon as the fermenting is over, the bulks are opened and the leaves arranged for sorting. These leaves are sorted into:

Brown—clear, light, and dark.
Red—light and dark.
Black—light and dark.
Fahl—light and dark.
Streaky.

These are again divided into five different lengths for each colour. Scrubs, which are very small, and poor leaves, are sold locally.

The tobacco costs about 30 cents shipped (5 annas) per lb., and fetches about 50 cents (8 annas) per lb. in Amsterdam.

The tobacco after sorting is baled into square boxes lined with palm-leaf matting, and when the tobacco is well pressed, the bale is made by sewing up the sides and tops. A ratchet screw with four handles is used for prising.

Cultivation.—In Sumatra tobacco lands are used once in ten years; after having once had a tobacco crop, they are left alone untouched for nine years. In Java owing to all the land being under some sort of cultivation, the planters grow on the three-year rotation system.

Seed.—I received two bottles of Manilla Kadow seed from a Dutch planter, which seed I intend sowing this year.

I left Java on the 15th April and arrived at Singapore on the 19th. Left Singapore on the 21st, and reached Penang on the 24th. Seeing that I should not be able to catch the steamer leaving for Port Blair from Rangoon on the 24th, I took advantage of a Government steamer leaving Penang for Taipeng (Perak), at which place I arrived on the 28th. I went up a hill in Taipeng, where there was both coffee and tea. The coffee, planted some 3,500 feet high, seemed very flourishing, good report of its quality having been received from England. There is no tobacco grown here, the soil I saw was not at all suited for it. I believe some tobacco has just been started further inland, but unless they have an experienced curer to look after it, no good result can be expected.

My travelling expenses being very limited, I could not see Sumatra. However, the seed of Sumatra and Java were originally identically the same, *i. e.*, Manilla Kadow. It is the virgin soil which gives that texture and gloss which is so much admired in the Sumatra leaf, the color is obtained through judicious fermenting.

I arrived at Rangoon on the 8th of May, and drove out with a gentleman there who is given to agricultural pursuits, and saw some of his tobacco, about 7 miles out of Rangoon. It was planted much too close, and otherwise badly attended to. None of the tobacco lands of Burmah can compare with Java for tobacco. This gentleman had grown some wheat, which requires a good deal of watering, and cost him a great deal of trouble.

I left Rangoon, on the 19th May, and arrived at Port Blair on the 21st instant.—*Indian Agriculturist.*

Kulu Peach Crop.—The Kulu correspondent of the *Delhi Gazette* writes quite recently:—"There is a simply amazing peach crop, some of my best trees being simply broken down by the weight of the fruit."

Hops, when introduced into England from the Netherlands in 1524, were regarded only as a means of "spoyling good beer," and in 1529 the city of London petitioned against coal from Newcastle on account of the stench, and against hops "because they did spoil the national drink." It was not until 1771 that they became subject to duty.—*Rural Australian.*

TOBACCO CULTURE IN ENGLAND.

The August number of the *National Review* contains an article by Mr. A. G. F. Eliot-James on the culture of tobacco in England. He says that since the cultivation of tobacco in this country was stopped the difficulties besetting the renewal of the industry have materially increased. The English climate, always to a certain extent unfavourable to tobacco growth, has altered for the worse, its variability is more pronounced, the rapid changes of temperature, especially of late years, being against not only vegetable but animal life. The soil, though still very fertile, has less of virgin freshness, and would require, for such an exhaustive crop as tobacco is proved to be, high manuring, which means money an article which our farmers, more particularly our small farmers, are found at present sadly wanting. Manuring is, however, by no means the only expensive outlay needed for a profitable growth of the plant. And, besides the disadvantages of bad climate, unsuitable soil, and want of capital, there are other conditions now attached to the opening up of a home trade which formerly did not exist. Foreign competition is incomparably more severe, the tobacco-grown area of the world has been enormously extended, and the freight charges on the foreign supply so greatly reduced since the time the plant was raised in the United Kingdom, and the cost of transmission consequently so trifling, that it would give our cultivators little or no advantage, certainly no really appreciable advantage, over the numerous foreign growers who would contest them the sale of inferior tobaccos.

Mr. Eliet-James goes a little into detail as regards the disadvantages. First of all, unfavourable climatic conditions. In a warm climate possessing a certain amount of humidity, a tobacco, by ordinary means, can be raised that yields a profit; a warm and moist climate allowing the selection of these fine sorts of leaf which command a high price. Can this be described as a warm climate? The tobacco plant is not hardy; on the contrary, delicate. Frost is most injurious to it in the early stages of growth, and the seedlings cannot be transplanted into the plantations from the beds in which they must be carefully protected until all danger of frost is over. Sown in March and planted out in May, the plant should arrive at perfection in September, and the leaves be gathered before there is any danger of frost, as a single white frost would spoil the whole crop and cause it to rot. Hail-showers at certain periods of early growth are absolutely fatal and high winds very detrimental, as they tear the leaf. Heat, sun-heat, is an essential to the well-being and proper development of the tobacco plant both to ripen it for harvest and to dry the leaf.

Taking soil, the difficulties, though great, are far more easily met than are those of climate. Tobacco requires a friable and sandy soil, rich in those ingredients on which the plants thrive. It draws from the soil, for the proper formation of its substance, carbonic acid, ammonia, lime, potash, magnesia, oxide of iron, chlorine, silica, sulphuric acid, and phosphoric acid. In most soils these essential ingredients are present; not only must they be present, however, but in proper proportions to the wants of the plant, as regards quantity and quality, or else it will not thrive. Tobacco needs a soil rich in humus from the fact that its development must be both rapid and complete. If the soil is not, therefore, naturally rich it must be made so artificially, by high and constant manuring with well-matured manure, carefully prepared for the purpose, and not of too heating a nature, or else blighting of the roof, dust, and consequent failure will be the result. Nitre is one of the principal ingredients tobacco extracts from the soil; and some tobacco-growers, particularly when they crop the same land successively with tobacco, counteract this drain by sowing rye on the land directly the tobacco is cut, and ploughing it under the next May, scattering the tobacco-stalks, cut into two or three inch lengths, over the land the sowing of the rye takes place, and ploughing them in also; both rye and tobacco containing nitre it is thus, as it were, returned to the soil. High manuring, without which even in suitable soil, no good results can be looked for, must be set against probable profits, as also the rent of the land, and the price of labour—no small consideration at the present time. Tobacco is a crop requiring incessant looking after, and a very large amount of hand labour from the time of seed-sowing to the outturn and delivery of the cured leaf into the manufacturer's hands. The number of persons employed would naturally depend on the amount of land under tobacco. The amount of seed required to raise plants for an acre of ground depends very greatly on the vitality of the seed. There are about 100,000 grains of tobacco-seed in an ounce; but the percentage of vitality is low, so from three-quarters of an ounce is usually sown in India to raise enough plants for an acre. Allowing the plants to be two feet apart in each direction, some 10,890 would be required and 4,840 if set 3 ft. apart. The medium distance is often observed of 3 ft. apart in one and 2 ft. in the other direction, and then 7,260 plants are needed. Anyhow, a reserve stock must be kept, as many plants die in the seed-beds or after they are transplanted into the plantations and such gaps must be kept filled up. In America less plants are set to the acre—1,613, if broad vigorous leaves are wanted. Such plants will each yield half a pound of prepared tobacco, or about 800 lb. to the acre; this average of produce to the acre being what the Indian Government farms are estimated to yield; the natives put the production considerably lower. In England the probable outturn may be roughly estimated at 600 lb. the acre.

In cultivation, the following numerous operations are followed:—The land is prepared by manuring, ploughing, harrowing, rolling, the ploughing and harrowing being repeated at certain intervals. The seed-beds are most carefully prepared, sown, and protected; the seedlings thinned out and transplanted in favourable calm weather into the plantations; weedings and light hoeings are given as needed, and followed by heaping, nipping, and topping (some few plants being saved for seed,) and when the crop is ripe, leaf-gathering; all this being hand-labour, the operations having to be conducted with care and delicacy of touch to avoid injury the plants or leaves. With the gathering of the leaf, the incessant labour is not over—indeed, the processes to follow are of a much more delicate and critical nature. Drying-houses will have to be provided, not of a very expensive character, perhaps, but still fulfilling the requirements of shelter and ventilation; wilting-sheds, too, must be built, unless there are unused barns or out-houses handy. If the plantations are far removed from the farm-house it is more convenient to have the buildings close to the standing crop, as the wilting, or withering, and sweating processes are carried on with less risk, as also the stringing of the leaves on a cord, or rather threading, for a needle is used for this purpose. When strung, follows the close suspension in the drying-houses, the outside drying in the sun, or by flue-heat if sun-power is not sufficient; the return to the houses and second suspension, farther apart this time; then what is called the final suspension; and lastly, the sorting, making into hands and packing for the market. It will be seen from the mere mention of these various operations, without dwelling on their intricacies, that tobacco is not simple but an extremely troublesome crop to grow; not an enterprise to be rashly and unadvisedly undertaken by any farmer, even supposing the experiments about to be made point to a favourable decision.—*St. James's Budget.*

The Transit of Tea.—A tea train is now running from San Francisco to New York, the object of it being to demonstrate that the railway transit can be accomplished more quickly than the sea journey by the Suez Canal.—*Home and Colonial Mail.*

COFFEE-GROWING IN MYSORE AND SOUTHERN INDIA.

('From Paper Read in Conference Hall, of Colind Exhibition, July 22nd, 1886, By Colonel Campbell, Formerly of the Mysore Commission.)

The coffee districts of Mysore are the furthest north on the line of the Western Ghats; next to them on the south lies Coorg; then Wynaad and the Neilgherries, and further south again Travancore.

The altitude at which coffee is grown varies from 2,000 to 3,500 feet above the sea, and the rainfall from 80 to 150 inches per annum. The months of heaviest rain are June, July and August. This is the period of the south-west monsoon, which begins to die away in September, and is succeeded by the north-east monsoon in October and November. The rains of this monsoon are not heavy in a locality so far to the west, and fortunately so, as rain is by no means acceptable at the time of picking and drying crops. In December rain sometimes falls. In January and February seldom or never. In March occasional showers are expected, and if none come till the middle of April the coffee tree begins to droop, except on well-sheltered estates, and anxiety is felt about the blossom and the setting of the fruit. At this time the heat is considerable, and thunderstorms towards evening are frequent. But no period of the year is in any special degree unhealthy, as compared with other parts of India, and the mere discomfort of hot weather is mitigated by the sea breezes from the western coast at night, the distance from the sea as the crow flies being not more than fifty or sixty miles. The rainy season is well known to be the healthiest time of the year, and as there is plenty of estate work to interest and occupy the planter out of doors, little regard is paid by him to the weather.

As was mentioned above, the three head-quarters of the Mysore coffee districts are—Koppa, Chicmugloor, and Hassan.

The oldest coffee estates in Mysore—some of them established between forty and fifty years ago—are to be found on the slopes of the Bababooden Hills, which project, in horse-shoe shape, towards the east. In Munzerabad there are estates upwards of thirty years old, and in Koppa, a few of nearly equal age. But numerous estates near Koppa, and in the Sullibyle portion of that talook and elsewhere, to the number of about thirty, have been opened out within the last ten years, and are growing trees, the seed for which was obtained from Coorg, the Wynaad and other places. The coffee from these plantations is distinguished in Mincing Lane from that known as "Old Mysore," and although more than rivalling the prices fetched by other Indian coffees, the "Coorg kind," as it is sometimes called, does not reach the figures obtained for some well-known brands of the "Cannon" description. But there is hope that prices will level up, and that as it is found necessary to fill up vacancies in the old estates by plants of the new kind, the distinction between them will, in process of time, be obliterated. At all events, the satisfactory conclusion may be drawn, that the coffee plant can be made to renew the promise of its youth in a green and productive old age.

The pay is four annas a day for a man, and two annas for a woman. It would be unwise to attempt to lessen it. As the coolie's native village is seldom more than three or four days' journey from the estate on which he works, there has been no necessity to burden the Mysore planter with rules and regulations intended to protect natives of India, who are tempted by large advances and high pay to emigrate to places far distant from their homes.

There is not very much land suitable for coffee cultivation remaining in the Mysore country, which is not either occupied or secured by grant; but there is room—much room—for the profitable employment of a great deal more capital than the majority of planters possess. Nothing is more certain than that in return for capital wisely laid out, coffee will pay handsomely. It is doing so in individual instances in which money and skill enable the fortunate owner to force a fair return in spite of all the well-known drawbacks, which is neighbour, for lack of sufficient means, is unable to overcome. In one word, judicious manuring is the secret of success, not, of course, neglecting the important operations of pruning, digging, &c. Without liberal manuring, the large returns of former years are not now obtainable. But perhaps these returns, if regarded per acre, were not so heavy as is often supposed. The yield from large estates of from 500 to 700 acres was not, as a rule, calculated at so much per acre. The ordinary yield being well-known to the owner and his neighbours, it was sufficient to quote the number of tons more or less in any particular year, and these were obtained sometimes from one block and sometimes from another. But in the more modern estates of from 200 to 300 acres, the calculation is per acre, and large blocks out of this comparatively small area cannot be allowed to remain fallow. It is not economy to open out an estate of less than from 150 to 200 acres, although the question is sometimes asked, why not restrict the area to 80 or 100 acres of choice land cultivated in as nearly a perfect manner as possible? But this risk, for reasons not difficult to imagine, no one is disposed to run.

Take an estate not less than six years old, of average quality in all respects. The outlay in up-keep, including superintendence, but excluding all crop operations on the estate, may range from R50 to R80 per acre. Under the head of crop:—

	R.	
The cost of picking and pulping is .	56	per ton.
Transport to coast	26	„
Curing, shipping, and insurance . .	78	„

Total expenditure on crop, from R150 to R160 per ton.

For R50 per acre spent on careful cultivation, but with little manuring, a return of 3 cwt. per acre, or 30 tons, may be expected in good years. But for R70, or R80, which means liberal manuring, at least 5 cwt. per acre, or 50 tons, on an average, should be obtained. Prices are now showing a tendency to recover from the depression of the last three seasons, and may for present purposes be quoted at £65 per ton net (a reduction of more than 20 per cent. on the prices of 1882-83).

At R50 per acre, the yearly expenditure under all heads in India would be—

	R.
Cultivation and superintendence . .	10,000
Crop expenditure at R160 on 30 tons .	4,800
Total . .	R14,800

The price of 30 tons at £65 would be £1,900, or R25,350, at 1s. 6½d. exchange. Profit, R10,550, or £811.

At R80 per acre, the figures would be—

	R.
Cultivation and superintendence .	16,000
Crop expenditure on 50 tons . .	8,000
Total . .	R24,000

Price of 50 tons at £65 = £3,250, or R42,250. Profit, R18,250, or £1,103.

An income of, say, £1,400 a year, when capitalized at 5 per cent, would be £28,000. But for money embarked in a distant land, with attendant risks, from 15 to 20 per cent. should be looked for with some confidence, and from £7,000 to £10,000 would therefore probably be the approximate valuation of an estate in full bearing, such as has been now described.

The value of a property brought into paying condition, after years of labour, anxiety, and residence in a foregin land, represents, of course, a sum much larger than the actual outlay upon it. An individual intending to open out an unfelled forest, and to bring gradually into cultivation an estate of 200 acres, should have at his disposal at least £4,000, to be expended during the first four or five years. Out of this money he would support himself at the rate of £150 a year. But if he were possessed of no experience in planting, or had not the help of an efficient partner, he would do well to go into training by working as an assistant on some well-managed estate, for, say, two years. Many men have

begun a planter's life with much smaller capital, and by the exercise of great self-denial, coupled with special aptitude for the work, have met with fair success. But such are exceptions, and in these instances the hour of success has to be patiently waited for beyond the ordinary period. On Indian plantations, as elsewhere, young men are received as assistants on payment of a premium, and may eventually gain a living as managers. But without capital it will be a living only, and the life is not to be recommended.

The calculations which have been given above have special reference to Mysore, where, although the conditions slightly vary according to the positions of estates, the supply and the price of labour are more favourable to planters than in most other districts. The figures which follow refer to coffee estates in Coorg, which is a British province lying to the south of Munzerabad in Mysore, and is administered by a Commissioner under a Chief Commissioner—namely, the Resident at the Court of the Maharaja of Mysore.

The present Acting Chief Commissioner of Coorg, Mr. C. E. R. Girdlestone, made a tour in that province in January and February of this year, and inspected a number of coffee estates, one of his objects being to inquire into the state of the coffee cultivation, and to ascertain whether local circumstances were such as to justify a request for a reduction of assessment which had been submitted to him by the Coorg Planters' Association.

The full assessment being R2 per acre, leviable only after the twelfth year, the Association urged that it should be reduced to one rupee for coffee in full bearing, and to eight annas on the remainder of the estate. The Chief Commissioner, in declining to comply with this request, pointed out that, while the relief applied for would be hardly perceived by successful planters, it would not avail to retrieve the fortunes of those who, for a variety of reasons, for which the Government was not responsible, had failed to make their estates remunerative. At the same time, he admitted that the planters had some cause for complaint in the state of the roads, and he promised to arrange that they should be placed in a proper condition.

The result of the Chief Commissioner's inspection of coffee estates, both in North and South Coorg, tends to confirm what has been said above—namely, that coffee may be relied upon to give a fair return for capital liberally and judiciously laid out. One estate of 225 acres is said to give in a good year 50 tons of coffee, or 4½ cwt. per acre, and the average net price last year was £62 a ton. The outlay was about R20,000 on the estate, or nearly R90 an acre, and if to this be added curing and shipping charges, with insurance at R80 per ton of crop, the result will be R24,000 or £1,846 for expenditure, against £3,100 purchase-money, or a profit of £1,254. Allowing for slight differences in rates, these figures are in near correspondence with those which have been quoted for Mysore.

In another estate of about 500 acres, the average yield was 150 tons, or 6 cwt. per acre, and the net price per ton about £65. The expenditure is not given but, taking rates in proportion to those stated above the profit must have been more than £5000. A third estate of 130 acres, yielded last year about 45 tons, or 7 cwt. per acre. Other estates are referred to as flourishing especially some in South Coorg, in what is called the Bamboo District, but figures are not given.

The concluding remarks of the Chief Commissioner, as coming from a disinterested observer after careful local examination, deserve attention and are as applicable to Mysore and other districts as to Coorg. Mr. Girdleston says, "I am by no means singular in the opinion that the success of the coffee industry depends, humanly speaking, on refraining from extravagant payments for land already stocked, on avoiding loans at high interest, on restricting the size of estates, so as to ensure close personal supervision, and on economical and scientific management. If these conditions be observed there is a fair competence attainable by European planters even though prices should remain comparatively low."

A CEMENT very much used at the present day in China and Japan is made from rice. It is only necessary to mix rice flour intimately with water and gently simmer the mixture over a clear fire, when it readily forms a delicate and durable cement.—*American Grocer.*

PLANTING GLADIOLI.—In lifting a quantity of Gladiolus bulbs of various kinds lately, I came across one of the largest I have ever yet seen, and all were as plump and fresh as could be desired; those that were lifted and replanted last season had for the most part two large bulbs with the old decayed one still under them, and others that had remained undisturbed for three or four years had increased into large clumps. The finest bulbs of all were on a raised bed of rather poor soil, and although last summer was excessively dry, and other plants on this bed nearly scorched, the Gladioli produced very fine spikes of bloom, and branched out into several side spikes when the leaders were cut off. I may remark that our soil is light and stony, and that the Gladiolus grows freely in it without the aid of manure. I feel sure that the bulbs are sounder and less liable to disease if grown without gross stimulants of any kind.—*Rural Australian.*

RATS.—Some years since (writes a correspondent of the *Queen*) I took a house in Ireland which had been untenanted for a considerable period; but very shortly after my arrival there it became infested with rats. For a period I submitted to the nuisance, merely allowing a terrier to visit the ground floor during the night; but the advent of an invalid relative caused food to be taken upstairs, and the vermin soon followed, overcoming my patience. Finding the rats behind the skirting board, I had it removed and a liberal coat of gas tar placed there, and, seeking closely, I found the run leading from below, into which I also caused some to be poured. I found this effectually stopped their raid to the upper storey, and then I determined to adopt the same plan on the ground floor, though, I had to take down a dado in my dining-room and entrance-hall. However, after this had been done, I neither heard nor saw a rat in my house for the remainder of my occupancy, which was about twenty months. The gas tar should not be too thick, so as to remain soft for the longest period possible, as the efficacy of the remedy depends on the feet and coat of the animal becoming soiled on passing it.—*Rural Australian.*

THE RESULTS OF THE LAST INDIAN TEA SEASON.—Most of the leading Indian Tea Companies have now presented their report for the past year, and a weekly contemporary has compiled an interesting table which exhibits at a glance the results accruing in regard to 25 of these as compared with those of the preceding year. From this analysis, which will be found at foot, it will be observed that although season 1884 gave good results, 1885, or last season, gave still better returns. Higher values were in most cases obtained for the teas of 1885—the highest average price realised last season for the crop of any garden in Assam, viz., 1s. 5¾d. per lb. was scored by the Jhanzie Tea Association. Among Cachar gardens Borokai Company still bears the palm, the average price obtained for that mark being 1s. 6¾d. per lb. The Darjeeling Company's average 1s. 5¾d. per lb., is also a handsome one. Larger dividends, consequently, were paid to shareholders on the results of 1885. In 1884, as will be seen, dividends ranged from 1 to 15 per cent. per annum. In 1885, however, they range from 1¼ to 20 per cent. per annum, and only four concerns out of twenty-five pay no dividend, while in three of these profits were made, although circumstances rendered a division of the profits inadvisable. It is somewhat surprising that with such handsome results tea is not a more favourite investment among English Capitalists. The shares it is true, quoted on the Stock Exchange, and for this reason probably little is known among the general public of the advantages of tea as an investment.—*Planters' Gazette.*

THE BANANA TRADE: AS IT IS AND AS IT MIGHT BE.

Under these headings a writer in the *Fiji Times* discusses thus the question of the disposal in fruit which cannot be exported:—

Roughly I estimate that six tons ripe bananas make one ton of dried fruit (if my memory does not play me false it takes only five tons). Well let us take the low estimate of 20 tons of fruit per acre, suppose half this fit to ship, green, the remaining half from various causes, such as defective size or appearance of bunch, or surplus over and above carrying capacity of vessel, or the ripening of large quantities between arrivals of steamers, or low price of green bananas in foriegn markets, or possible causes I have not enumerated, the grower sells to be dried, for which I believe it possible to pay him £1 per ton and still leave the driers a sufficient margin for profit and working expenses. Now the question is, Will it pay to raise and deliver them at Levuka or other curing centre at such a price? I believe it will, it pays to deliver cane or river banks for 10 per ton, surely it will pay to deliver and carry a reasonable distance a much hardier crop than cane which is liable to ferment in a very short time. He has also to the good all those bunches fit to send direct to a foreign market; also the advantage of such a case as is now before me where I am informed 1,000 bunches, which if of marketable size, ought to weigh at least 22 tons, have arrived too late for the steamer, and unless another steamer arrives will have to be thrown away which amounts to this, that £22 worth of raw material or its equivalent of £103 manufactured do, will be thrown over-board. This is only a case of many in point. I suggest no royal road to wealth. I greatly doubt its existence except in stock gambling, but I certainly think money might be profitably saved which is now utterly lost. It has been objected to me that it would cost more than the article was worth to place the first instalment on the market; well the only part of the premier transaction which I perceive to be non-rumunerative would be the cost of the travellers' wages and expenses. This difficulty I opine to be unavoidable, but I cannot at all see that so slight a one need crush the industry, and this of course would be a matter of after detail.

There is another use for the banana, viz:—the manufacture of jam. It makes a first class jam and being free from stones and seed is admiraby suited both for the table and culinary purposes; and also I believe the fruit to be suited for canning purposes, though in that I have not practically tested it. In fact to sum up, we are only at the beginning of the banana trade and have only developed one branch of it; the other features are not to be projected without an effort, at least.

OLIVE CULTIVATION IN SPAIN.

Consul Oppenheim says that there are many varieties of the olive tree cultivated in Spain, the better known descriptions being the *Manzanillo. Sevillano, Gordal, Beliotudo, Redondillo, Lechin, Nevadi'lo blanco, Varal blanco. Empeltre, Racimal, Verdejo, Madrileno,* and the *Cornicabra.* Each of these varieties can be reproduced in several ways, but the method of propagation generally adopted is either by *estacas* or by *garrotes.* Both these methods are followed throughout the whole of Spain, though in the central provinces the second process is more general, while the contrary holds good for the south and the extreme north. The time chosen for planting is from January to March in the maritime zone, from January till April in the central provinces, and from January till May in the north. The *estaca,* which is a stout limb of the parent tree about three yards long, is planted immediately after being cut from the tree; a hole is dug to a depth varying between one and two yards, the depth increasing with the severity of the climate. Square pits, about three quarters of a yard each way, are considered to be the best for the purpose. At the bottom of the pit a layer of manure is first deposited, upon which a layer of soil is placed; the limb is then placed in the centre of the pit, and earth is then put in, thoroughly broken up, and pressed down with the feet. In Andalusia it is usual to pile up moist clay against the protruding part of the *estaca,* until no more than about a foot of its length is visible; and this is considered to be very efficient in hot, dry regions, as otherwise it often happens that the limb produces shoots from the lower part only, while the upper part becomes dried up. The moist clay is piled up in the form of a slender cone, and at half its height an opening is left for supplying the limb with water, which in dry weather is done plentifully. The *garrotes* are cuttings of from two to three feet long, and for these the pits are dug somewhat less deep than for the *estacas,* and two of the *garrotes* are planted together, leaning towards each other in such a position that the two cuttings and the bottom of the pit form a triangle, of which the apex is even with the ground. In regard to manuring and filling the pit, the process is the same in both methods of planting, only the upper part of the smaller cuttings must be covered with a little loose soil. The sprouts from these smaller cuttings are more exposed to damage by frost and by animals, and the bearing age is also reached some four or five years later; but it is considered that the trees cultivated in this way are more hardy and productive. During the first eight or ten years after planting, the orchard is ploughed three times a year, and the soil immediately surrounding the plants hoed three times the first and second year, and later twice a year. Manuring is usually effected once every three years, and the autumn is the period generally chosen for this operation. Plaster from old walls is considered to be a beneficial addition to the stable manure ordinarily used, and calcined bones are known to expedite the growth and increase the yield of oil. It has been stated that one hundred kilogrammes of manure increase the product of each tree the first year by over two kilogrammes, the second year by three, and the third year by two kilogrammes again. Artificial irrigation is restored to only in dry regions, or in times of drought; as a rule the grown trees thrive very well without it. In Saragossa irrigation is largely resorted to, as is also manuring, while in Seville there is very little of either. The time at which the olives ripen varies considerably, according to locality and the species cultivated. In Andalusia, when intended for pickling, they are picked usually about the middle of September, and the pickling lasts until the middle of October; at that time the fruit has reached its full development, as far as size is concerned, but is yet green and hard. When the fruit is required for the extraction of oil, the harvest commences in November and sometimes last until January. The usual mode of gathering is by knocking the fruit down with sticks, but careful growers pick by hand, which is less expeditious but more profitable, as the fruit is obtained in a better condition. For pickling there are two methods employed, the first, which is a very slow process, being as follows:—The freshly picked olives are placed in water, which must be changed every day, and allowed to remain a fortnight; at the expiration of that time the water is quickly drawn off and promptly replaced, not leaving the fruit exposed to the air more than is absolutely necessary. The water drawn off is at first very bitter, and this bitter taste will go on decreasing day by day, the taste being taken as a criterion as to when this process is to be considered as completed, a fortnight being the time usually required. The olives are then placed in a solution of salt and water, generally in barrels, in which wine or brandy has been kept. At the bottom a layer of olive twigs and leaves is first placed, which protects the olive from injury by pressure, and on the top of the fruit another similar layer is placed, care being taken to have this layer well covered by the brine. The whole is kept down by oak staves weighted with bricks or stone. all of

which are kept scrupulously clean, as any noxious taste or flavour imparted to the brine will effect the olives, and the vessels are then covered with a cloth or tarpaulin in order to exclude the dust. Olives thus treated will be in good order for boiling or for consumption in about four months, and will keep sound for two years. For pickling by a quicker process, a solution of caustic soda is prepared, and the fruit placed therein. After remaining in soak about one hour, a few olives are sampled by cutting, in order to ascertain how far the solution has penetrated the pulp; the depth of such penetration being easily seen by the colour, and it should not exceed half the thickness of the pulp. When the olives are in proper condition, the solution is immediately drawn off, and replaced by fresh water, which must be changed quickly three or four times, the fruit being allowed to remain in the last water for twenty-four hours. During that time the brine is prepared, and the next day the olives are placed in it. By this method of pickling, the olives will be ready for use within thirty days. In both processes the olives, after once being wetted, are never exposed to the air more than a few minutes at the time, and in handling the fruit, ladles of wood or tin are used invariably. The extraction of oil is effected in many ways, some of them being very primitive. The first pressing is generally done by means of a mill, and the mass, when reduced to a pulp, is soaked in hot water, and is then subjected to a second pressing, which in the Seville district is usually accomplished by means of hydraulic machinery. The refuse of the second pressing is used as fuel, and in some cases as cattle fodder. Recently a new process has come into vogue, whereby a further quantity of fatty matter is extracted which is used for making soap. Where it is not thought advisable to utilise the refuse in any of these ways, it is employed as a fertiliser for the olive groves. It is estimated that the yield of oil generally averages from about 16 to 25 per cent. Consul Oppenheim states, in conclusion, that a considerable export trade both in olives and in olive oil is carried on in Spain, the amount of the former shipped in 1882 exceeding 1,722,000, and of the latter 13,730,000 kilogrammes, the principal countries of destination being the United Kingdom, France, and Cuba.—*Journal of the Society of Arts.*

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

CANADA.

A trophy of fruits shows what may be done in preserving the appearance of fruits. Mr. W. Saunders, of London, Ontario, a pharmacist whose name is as well known in this country as it is as an entomologist in Canada, after many unsuccessful experiments has at length hit upon a fluid which itself remains uncoloured while preserving the plumpness and a good deal of the natural colour of these fruits, and it may be hoped that he will publish some information respecting the preparations employed. Some idea of the fruit trade in Canada may be gathered from the fact that 200,000 barrels of apples are annually produced in Nova Scotia alone. Among the chemical and pharmaceutical products it is interesting to note that there is a collection of chemicals exhibited by the North American Chemical Co., and presumably manufactured in the Dominion. Hemlock bark extract, obtained from bark of *Tsuga canadensis*, is also placed in the same class of products, instead of, as might have been supposed, amongst tanning materials. According to Mr. H. B. Small's pamphlet on Canadian Forests, the manufacture of this extract is assuming large proportions, the export of extract having risen from 190,068 dollars in 1881, to 305,426 dollars in 1883, exclusive of the bark, which amounted in 1883 to 321,291 dollars. According to the census of 1881 there were at that date four factories employing 140 hands engaged in this industry. In a Report of a Committee of Parliament in 1868 it was estimated that an extent of 10,000 acres of the best hemlock land was stripped every year for the bark, the timber being left to rot on the ground. This wholesale destruction threatens to diminish the future supply of a wood that will become more and more useful as the pine disappears. The mineral exhibits are far too extensive to be noticed at length here. Among the more striking exhibits in this class are a large mass of graphite, surmounted by a gigantic plumbago crucible, a fine block of crystalline sulphate of strontian (celestine), magnesite, sulphate of barytes, a very large crystal of apatite (native phosphate of lime) for which £50 is asked, and a case illustrating the manufacture of asbestos; also some good specimens of mica shown close by.—*Pharmaceutical Journal.*

AGRI-HORTICULTURAL SOCIETY OF INDIA:

A Bifurcated Bamboo.

Mr. H. C. Spry, of Dhoolie Tirhoot, writes regarding the very unusual circumstance, which he had recently observed, of a bamboo branching. The following is his description of the phenomenon:—"The bamboo shoots up some thirty feet high, and then divides off into two separate perfect bamboos: the measurements are as follows:—From root to where the bamboo shows signs of dividing 22 feet; at 32 feet it divides, each fork measuring 25 feet; the total length being thus 57 feet. The circumference of the stem at the root is 10½ inches, and the same where it divides: the forks shortly after separating are each 7 inches in circumference." The Deputy Secretary stated that he had not found any record of a similar freak, and had consulted Dr. King of the Royal Botanical Gardens, who had in reply stated that he was not aware of such a case being recorded, and thinks it must be of very rare occurrence. He suggests that the specimen would be valued at Kew. Dr. King remarks that "there is not more reason why a bamboo should not bifurcate than why a palm should not, but palms occasionally do. We have a fine bifurcated specimen of *Dictyosperma Alba* in the garden here." There is also, or was, a branching date-palm at Indore, of which a drawing is given in Vol. IV., New Series of the Society's Journal.—[A seven-branch coconut palm which was one of the great sights of Colombo, was destroyed in the burning of the Racket Court building recently.—Ed.]

Malta Lemon.

Dr. E. Bonavia has frequently, in letters to the Society, alluded to this fine fruit. Some lemons grown by Mr. Stalkartt, of Goosery, were recently sent to him. He writes as follows:—

"I have received the lemons you kindly sent me and which were grown in Mr. Stalkartt's garden, Goosery. Please tell him he has the finest lemon in the world. It is neither more nor less than the *Malta lemon* (*citrus limonitum vulgaris* of Risso). It agrees in every possible way with that lemon—scent and shape of leaf—scent of rind, and shape of fruit; abundance and purity of the acid juice, bears a heavy crop, *heaviest* in cold weather. That is the spring crop, (*sets* in spring). Those you sent me are '*Dumrez*,' or after crop, which ripens in the hot weather and rains. With *mnageium* this lemon tree can have ripe fruit all the year round. The *Dumrez* is smoother, and varies often in shape from the Spring crop, which is rougher. There is no one point in which Mr. Stalkartt's lemon does not agree with the Malta lemon. I should like to learn the history of it. I introduced the Malta lemon in Lucknow in 1863. Last year when I sent your Society some Malta lemon trees, you stated that there were some old trees in the Society's Garden of the same kind, and it was not known they were Malta lemons. Probably your old trees came originally from Lucknow, and Mr. Stalkartt may have got his from your Society. Anyhow I have been sending Malta lemon trees to Assam, and Devikulam, South India, from here, and you have lots of them in Calcutta, from which you could supply both East and South India. This lemon is the *best* for *decoction*, for fever and spleen. More-

over, it makes the best *jelly*, for which I send you a recipe. If Mr. Stalkartt will try it, he will never eat English or Scotch marmalade again. It is, in addition, a fine antiscorbutic; I mean the lemon-jelly. This fine lemon tree is easily propagated by cuttings in the rains in the shade of trees. This is also the best time for *layering* it. In two months the layer's roots fill the pot. The layering is done as follows:—Take a lower branch fit for layering; tie a bit of twine tightly below a joint, so as to cut slightly into the bark, and knot the string. Then bend the part tied, U-fashion into a pot of good soil well drained, cover it with soil, and put a heavy brick over the surface to prevent the branch from springing out. In two months or less, in the rains, the pot will be filled with roots. This can be easily known by lifting the brick, and seeing the roots under it. Then it is fit to separate from the tree, and should be kept in the shade and watered, till planted out. Lime in any form is a good and essential manure for all Citrus trees. Anybody who has a tree of this kind would do a good service by propagating it, and widely disseminating it. It propagates by *seed* and *bud* also. Seeds sown now will be fit to plant out next rains.

"Now for the jelly recipe:—Cut up the lemon very finely, removing all the seeds. To every pound of lemon allow 3 pints of water, soak the lemon in the water for 24 hours (in the rains perhaps less) then boil in the same water in a *glazed vessel*, till quite tender, and let it stand another 24 hours (in the rains may be less.) Then weigh 1½lb of Cossipore crystallised sugar to each pound of the boiled lemon and water. Boil sugar, lemon and water till the marmalade, *on trial*, will *set*. When cool, eat it with toast and butter. According to taste, more lemon juice and less rind can be used.

"I am glad to find you have this lemon tree well established in Calcutta."

Mr. Stalkartt, on being referred to as to the age of his plants, stated that he has known them to exist at Goosery for some fifty years; so it is probable that the Society obtained their grafts from him. Firminger, at page 226, Edition 1874, alludes to lemons distributed by the Society as "the common Spanish, so much used in England," though he adds: "this is not altogether similar in shape to the European fruit," *Kurna Neebo* is given in Firminger as the native name, and under this name the *Citrus medica*, common lemon," is given in the *Hortus Bengalensis*, or a catalogue of the plants growing in the H. E. I. Co.'s Botanic Garden at Calcutta (1814) and the date of its introduction is given as 1796. Mr. Stalkartt's lemons are probably grafts from these plants, which may themselves exist at the Botanical Garden.

Dr. Bonavia, again writing on the subject, mentions that he calls the Lucknow lemon "Malta lemon," as he introduced them from that island, but it is indentical with those grown in Sicily, Malta Spain, Portugal, &c. He adds: "In the olden times the lemon was *C. medica*, then Risso and Poiteau called it *C. limonum vulgaris*; Hooker and Brandis have now called it *C. medica var limonum*."

In a subsequent letter Dr. Bonavia asks for samples of the different limes and lemons obtainable in Calcutta, and these will be sent to him to assist him in the preparation of his book on this useful family.

Mr. Sturmer, of Khaja, Ghazipore District, mentioned at the meeting that he had in his garden plants of lemon exactly similar to those placed on the table by Mr. Stalkartt, and they had been in existence for some thirty years to his knowledge.

Rhea.

At the last Meeting of the Society a letter was read from Mr. C. S. Bayley, Under-Secretary to the Government of India, submitting a sample of Rhea fibre prepared by M. Legros, an engineer attached to the Public Works at Cairo. The following reports were kindly furnished by Mr. W. Stalkartt, of Goosery, and Messrs. Birkmyre Bros.:—

Report.—"Sample of Rhea fibre from M. Legros, Cairo, said to be prepared by a chemical process of little cost,

"Parts of the sample are well cleaned, and the fibre retains its full strength, unlike other samples I have seen chemically prepared; while in other parts of the sample, the gum and bark adhere to the fibre; save for this, the process appears to be efficient. The important consideration is that the strength of the fibre does not seem to be in the least deteriorated by the process, as is unhappily so often the case with chemical treatment."—W. Stalkartt.

Report.—"In reply to yours of 1st instant, we beg to report upon the sample of Rhea fibre, from Mr. Legros, Cairo, said to be prepared by a chemical process of little cost, as follows:—

"The fibre retains its full strength, and does not appear at all injured by the chemical used, but we cannot say that the bark and gum have been effectually removed.

"We enclose you a sample of Rhea prepared by Messrs. Death and Ellwood's machine, and also return you your own samples and letters appertaining thereto."—Birkmyre Bros.

ROOTS AND THEIR WORK.

Uses of Roots to Plants.—*Special Uses.*—We have in considering the various forms of roots spoken of the probable uses for which many of them would be suitable—the strong root for the tall growing plant the much branched fibrous root for the grossly feeding, plant, the wedge-like root for such as need support and grow in crevices, &c. Some plants require long roots to reach to considerable depths, as in many alpine plants where a stem and leaves 1 inch above-ground may have "40 inches below." This is to ensure that the plant gets a supply of water when the soil and surface of the ground are deeply frozen, and which the sun's heat would not affect, whilst the leaves of the plant would soon wither under its heat, no fresh supply of water coming into the tissues. A Statice incana measuring some 9 inches to the top of its leaves actually measured 7½ feet from the neck to the extreme end of the roots. Six of these plants were grown round the edge of a pot, their roots had coiled round and round at the bottom, squeezing the crocks into the "ball." Here, doubtless, the length of the root might be abnormal—it might have grown at the expense of the plant, but evidently the root attains great lengths in its natural home, perhaps enabling it to penetrate among rocks to a fairly depth.

Functions of the Roots.—But we have other than mere variations in the size of roots likely to be of aid in meeting special ends; we have general uses which roots fulfil, which we will briefly mention here:—They support or fix the plants, as we have elsewhere alluded to, and as it is so evident a fact we will not further consider it here. They are the means of supplying most of the [liquid] food necessary to the growth of the plant. We notice that the leaves wither and dry up if they are severed from the root; they may last for a considerable time if placed in water; but it is evident by this that roots are the means by which plants obtain the large amount of water required by them. If we take a leaf of Eucharis amazonica and place it between dry pressing papers we find, after drying it, that instead of being about one-eighth of an inch in thickness, it will now be less than one-hundredth of an inch. This shows how large a part of most plants is water alone. The solid part left after drying might be burnt to an ash, and we could learn what chemical substance it was composed of. It is very evident that these solid ashes could never travel up the plant or enter into it in a solid form, and they must have either got there [in solution] from the air or from the earth.

Action of Leaves.—We learn that there is not enough of the substances required for the plant's food in the air, even were the plant capable of taking it in. Carbonic acid gas, however, is plentifully taken up by the leaves, a very large amount of the ash being carbon. The greater part of the other constituent matter is dissolved in water, and so

passes from the roots through the cells of the plant, and is so carried up to the leaves, &c. Water may also be taken in by the leaves, as we know is the case when they are cut off and placed on the surface of water; also one use of a very damp atmosphere in some of our houses for young plants is to supply them with water, or at least not to allow the water already in the leaves to drain away by evaporation. We might just note here that roots seem to have the power of turning towards moisture or to substances they seem to like to grow in, where also they are generally found emitting more root branches. We learn also that roots have the power to secrete fluids [when in contact with particles of] the soil; at times these secreted fluids are said to aid in dissolving solid matter (as marble even) which may be taken into their tissues when so dissolved. Some roots store up starchy or other matter for the future use of the plant. We may see the swollen growth of the preceding year decaying away as the leaves form, and another reservoir for such starchy matter is built up. There are good examples of this to be met with among biennials, as many Campanulas with a thickly developed "first-root" or tap-root. Dahlia also is a good example, and I expect that Oxalis hirta has its root developed for a similar purpose. Potatoes are about the best example one knows, however, and it is a really marvellous sight to see the innumerable starch granules when exuded from a cut piece, under a powerful microscope; but we have considered Potatoes as branching from (underground) stems, though capable of emitting root fibres as well as buds; they also absorb fluid matter through their exterior which bulbs and corms of Hyacinth and Gladiolus are, I should imagine, unable to do, by reason of their "coat." We might by "stretching a point" consider that roots, as the word is understood by horticulturists, of Drosera, Primula (and Dodecatheon?), had another use to perform, that is, to continue the species by budding.

The Manner in which Roots Perform their Work.—Bearing in mind the remarks made as to the structure especially, but also of the external features of roots, let us discuss how they perform their varied works in aiding the life of the plant. 1. It is not difficult to see how they act as anchors or supports. The few fibrous roots noticed in the Pinguicula and Drosera, the swollen tap-roots of Astragalus or Hippocrepis, the huge branching roots of the Oak or Elm, all plainly tell us by their construction and direction that they support or fix the growths above them. Often the roots of a tree will extend underground as far as the branches do above. There seems a mutual dependence of one upon the other, causing them to grow more profusely, or stretch for further distances as required. 2. As to the absorbing of food by roots. We have seen that the external tissue of all young roots is soft, and that this young tissue, either of cells alone, or of hairs and cells, is present everywhere in roots, from the moss to the highest tree. As any soft substance will absorb water when placed in it, so we might assume the soft tissue of the root would do so. We can indeed see coloured water entering into the root-hairs when these are placed in it. Most plants are not surrounded by very evident supplies of water, and it is here that the longer root-hairs become most useful. They stretch among the particles of soil, and abstract the watery films which we learn enclose all but the very driest particles. All the solid food elements needed, if dissolved in water, would thus be able to enter into the plant. We have next to see how such are taken from the root to the leaves, where we know the fluids undergo necessary changes upon their distribution throughout the plant. If we consider—1st, the action of a sponge or piece of sugar when placed in water; and 2nd, the effect produced by sucking the air from a straw held in water, we shall have a partial clue to the *modus operandi*.

Capillary Action and Pressure of the Air.—We know that in both the cases referred to water will rise above its level in the dish in which sugar and straw were placed. This rising of fluid is due to simple physical laws, depending in one case on the closeness of the particles of sugar for its effect, the water rising up the thread-like openings between the particles, and in the other on the partial vacuum which would be caused by suction necessitating that the water should rise [by atmospheric pressure].

Osmosis.—The cells of a plant, as we saw, are so arranged that watery fluids would rise in or between them as in the sugar, and would be much helped by the evaporation going on from the leaves, compelling its rise, as the suction of water up a straw does. But we often have, as in winter-pruned Ivy, a great surface to be supplied with nutriment, and no leaves to aid in drawing fluids up the stem. Clearly we have great need for another process by which it shall rise, and this has been found by botanists to be indentical with a well-known physical process termed *osmosis*. Roughly this process of osmosis takes place wherever a denser fluid is separated from a lighter one by any thin-walled substance such as parchment, when a current will be set up from one to the other until the densities of the fluid on either side are similar. With the cell wall instead of parchment the cell's denser contents might pass out into the earth, whilst water would be taken in were it not that the evaporation from the surfaces of the plant keeps up a continual inflowing, whilst the currents from one part of the plant to the other are stimulated by the denser contents of cells from evaporation takes place, drawing lighter fluids towards them. This ascent of sap is naturally much more vigorous and *vice versâ* in summer, and nearly ceases in winter. Experiments have shown its force to be very considerable.

Stem Cuttings and their Roots.

These are mostly fibrous. At times, however, some are specially developed, and grow much in length, and harden very considerably.

If we place a suitable piece of stem in the earth, so that it produces roots, various changes take place at the cut end, as follows:—

1. The pith cells shrink slightly and become discoloured, owing to the decay of the damaged cells.
2. The cells forming the ring around the pith cells grow so as to produce a ring of warty structure. This is called "the callus."
3. From below this ring or series of worthy growths are given off in an ordinary manner a greater or less number of roots. In some cases these roots penetrate through the warty cells, but generally I have observed that they spring from below them.

Probable Reasons For These Changes of Tissue.

1. We can understand that the pith cells should decay back where broken—possibly they harden a little—in some cases where a stem is cut at both ends one end may dry.
2. We see the necessity for the woody and fibro vascular cells to be sealed up by some means—as they are by the callus—or else the sap in them would not be properly subjected to the influence which would cause it to spread through the cutting.
3. We have seen that in all root-branches or roots such as these are that there is necessity for some of the denser central tissue entering into their structure. We should then expect that they would (as we saw in Strelitzia) start from the thickened layer of cells. These roots push through the surrounding cells in the ordinary manner.

I believe that before much or any root-growth takes place there must be some pressure of the fluid causing tension in the cells of the plant, and this state cannot well be if they are open in the ground or "bleeding."

A knowledge of the preceding facts will, I think, show us why in many cases we should not expect cuttings to strike.

What will Strike.

1. We should not expect any stem destitute of a fair band of the harder (fibro vascular) cells, either to "callus" or subsequently to emit roots.

2. We should not expect plants having a very thick or hard epidermis to root, as the necessary absorption through thin-walled cells could not take place. Nor would the root branches be well able to pierce the epidermis did they commence to bud.

3. We should not expect portions of the stem in which there was a great amount of woody or thickened tissue (in addition to little outer absorbing tissue) to callus readily enough to allow much change of growth before the cutting decayed.

Naturally we ask ourselves, Can we formulate any rules which will be fairly correct in regard to the chances of cuttings of roots "striking"?

We require the formation of leaf-buds here in addition to the formation of feeding roots. The giving off of fibrous roots we may consider even more likely as were they in a slightly undeveloped state I believe they might grow without callusing of the cutting.

But it will be considerably more difficult for stems or leaves to be given off.

1. A stem requires a pith or central medullary tissue as well as woody tissue. This we have seen is generally absent from roots.

Could the stem-buds, if present or dormant, find enough woody tissue, and also obtain pith perhaps from the outer layer, as they do when branching off from a root-stock, as in Lysimachia, we might fairly consider that our root cuttings would generally succeed. That they sometimes callus without producing leaves is a known fact.

Leaf Buds from Roots.

An examination of Primula cashmiriana and Drosera has led me to think that the reason why these roots [stocks] give off leaves so readily, is because there is no central pith required; the growths are "stemless."

Dodecatheon will produce little rosettes of leaves from every root stock if once the crown has decayed away after flowering. This may not be a fair example of root-propagation, as it may be thought that some portion of a very slightly developed stem would be attached to the upper part of each root and from this leaves were given off.

Rhizomes.

Wherever there are dormant leaf-buds, as on the rhizomes of Helleborus and Dracæna, there is no difficulty in getting plants from small cuttings, but these are not true "root-cuttings." There are cases, as in Ipecacuanha, where stems are produced from annulated root-cuttings, where also there is no pith. It seems rather that we may take it as a fairly correct rule, that where stems are required from our root-cuttings there must be pith. In Dandelion and Dock when cut accross we know there is the power to give off leaves.

We might consider here how universal in the vegetable kingdom is the readiness of certain tissues to emit roots. There must be a trace of a harder tissue than that which exists as an absorbing agent at the exterior of all roots. They are given off:—1, from scales, as in the Lilium auratum, Pinguicula caudata, and many others; 2, from bulbils borne among the flowers (in allium) or from the axils of the leaves, in Lily or Banunculus Ficaria; 3, from soft leaves, as Begonia or Kyophyllum: from succulent leaves, as in some species of Echeveria, &c.; 4, from almost any part of the stems and branches if treated carefully, from the end of Fern fronds, as in Adiantum Edgeworthi; these organs, developed especially to feed the plant, are very freely given off from the other organs of vegetable growth.

Places from whence Roots grow out.

We are not surprised to see, then, that from many lower parts of stems roots and stems (the latter either ascending or creeping) are given off one above the other very indiscriminately. This can be seen in hosts of examples, from palm (Phœnix) to bog-loving creeper.

Roots prefer to grow out from places as in the swollen nodes in stems, where there is more fibro-vascular tissue, and as in the Philodendron, where, though having most of its bundles scattered through the softer tissue of the stem, there is yet a concentric layer below the epidermis of more substance, therefore more really giving off roots.

I may mention that Lysimachia verticillata is an excellent example, showing the roots growing from the dense woody ring in the lower part of the stem if cut across, whilt the branching stems have a growth from the seemingly much-coloured pith (resin in the pith?) passing into them in the centre of the woody tissue.

The Distinctions between Stem and Roots,

Lastly, before passing on to consider the bearing of these facts upon cultivation, we will roughly try and note whether we find any distinction between stem and root, so nearly, as we have seen, do they resemble each other.

1. The growth of the stem upwards away from the more damp earth towards the light, stands out in great contrast with the tendency in all roots to grow towards moisture, and as a necessary consequence towards shady or dark places.

This growth in different directions is in direct relation to the differing functions of the two organs—stem and root. The one bears flowers and leaves spread out to all the influences of air and light—the other as a general thing chiefly developed to absorb water and food which may pass into the whole plant.

2. As to whether there is any difference in external or internal structure I believe is an undecided point. Internally the cells are, to all less thorough investigation at least, just the same. We certainly find that pith is oftenest present in stems and absent from almost all roots, except as in some trees where they branch from the trunk, the pith being present because growing as continuation of that in stem. This pith (though useful in giving more bulk to the stem, from which the leaves may more readily pass off) is needless to the root.

We can all see that the root is colourless generally though when growing in the air at times, as in Chlorophyton, it becomes green, or hard, brown, and stem-like, with bark on it. The epidermis in many stems whilst green has also breathing places, or "stomata." It is sufficiently evident that there would be no need for these in terrestrial roots, although botanists point out among aërial roots, as in some Orchids and in Mangrove, the marks of similar stomata.

3. As to the power in stems, and the absence of this power among roots, to give off leaf-buds, which we have already referred to somewhat fully, I may add that according to the functions of a root we do not need the presence of leaf-buds, and they are never present in true absorbing roots as we should perhaps restrict the term though whether present in storage roots at all frequently I cannot yet make out.

It is certainly difficult to draw a hard and fast line between these two organs, especially when in so many of our best text-books of systematic botany we read of "roots," and find such able to produce leaf-buds plentifully under certain favourable conditions. I think, however, that the greater number of botanists will look upon roots and stems both as complex structures having similar rudimentary structures (in the thin-walled cell), although these may be developed differently according to their functions.—*Gardeners' Chronicle.*

Rubber in Brazil.—The Pará statistics not having come to hand, only those for Amazonas are published, viz.:—

	weight.	value.
1882-83....	718,137 kilos.	2,253,369$
1883-84....	1,040,358 ,,	2,564,431
1884-85....	1,412,407 ,,	2,505,580

The minister suggests that the municipalities and provincial legislatures should take steps to replant the tree, in the proper situations, near villages, not only to prevent the destruction of this source of wealth, but also by reducing the cost of harvesting to place the article on a better footing as regards foreign rubber.—*Rio News.*

GAMBOGE OF BURMA.

Although various varieties of gamboge-bearing trees have for many years past been known to exist in different parts of the province, notably in the Tenasserim division, it was not until comparatively recently that the subject was brought specially under the notice of the local Government. Writing more than 30 years ago, Mr. Simmonds, in his work entitled *Commercial Products of the Vegetable Kingdom*, says: "The *Garcinia elliptica* of Tavoy and Moulmein affords gamboge and approaches very closely in its character to Graham's *Hebrodendron*;" and he adds that it affords "a fine pigment." Dr. Mason also, in his work on Burma, remarks that "the best gamboge is produced by *Garcinia elliptica* but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. kydia*, *G. succifolia*, *G. xanthochymus*, and *G.* (*Hebrodendron*) *morella*. *Garcinia Cambogia* yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts."

In 1875 Mr. Whittall, of the Forest Department, drew attention to three different species of trees, belonging to the genus *Garcinia*, growing in the districts of Southern Tenasserim. These were known to the natives as *Tawmengoot*, *Parawah*, and *Parajay*. The two last named Mr. Wittall did not consider of much account. The *Parawah* yields an exudation of a white colour, which changes to a reddish yellow on exposure to the atmosphere, and is scarcely at all soluble in water, but yields to alcohol. The *Parajay* yields a rather copious exudation which when dissolved in spirits of turpentine, affords a beautiful, permanent, yellow varnish for metallic surfaces, and on this account has been called the gamboge tree as well as the yellow varnish tree; but its exudation does not form an emulsion with water, and, for this and other reasons, Mr. Whittall considered it had no claim to be considered a real gamboge tree. The *Tawmengoot* was, in Mr. Wittall's opinion, the gamboge tree of the South Tenasserim forests. He says: "The gum resin is larger in quantity and darker and of a more glossy colour than the others: neither wet nor dry is it so sticky, and so readily does it form an emulsion with water that the exudation on the outer bark is completely washed away by the rains." This tree he believed to be the same as that which Dr. Mason calls *Thanataw* (*Garcinia elliptica*) [*G. heterandra*], and he adds that it was supposed to be the same as that which yields the gum resin exported from Siam. But Mr. Hill, Officiating Conservator of Forests, Pegu Circle, thinks the *Tawmengoot* is probably the *G. morella* or *pictura*, or *gutta*, the true gamboge tree, which does not grow all over Burma like *G. elliptica* or *G. cowa*, which latter are common trees throughout the province.

In May 1884 the Commissioner of Tenasserim, drew the attention of District Officers to the trees called *Thaungthaleh* (*G. kydia*) and *Thanataw* (*G. elliptica*) found growing in the tropical forests of Martabau and Tenasserim with the view, if possible, of developing a new industry for the people. Of the former Mr. Hill says: "It yields a yellow substance of a bright colour, but paler than the gamboge of Siam. It is scarcely soluble in water, but dissolves in spirits of turpentine and affords a beautiful, permanent, yellow varnish for metallic surfaces. As the substance is very resinous and will not dissolve in water, it is valueless as a pigment." Of the latter he remarks: "The product known as *Thanataw* is obtained from *G. elliptica* or *heterandra*. It is called a superior gamboge, but in all probability merits the name almost as little as *Thaungthaleh* owing to its only partial solubility in water. It is found throughout the province and is darker in colour than *Thaungthaleh*." A sample of *Thanataw* obtained from Tavoy was found upon analysis to contain—

Resin, ...	76·5
Gum, ...	23·5

This sample was sent to Calcutta for valuation, where it was declared to be gamboge, but unsalable in an unrefined state. In August of the same year samples of gum produced from two other kinds of trees called *Palagyi* and *Tawmengoot* were also obtained and submitted for analysis. They were found to contain—

	Palagyi.	Tawmengoot.
Resin, ...	58·82	53·20
Gum, ...	9·54	20·30
Water, ...	32·66	25·60

In his report on these samples Dr. Romanis, the Chemical Examiner, says the yellow kind (*Tawmengoot*) makes a very fair paint, but the other is of no use. If the gum is extracted it makes a spirit varnish, but when warm it melts and gets sticky.

According to the broker's report, to whom the sample of *Thanataw* referred to above was submitted for valuation, gamboge in its refined state sells in the Calcutta Market at from R2 to R2-8 per seer. It arrives there freely from June to August, usually packed in cases of from three to four maunds, and it is chiefly used in French polish and paint. In Burma the cost of collection alone is estimated by the deputy Commissioner, Tavoy, at R25 per viss (3·65 lbs). That is to say, the cost of collection amounts to nearly R7 per lb., while the market value of the product is only R1-4 per lb., and that too when it is in a refined state. It does not appear why the cost of collection is so great. In Ceylon the process of collection is very simple. There the gamboge is usually collected by cutting a thin slice of the bark of the tree here and there of the size of the palm of the hand. On the flat space thus exposed the gum collects and is scraped off when sufficiently dried. It may be possible perhaps to reduce the cost of collection. Unless it can be reduced very considerably, we cannot hope to introduce the Burma product into the market. From the enquiries made, then, it would appear that the *Tawmengoot* alone yields good gamboge, and that the only obstacle in the way of the gamboge succeeding as a commercial product is the high cost of collecting it. The products of the other trees mentioned are not promising because of their comparative insolubility in water.—R. A. Mack, of the Agricultural Department, Rangoon 22nd April, 1885.—*Indian Forester.*

PSEUDO-GUTTA-PERCHAS, OR SUBSTANCES SUPPLEMENTARY TO GUTTA-PERCHA.

From time to time numerous substances have been recommended as substitutes for, or supplementary to, gutta-percha. That a substance answering these purposes has not yet been introduced lies, I think, more in the fact that these substances have not yet been properly treated, or such a substance has yet to be discovered, than that such substance or substances do not exist. As to the method of preparation of these proposed substances, I have pointed out, in an article on gutta-percha,* the rapid oxidation of that substance if it be not prepared immediately after collection. This applies even more strongly to subjects of the present article. Balata gum has an assured value of its own, and with regard to the rest they may yet be utilised if their rapid resinification can be arrested.

In the following remarks but a brief *resume* is given, and the subject geographically treated. In view, too, of the various names which have been given to these plants in various botanical works I also append the synonyms.

I.—AMERICAN SOURCES OF SUPPLY.

(1) BALATA GUM. (2) MIMUSOPS BALATA, GAERTNER. (3) Natural Order—SAPOTACEÆ.

SYNONYMS.—*Sapota Mulleri*, Bleekrod; *Mimusops Kauki*, *L*; *M. dissecta*, Hooker; *M. Hookeri*, A.D.C., *M. Manilkara*, Don; *M. Ballota*, Blume; *Achras balata*, Aublet; *Lucuma mammosa*. De Vriese.

VERNACULAR NAMES.—Paarden vleesh (Dutch), Horse-flesh; Bullet tree; Bolletrie and Boerowé by the Arrawak Indians.

GEOGRAPHICAL DISTRIBUTION.—Demerara; Berbice; British Guiana; Antilles; Jamaica and Surinam.

* Encyclop. Britann.: Article "Gutta-percha."

One of the first writers on this substance was Professor Bleekrod, who communicated some information as to the plant and its product to the Society of Arts, in 1857.* He also described and named the plant as *Sapota Mulleri*. In 1860 Mr. Walker † communicated samples, &c., received by him from Dr. Van Holst, of Berbice, to the same Society; and in 1864 Sir William Holmes also drew attention to the same subject.‡

The tree is a large one, with a trunk of about 6 feet in diameter, and furnishing a wood much sought after as a building material. The Dutch name, Paardenoleesch, is given on account of the wood being of the colour and having the appearance of horseflesh. The bark is thick and rough, and the fruit is of the size of a coffee berry, sweet, like a plum, and with a hard white kernal, which yields an oil bitter in taste. The leaves are glossy, oval, and acuminated. The milk is drunk by the natives, and when diluted with water, used as cow's milk. The trees grow in groups, and in alluvial soil.

The "Balata" gum is of a character somewhat betweeu caoutchouc and gutta-percha, combining in some degree the elasticity of the one with the ductility of the other, freely softening and becoming plastic, and easily moulded under the influence of hot water.

What small parcels were sent to this country met with a ready sale, and were remarkably free from adulteration. But, unfortunately, through the difficulty of collection, the undertaking being so dangerous and unhealthy, the supply of this excellent and most desirable article has fallen off.

Balata is collected by making incisions in the bark about 7 feet from the ground, and a ring of clay placed round the tree to catch the milk as it exudes. The yield is said to be in profusion, especially at the time of the full moon—a statement with regard to milky juices which is adhered to by natives in all parts of the world—and the operation can be repeated every two months in the rainy season. It takes six hours to bring about coalescene by simple atmospheric influe ce, but very quickly by boiling in water. A lar.e tree is said to yield as much as 45 lb. of dry gum.§

II.—INDIAN SOURCES OF SUPPLY.

PAUCHONTEE, OR INDIAN GUTTA TREE.

Dichopsis elliptica, BENTHAM.

Natural Order—*Sapotaceæ*.

SYNONYMS.—*Bassia elliptica*, Dalzell; *Isonandraacuminata*, Lindley.‖

VERNACULAR NAMES.—Indian Gutta Tree; Pauchontee, Pauchoontee or Pashonti; Pauley or Pali Tree.

GEOGRAPHICAL DISTRIBUTION.—Wynaad; Coorg; Travancore; Anamally and Neilgherry Hills; Sholah Forest; Cochin; Sichar; and according to General Cullen, "appears to be common in all the forest tracts at all within the influence of the south-west rains."

This tree, which is now placed in the same *genus* as the true gutta-percha, is a large one, from 80 to 100 feet high, was first met with by Mr. Dalzell in North Canara, near the falls of Goirsuppah, in 1849. Since that date, General Cullen and Dr. Hugh Cleghorn have used every exertion to bring the substance prominently forward. The gum is obtained by tapping, a pound and a half being obtained from one tree by five or six incisions, a large tree yielding as much as 20 to 40 lb. of sap. Many experiments have been made with specimens of the raw milk, *i.e.*, milk simply dried after taken from the tree. The result of these experiments have shown that for telegraphic purposes it is wanting in some essential qualities, but it has been recommended as a sub-aqueous cement or glue. When dissolved in ordinary gutta-percha solvents, it, after the evaporation of the solvent, remains for some time soft and viscid, and partakes somewhat of the characteristics of birdlime. When cold it is hard and brittle. Without wishing in the slightest degree to throw doubt or discredit on the many and valuable experiments made, I would suggest that good samples be collected. I have not the slightest doubt, from the scientific aspect of the case, as well as from practical experience and experiments at home and abroad, that many a parcel of what would otherwise be good gutta-percha is spoilt through not being *well boiled immediately* after collection from the tree. At present, this is the only way in which I can see a possibility of ascertaining whether this product can be utilised, and I have the more hope that it can, from the fact that its structural character has led the plant to be placed in the same *genus* as the gutta-percha tree: structural affinity being a wonderfully safe index in numerous instances to chemical affinity also. There are in India various species of *Isonandræ* and other closely allied sapotaceous *genera*, but I have found no mention nor heard of their yielding any milky juices likely to prove of commercial value. It would be well if experiments were tried with the products of these trees.

* Jour. Soc. Arts, London, Oct. 8, 1857.
† *Ib.* Aug. 24, 1860.
‡ *Ib.* March 4th, 1864.
§ *Trinidad Chronicle*, September 2, 1873.
‖ Under this name, Dr. Hugh Cleghorn wrote a very valuable report in 1858.

CATTIMANDU AND OTHER EUPHORBIUM GUMS.

Euphorbia cattimandoo, and other species.

Natural Order—*Euphorbiaceæ*.

Euphorbia cattimandoo, of W. Elliot, is found in Vizagapatam, and is variously known under the vernacular names of Cattimandoo, Catemandoo, or Kattimundoo.

The product of this tree was first brought to notice by the Hon. W. Elliot, and a prize medal was awarded for the substance by the jurors of the Exhibition of 1851. This Euphorbia grows to the size of a shrub or small tree, and the milk flows out freely when a branch is cut. The natives use the milk as a cement to fasten knives in handles, &c. Under the influence of heat it becomes soft and viscid, and when dry it becomes very brittle. The same remarks as to the probable utility of "Pauchontee," apply also to this and following substances, although in a somewhat limited degree.

Euphorbia tirucalli, of Linnæus, known vernacularly as the Milk hedge or Indian tree spurge, tirucalli and the Lunka sij, is found in the Coromandel, Malabar, Bengal, and is, in fact, a very common plant in various parts of India.

This succulent unarmed plant often attains a height of 20 feet, and its inspissated milk is used for various purposes, chiefly medicinal, in India, and has been recommended as a substitute for gutta-percha; but like Gum Euphorbium, it has a very acrid character, and the collection of it is a very dangerous operation to the eyes. When dry it becomes very brittle, but when warmed in water has a certain amount of plasticity.

ALSTONIA OR PALA GUM.

Alastonia scholaris, ROBERT BROWN.

Natural Order—*Apocynaceæ*.

SYNONYMS.—*Alstonia oleandrifolia*; *Loddidge*; *Echites scholaris*, LINNÆUS.

VERNACULAR NAMES.—Mookum pala; Pala; Chatinn; Eerellay-palay; Ezhilaip-palai; Edakulapala; Edakulatariti; Edakula-ponna.

GEOGRAPHICAL DISTRIBUTION.—Travancore, Coromandel, Assam, and Ceylon.

This tree attains a height of 50 feet, and its wood and bark are much valued in India for their medicinal qualities. The tree yields an abundant milky juice, which was recommended as a substitute for gutta-percha, amongst others, by Mr. Ondaartjee, who brought the substance before the notice of the Society of Arts in 1864.* It is stated to readily soften in hot water, take impressions readily, and to retain these impressions when cold. I have only had very small specimens in my possession, so am unable to form any decided opinion. Good specimens of this and other like substances would be acceptable.

* Jour. Soc. Arts, London, vol. xii. 39., Feb., 1864.

MUDAR GUM.

Calatropis gigantea, ROBERT BROWN.

Natural Order.—*Asclepiadaceæ*.

This plant, known also under the name of *Asclepias gigantea*, of Willdenow, was very early described by Rheede in his Malabar Plants, under the name of Erica.

VERNACULAR NAMES.—Gigantic swallow-wort; Yercum; Yerica; Nella-jilledoo; Akund; Mudah; Ark.

GEOGRAPHICAL DISTRIBUTION.—throughout the peninsula and Southern Provinces of India.

This shrub is found in waste places, and grows to a height of from six to ten feet. Ten average shrubs are said to yield one pound of a gutta-like substance, which becomes plastic in hot water, and other ways behaves like gutta-percha. There is also another species said to yield the same characteristic milk, viz., *C. procera*, but I have not been able to procure specimens.

III.—CEYLON SOURCES OF SUPPLY.

In Ceylon there are species of *Dichopsis*, *Isonandra*, and other allied *genera* belonging to the natural order: *Sapotaceæ*. Specimens of their inspissated juices I have not seen. When I passed through Point de Galle, in 1874, I wrote to the late Dr. Thwaites, the talented Director of the Government Gardens at Peradeniya, with regard to the question of gutta-percha, and received a quick and courteous reply, by which it appears that the natives do not collect any of the gutta, even if the trees yield it in appreciable quantities. This agrees, too, with information I have received from native and other sources of information. Dr. Thwaites also remarked that some years ago he sent the inspissated juice of one species to Sir W. J. Hooker, but that the report on it was unfavourable.

Certain parts of Ceylon having a climate,* so similar to that of the Malayan Peninsula and Archipelago, it seems probable that here would be found the best localities for the acclimation and cultivation of the true gutta-percha tree. I have recommended the adoption of this course, and sincerely trust that efforts will be made in that direction. It is also probable that the island contains many indigenous pseudo-guttas, which might be made use of.

IV.—AFRICAN SOURCES OF SUPPLY.

At the Cape of Good Hope there are many species of Euphorbias which are said to yield a substance very similar to Cattimandoo, but hitherto I have only been able to see fragments, and thus have been precluded from making any experiments. Like the *Euphorbia officinalis*, the juice is so acrid as to give intense pain and irritation to any part of the body with which it may come in contact, especially the eyes and nostrils. Dr. J. Crombie Brown, whilst holding the post of Government Botanist at the Cape, paid much attention to the subject, and favoured me with much correspondence upon it. Our united efforts bore no fruit. The substance has been well spoken of as an anti-fouling dressing for ship's bottoms.

Mr. Baxter, whilst on the Niger Expedition, collected a specimen of *Chrysophyllum* (Sapotaceæ) yielding a substance like gutta-percha, but no specimen seems to exist. Tropical Africa should indeed be rich in such substances, and doubtless such will prove to be the case when careful search and enquiry is made.

With regard to the whole question of the Pseudo-Guttas, Balata should most certainly receive attention, and efforts should be made by the Government to introduce it into Ceylon and elsewhere. Pauchontee, too, should receive attention, and the possibility of the utilization of the rest of the group not denied till further trial has been made.—J. C.—*Indiarubber and Guttapercha Journal.*

SQUIRRELS AT WORK ON NORWAY SPRUCE.—In the August *American Gardener's Monthly*, Professor W. A Buckhout attributes the broken branchlets found under the Norway spruces in the spring, referred to in the previous number of the periodical, to squirrels. These branchlets usually lie among the clumps of trees near where these rodents may be seen feeding on seeds and cones. Isolated trees do not thus suffer; though native Pines (*P. rigida*) do. The editor admits that the Professor's specimens show distinct marks of gnawing; but specimens from New Hampshire appear broken off at a bud—disarticulated as it were—which a squirrel could not to do. Such disarticulation may have begun by drying commencing after the rodent had cut the branch.—*Journal of Forestry.* [We in Ceylon know what our "rodents" the coffee rats can do in the way of branch cutting.—ED.]

ARABIAN DATE TREE.—At the suggestion of Mr. Cameron, of the Lal Bagh, the Dewan has sanctioned the introduction of the Arabian date tree, which is to be cultivated as an experimental measure in the province. Steps have been taken, through the British Consul in the Persian Gulf, to obtain a supply of the proper variety of the date palm and it is expected that 400 or 500 young shoots will arrive shortly. The date palm which grows luxuriantly in localities that have a scantly rainfall, will, it is hoped do well in the Chitaldroog and Kolar Districts and part of Tumkur where the rainfall is precarious and far below the proviucial average and should the experiments turn out a success, and if the cultivation is largely extended, it will prove a stand by in the shape of a large yield of dates, as food for the people in times of scarcity. We believe that after careful enquiries and an examination of all records, it was found that some plants of Arabian date flourished in the Lal Bagh may years ago, but being lost sight of probably in the rush that set in for flowers and fallals the trees were either cut down or allowed to perish from neglect. B. S.—*Madras Mail.*

CHINA TEAS *vs.* INDIAN AND CEYLON TEAS.—The first crop from China is larger than that of last year. This has now been all shipped, or very nearly so. The quality of the second and third pickings is determined to a great extent by the prices obtainable by the growers, and when the demand is good, fourth and even fifth pickings are made, so that practically the supply from China may be said to be almost unlimited, or at any rate limited only by the fact of the value declining so as to render it unremunerative to pluck. We are inclined to think that a favorable spring, after and unusually hard winter, and fine weather for drying the leaf, have had more to do in determining the quality of this years' crop of China tea (which is undoubtedly above the average) than the Government edict, though this may have brought the desirability of making good tea prominently to the notice of the factors. The Chinese are eminently a practical people, and are shrewd enough to take care of their own interests. The course of the London market is not such as to induce them to make much really fine tea, and as the Russians also, who used to take most of their finest crops either direct or through their agents in London, appear now to be turning their attention largely to the medium and common grades, it seems doubtful whether it will pay the Chinese to expend time and labor in the manufacture of choice parcels when they can obtain a good average price with less care. While, therefore, we believe that the resources of China in regard to the production of tea are almost unlimited, and that she possesses many advantages, not the least being an abundance of cheap labor, we do not think that the outlook need cause alarm to Indian or Ceylon planters. The question to them to a great extent is the cost of production. If by the use of improved machinery they can keep this sufficiently low to make tea planting remunerative in the altered condition of the market, and maintain a high standard so far as quality is concerned, they will hold their own. They have no native tea-drinking population to fall back upon like China, and the greater portion of their produce must find its way to this market. The taste of the British public is what they have to cater for, and that demands for the most part a good strong tea at as low a price as possible. There is also an outlet for the finer grades, if they *are* fine to a certain extent, but the bulk required must consist of Pekoes and Pekoe Souchongs, and moderately fine Broken Pekoes."—Cor. Local "Times" quoting London Brokers.

* *Vide* Thwaite's *Flora Zeylanica*. (Preface).

CINCHONA BARK AND QUININE SUBSTITUTES.

Another scare has just been started, this time in London, which, did it contain the elements of success in it should indeed cause uneasiness in the minds of cinchona planters, not only here, but all over the world. The following paragraph appeared in the *Morning Post* of Monday, 23rd August:—

REMARKABLE DISCOVERY.—A correspondent says:—Dr. Cresswell Hewett, of Lincoln's Inn Fields, has discovered the synthetical or artificial mode of making quinine, by which the price of that drug will be reduced to something like 3d. per ounce. The importance of this discovery (which was made two or three weeks ago through the accidental breaking of a medicine bottle) is rendered greater by the fact that while hitherto we have been depending for our quinine on the cultivation of the cinchona tree, from whose bark only about 2 per cent. of good quinine can be extracted, 98 per cent. being valueless, the drug can now be manufactured without limit by a very simple process from an article which can always be got in abundance in any part of the world. A few days ago Dr. Hewett submitted a sample of his preparation to Messrs. Howard and Sons, quinine manufacturers, Stratford, who have expressed surprise at the result of their analysis the sample being equal to the best quinine in the market. The discoverer is about to communicate with the Government, who annually spend in India alone about £60,000 in the cultivation of the cinchona tree.

This was followed by the publication of the following letter in the *Lancet*;—

TO THE EDITOR OF THE *Lancet*.

"Sir,—In answer to your note of yesterday's date, I beg to inform you that the enclosed paragraph is in substance correct, with the exception that the process referred to was not accidental as described, but was first suggested to me by the late Dr. Matheson, of St. Bartholomew's Hospital, in 1869, while assisting him in experiments regarding apomorphine. Subsequently Professor Parkes, of Netly, aided me with his advice. To these gentlemen rather than to myself the process is due.—I have, &c.,

"CRESSWELL HEWETT,"

From Messrs. Wilson, Smithett's circular, appearing in our last issue, it will be seen that this correspondence, which appears to have gone the round of the daily papers in London created some excitement in the quinine trade, but the value set upon the announcement, as the above firm of brokers state, may be very fairly gauged by the better result of the bark sales which took place shortly afterwards; whilst Messrs. Howard & Sons state that Mr. Cresswell Hewett had no authority to use their names in connection with his discovery. The same sort of "discovery" has been so often repeated before, that planters are likely, we fancy, to be scared as little as the quinine manufacturers appear to be. Threepence an oz, is certainly a low price for quinine, but the news is, we fancy, too good to be true. There will be found, we think, to be just one little thing wanting to complete the success of Mr. Hewett's "discovery."—Local "Times."

THE ALLEGED DISCOVERY OF ARTIFICIAL QUININE.

Our readers interested in cinchona bark may make their minds easy about the alleged discovery of Dr. Cresswell Hewett, who is so unscrupulous in his statements that the only excuse that can be offered for him is mental aberration. His assertion that the Howards had endorsed his invention is disposed of by a letter which Messrs. Howard & Sons sent to the *Chemist and Druggist* to the following effect:—

"*Artificial Quinine*—The alleged discovery of the above was brought under our notice, the supposed inventor entirely failed to satisfy us of its synthetic formation."

The account given by the representative of the *Chemist and Druggist* of an interview with the alleged discoverer, will afford our readers amusement, even if it leaves them in doubt whether Dr. Cresswell Hewett is more humbug than madman. It is natural to incline to the latter conclusion when we find the man talking of manufacturing 90,000 tons of an article of which only 150 tons are at present consumed annually in the whole world! Here is the amusing account of the interview with the eccentric doctor who had purchased 180,000 gunpowder tins to hold his synthetically formed quinine:—

THE ALLEGED DISCOVERY OF ARTIFICIAL QUININE.

INTERVIEW WITH DR. CRESSWELL HEWETT.

That eminently respectable and aristocratic organ, the *Morning Post*, created quite a sensation on 'Change last Monday, when, in a somewhat obscure corner of its columns, as though the editor were not quite certain whether he was announcing a discovery of the utmost importance or communicating a joke, there appeared the following paragraph "from a correspondent":—"Dr. Cresswell Hewett, of Lincoln's Inn Fields, has discovered the synthetical or artificial mode of making quinine, by which the price of that drug will be reduced to something like 3d per oz. The importance of this discovery (which was made two or three weeks ago through the accidental breaking of a medicine bottle), is rendered greater by the fact that, while hitherto we have been depending for our quinine on the cultivation of the cinchona tree, from whose bark only about 2 per cent of good quinine can be extracted, 98 per cent being valueless, the drug can now be manufactured without limit by a very simple process from an article which can always be got in abundance in any part of the world. A few days ago Dr. Hewett submitted a sample of his preparation to Messrs. Howard & Sons, quinine manufacturers, Stratford, who have expressed surprise at the result of their analysis, the sample being equal to the best quinine in the market.* The discoverer is about to communicate with the Government, who annually spend in India alone about 60,000*l.* in the cultivation of the cinchona tree."

From these statements it would appear to be probable that the anonymous correspondent is but imperfectly acquainted with the properties of cinchona bark, but nevertheless the information conveyed by him was sufficiently startling to cause a sensation among the large number of persons interested in its preparations. Mr. David Howard no sooner appeared on 'Change than he was besieged by eager inquirers, desiring to have his view of the matter. Mr. Howard stated that his firm had actually received from Dr. Cresswell Hewett a sample of quinine sulphate, which was found to be in every respect equal to the commercial article, but they had no means of knowing how the article was obtained. The mention of their firm in the *Morning Post* was entirely unauthorised.

Desirous of obtaining some information from the alledged discoverer in person, a member of our staff set out in search of that gentleman, who figures in the Medical Register as Frederick Charles Cresswell Hewett, Member of the Royal College of Surgeons (England), and Licentiate of the Society of Apothecaries (London). Mr. Hewett's address in the Medical Register being inaccurate, and that in the *Morning Post* vague, the discovery of him was a matter of some little difficulty, but was overcome after some perseverance.

After stating our business to the attendant we were admitted into the Doctor's parlour, where we found him apparently engaged in "coaching" a couple of medical students.

Dr. Hewett commenced by inquiring whether we had come provided with a cheque for 20,000*l.*, which amount he named as the price for his secret, and upon

* The explanation being that the sample was ordinary quinine, probably Howards' own.—ED.

being answered in the negative, jovially responded, "That settles it, my boy; then you will not get it out of me."

We stated that we had not the remotest intention to deprive him of the secret of his invention, but merely desired to hear something concerning the manner of the discovery, and the use he intended to make of it.

"Ah!" said the Doctor, "that's another matter. Let me first tell you that the communication to the *Morning Post* was entirely unauthorised by me. I don't know who can have put the thing in, and I didn't want it to appear. I wanted to keep the matter quiet until I should have manufactured *ninety thousand tons* of the article, when I would suddenly have swamped the market. Did you see those tins outside?" (Referring to some granulated gunpowder tins piled against his door.) "Yes? well, I have bought up 180,000 of them, sir. The cellar down below is chokefull of them; and the lot you saw in the passage only cost me a shilling. I am interested in this granulated gunpowder; it is made by an old friend of of mine in the neighbourhood of Hamburg, and I am going to put up my artificial quinine in these empty tins. As I say, I want £20,000 for my invention, and I think I shall get it too. I am now in communication with the Government, and I think I ought to get part of the annual subsidy they give towards the cinchona plantations in India. Bless you, sir!" Dr. Hewett excitedly exclaimed, applying vigorous slaps to the seat of the sofa upon which he was reclining, "I have had Mr. Howard in this room, sir! sitting on this identical sofa! He wasn't a bit surprised when I told him of my discovery, but said he expected it all along, and knew it must come."

Dr. Hewett did not appear willing to give any further account of his alleged negotiations with Messrs. Howard & Sons. He mentioned, indeed, that he had a letter from that firm which he would like to show us but, upon looking for it the document could not at that moment be found. He thought, however, that he would be able to produce it later on, if we would pay him another visit, to which we agreed.

Calling again later in the afternoon, we found the Doctor enjoying a peaceful slumber on his sofa. He had, he said on awaking, received no end of calls from people anxious to know all about his invention and felt very fatigued. Again adverting to the question of his discovery he stated that he actually, at that moment, was in possession of an offer from a German firm, a member of which was a personal friend of his, the acquaintance having sprung up during the Franco-German War, in which Dr. Hewett was engaged as a member of the Red Cross Society.

As to the statement that the discovery was made through the accidental breaking of a medicine-bottle, that was quite incorrect. He, Dr. Hewett, was not in medical practice, and had never used a medicine-bottle in his life. The fact was he had during the last eleven years devoted his energy to the discovery of artificial quinine, and it was at last found by him in connection with the action of salicylic acid on urea, with which he was temporariiy occupying himself.

The Doctor declined to answer our question whether he obtained his artificial quinine from a mineral or a vegetable matter, but admitted the correctness of the statement that the material from which it is manufactured is obtainable in abundance in every part of the world. He distinctly stated that it was prepared by a synthetical process, and was nothing in the way of conversion of amorphous quinine as had been suggested in some quarters.

Dr. Hewett claims to be able to make either hydrochlorate or sulphate of quinine, and maintains that the article can be turned out by him even at a cost of twopence per ounce, if the manufacture takes place on a sufficiently large scale.

He states that he has actually sold some of his quinine, not, however, in wholesale quantities, his laboratory at the present moment not being sufficiently extensive to enable him to do so.

We requested the Doctor to provide us with an ounce of his artificial quinine, observing that of course we expected it at the new rate of 3d per oz. This the Doctor could not agree to. He was quite willing to make some quinine for us—would we have sulphate or hydrochlorate?—but he would have to charge us the present market price for Howard's quinine.

To this arrangement we raised no objection, and it was agreed that on the morning following our interview the Doctor should send us a sample of his preparation for inspection. But, remembering that his time was very limited that evening, and having, he said, no artificial quinine whatever in stock, he asked us to be satisfied with the delivery of ½ oz. next morning, that being as much as he could turn out that night. By way of explanation, he added that the drying process of the quinine in the water-bath was a slow one.

Adverting again to the commercial aspect of the question, we wished to be informed in what manner the Doctor purposed working his invention commercially. "Would he take out a patent?"

This inquiry, natural and harmless though it seems, appeared to rouse Dr. Hewett's anger, and in stentorian tones he desired us to say whether we thought he looked like a fool or an old woman. He knew very well what he was going to do, the principal and first step being the puttiug of money into his own pocket! Then, as if regretting his momentary ebullition of temper, the Doctor assured us that he had carefully made his plan. His idea is to start a company; a sum of about 2,000*l.* being, he thought, all that was required for building purposes and to set the concern going. He will be glad to hear of anyone willing to co-operate with him.

Our representative then pointed out to the doctor that the present annual consumption of quinine in the entire world is stated to amount to some 150 tons only and suggested that the quantities mentioned in the earlier interview as intended to be placed on the market by the doctor were out of proportion to all possible requirements. But Dr. Hewett firmly adhered to his determination to swamp the market in the manner indicated. It might be that no sufficient demand for the artificial quinine would be found in Europe, but he was quite sure that the inhabitants of other parts, particularly North and South America, only required to have the drug put before them at a "popular" price, in order to swallow it in quantities undreamed of hitherto.

We regret that up to the time of going to press the promised ½-oz. sample of the artificial quinine has not been received by us.

ASBESTOS *VERSUS* INDIARUBBER.

Our naval authorities appear to be showing a praiseworthy activity in the study of the problems which anticipation of the maritime warfare of the future suggests to them. How quickly ships become obsolete nowadays is demonstrated remarkably by the fact that the target for the guns of the "Blazer" and the "Pincher" yesterday was the "Resistance," an ironclad designed by Sir Edward Reed, soon after he had done the same creative work for the "Warrior." The object of the experiments was to test the merits of indiarubber and asbestos fibre as a means of plugging short holes, preventing the inflow of water into a vessel after performation by shot, and minimising the damage from shell fire below decks. The indiarubber inserted in the skin of the ship seems to have failed altogether. It was lacerated and scattered, and was manifestly not to be relied upon. Reports differ as to the results of the trial on the asbestos, but it would appear to have carried off the palm from its rival, though it won its victory in an unexpected fashion. It was supposed that it would keep out water by swelling, and through its elastic power generally. This was not the case, however. It achieved the desired end by changing its substance, after perforation by the shot, having been converted into a sort of paste or putty by means of absorption. When the ship was heeled over so as to bring this paste below the level of the waters of the "Solent," it was found that it

fully answered the purpose for which it was intended. The importance of the discovery of these qualities of asbestos cannot be over-estimated. It will raise our confidence in those of our fighting ships which have unarmoured ends, and many prevent them from becoming practically waterlogged in action. Indeed, it would appear that a most invaluable addition has been made to the defensive properties of war ships.—*Globe.*

NOTES ON POPULAR SCIENCE.

By Dr. J. E. Taylor, F.L.S., F.G.S., &c., Editor of "Science Gossip."

Most of my readers are aware that the edible swallow's nests, which form the acme of Chinese gastronomy, are composed of semi-digested seaweed disgorged for the purpose of constructing those curious dwellings. They may be also further aware that many fishes build nests, some of a highly artistic character. Amongst these nest-building fishes the sticklebacks, marine as well as freshwater species, are most distinguished. Our marine stickleback constructs a nest of various available materials, which latter he binds together by curious mucous filaments. Professor Moebious, the distinguished Danish naturalist, has recently shown that these mucous filaments are formed from the epithalial cells of the fishes' kidneys. Moreover, he formulates the possible means by which this curious habit has come into play. First, the kidneys are hypertrophied; their enlargement causes an abnormal pressure, from which the stickle-back tries to relieve itself by rubbing against foreign objects, to which the squeezed-out mucin adheres. But at such time he is in close company with his mate, and near to the bunches of eggs which the latter has fastened to the water plants. Among the latter he finds the nearest and most convenient place for getting rid of the troublesome mucin, and thus he becomes an unconscious nest-spinner.

Everybody is acquainted with the fact that after the leaves of trees and shrubs fall the wound closes up again. Otherwise the places would "bleed," and the sap or vegetable blood would ooze away. The healing of these vegetable wounds is not a matter of accident, nor is it always effected in the same way. Professor Haby has been carefully studying the subject, and he finds that the closing of the scars after the falling of the leaves takes place in at least four different ways. First, by the drying up of the surface of the wound, as in tree ferns; second, by the formation of reticulated cells, as among the orchids; third by the formation of a special skin or periderm (which is by far the commonest method); and, fourth by the wounds being closed by the exudation of gum. The latter process is also very common in nature, and it suggests an artificial means by which we may heal any accident to the shrubs and trees of our gardens.

A very suggestive and possibly important discovery to winegrowers has been made by Signor Cuboni, an Italian scientist. He shows that the sap which flows from the Italian grape vine stem in March and April contains numerous germs or microscopical organisms which he holds to be identical with Saccharomyces. When these germs are placed in sterilised must they rapidly produce vinous fermentation. A still closer examination has proved that the "germs" are merely buddings from the fruit-bearing (hypha) branches of a fungus which grows parasitically upon the bark of the vine, and which is known to botanists as Cladosporium herbarum. These buds get into the gum which exudes from the cut surfaces of the old branches, or into the sap which flows out. They then put on all the appearance of, and are possibly actually identical with, the ferment fungus Saccharomyces. Thus it may happen that we are indebted for the fermentation, ripening, and bouquet of our wines to the apparently accidental wanderings and ramblings of fungus spores, which have no botanical business to be where we find them.

It has been shown that the quality of yeast depends very greatly upon the absence of Bacteria. The vinegar-plant' (as it is called) builds up a tissue of true cellulose; but the real yeast plant develops a modified cellulose structure resembling that produced by Bacillus aceti, quite different in its reactions to the other. I don't know whether the little creature haunts Australian houses, but I have a strong opinion that I saw it in Melbourne—the "fish-moth," "silverfish," &c., as it is popularly called, but more correctly known to entomologists as Lepisma domestica, one of the Thysanuridæ, whose scales have long been favourite objects with microscopists. It haunts damp cup-boards, and glides about like a fish, and yet its body is silvery and moth-like—whence its popular name. It is very common in all old houses here. These insects are very fond of paper, and their chief delight is to devour the labels in museums. It has just been found that they are also partial to silk dresses (*always black ones*) and even woolen garments, Curators of museums, &c., are recommended to steep their labels in corrosive sublimate. Ladies cannot adopt the same precaution with their black silk dresses, so they will have to hang them in very dry wardrobes instead.

An important paper by Dr. Kelner has recently been published, in which many of the facts menioned will be familiar to horticulturists and agriculturists. The subject of the paper was the influence of urea upon soils, with special reference to the well-known methods of employing it in China and Japan. It is proved that the application of fresh excreta is actually injurious to crops, and that in such a state a great deal of the most valuable nitrogenous compounds of the manure are lost by the rain carrying them into the deep subsoils beyond the reach of the roots of plants. Japanese farmers never employ either urine or manure except when it is in a highly decomposed state, and the urea has been converted into carbonate of ammonia.—*Australasian.*

LABOUR IN FIJI.

(*From the "Handbook to Fiji" for the "Colind" Exhibition.*)

The chapter on "Labor" notices the subject under its three phases, Indian, Polynesian, and Fijian, and gives prominence to the leading facts in each case. Among other matters having respect to Indians it is observed:—"The quality of the coolies imported into Fiji has varied with each vessel. Some ships have brought a fine working lot of men; others appear to have successfully relieved India of a surplus gaol population. No doubt the past experience of Fiji planters, confined to quiet and more easily managed Polynesians and Fijians, has not been good training for the working of Indians. The notorious litigiousness of these people has been a source of great annoyance to planters in Fiji and has multiplied by ten the work in the district courts.' It may be hoped, however, that as time passes by, both Indians and their employers will become better able to form working traditions which will bind both sides by the bond of mutual advantage." It is generally understood that Mr. Anson will shortly return to the colony, and the resumption of his rule at the Immigration Office affords the very best possible guarantee for the realisation of the hope above expressed. Further it is remarked:—"That Indian immigration to Fiji has on the whole been a success admits of no question; without coolies none of the large companies could carry on work." It may here be interjected by way of comment that the full list of employers is under thirty; that almost half the coolies are under engagement to one leviathan company, and that when four others have been reckoned with, out of a total of about 6,000 there are not more than 600 or at the outside 700 in the employ of the rest. But to proceed; it is stated:—"Several indeed (of the large companies) have discarded Fijian and Polynesians entirely and work with Indians alone, from whom Europeans can obtain ordinary and extraordinary work by the inducement of money, which offers few temptations to the unsophisticated Polynesian, but which appeals with annually increasing force to the Fijian." This statement contrasts strangely with the following, taken from that section of the chapter devoted to Fijian labor.—"At the present time (Feb. 1886) there are 600 native laborers engaged for a term of a year beyond their home districts at rates of wages

varying from £5 to £8 per annum." The cost of Indian introduction per caput is £21 16s 5d exclusive of £7 10s for return passage money; the cash inducement is annually appealing with increasing force to the Fijian; yet out of a population of 114,000, but 600 are engaged as yearly laborers. The explanation given is that:—"This state of things has been contributed to by the Fijian's high idea of his own importance as a laborer and his exorbitant demands at a time when they had to be conceded." This of course supplies the fullest explanation which could possibly be required. But reverting again to the coolie; it is remarked that "constitutionally the Indian coolie seems to adapt himself to whatever colony he emigrates to. The climate of Fiji appears to be admirably adapted to him and unlike the Polynesian he has always formed one of the healthiest factors in the population of Fiji. They are, however, by no means such good workers as the Polynesian; while it would hardly be an exaggeration to say that the criminal statistics of the colony date their existence from the arrival of the coolies. It cannot but be regretted that while due recognition is given to the value of the work performed by the coolies, both on and off estates, the necessities of the colony no less than the crying calls of humanity called for the substitution of Indian for Polynesian and Fijian labor." Concluding this subject the followinn may be quoted from the section devoted to Polynesian labor and it may be read in conjunction with the above statement that the Indians are "by no means such good workers as the Polynesians."—"It cannot be said that Polynesian labor is really cheaper than that of the Indian immigrants, but being more docile and more trustworthy the Polynesian is preferred to the Indian by most planters who have had experience in working them. It has been found that the Polynesians are not sufficiently strong to undergo constant work in the sugarcane fields and the Government have therefore discouraged their employment by large sugar planters. On the coconut and fruit plantations on the other hand these people are quite at home, and are generally preferred to any other class of laborers. Of the Fijian it is further remarked:—"It may be said that his occupation is gone. Eminently fitted for such work as clearing a plantation his services were, on plantations being opened up, eagerly sought; but now that work of this nature has for the most part been completed the supply of native labor exceeds the demand." There is in the whole of the remarks on the labor question a great deal that is undeniably true, but there is also a great deal which will afford Fijian planters food for reflection and comment.—*Fiji Times*, July 21st.

HOMING PIGEONS.

Sir,—I noticed in your issue of the 28th August last an article on homing pigeons, by "Homer." Allow me to point out that, not only in this country but in Europe also, the carrier pigeon has been immortalized by poets and historians as the messenger pigeon sent out to friends at a distance from beleagured cities with written messages, and in such instances the preference has always been given to the carrier. But in this country, from the manner in which these birds are reared, they are not equal to sustained flight, and from the want of practice often grow too heavy for the purpose. For homing pigeons, carriers should be selected when about two months old, and they should be flown morning and evening for an hour or two, with the double object of allowing them to exercise their wings, and to acquire powers of sustained flight, as also to make themselves familiar with the surrounding country in which their home lies, after which they should be taken out either daily or two or three times a week to a certain distance, which should be gradually prolonged, and then let loose, to find their way home. When they can in time accomplish distances of one or two hundred miles they may be considered fully trained. I have said carriers are the best kind of birds to form homing pigeons, but I have been in the habit of crossing carriers with the wild blue or rock pigeon, and their young make excellent homing pigeons, as they do not grow so large as the carrier, and they have the vigour of great sustained flight, which they inherit from the wild bird. I have now some kind of carriers as well as crosses with the wild birds that would make excellent homers.

Yercaud, 8th September. John Shortt.

—*Madras Mail*, Sept. 10th.

THE ORIENTAL BANK ESTATES' COMPANY.

It must be remembered that there were no less than nineteen Ceylon and four Mauritius estates to be taken over *en bloc*, comprising in the former over 10,000 acres, and in the latter over 11,000 acres. Though the Ceylon estates as a whole left a margin of profits, and were certainly far more saleable than two years ago, yet it is fair to assume that they are not all equally remunerative, and indeed, that some of them being in the trantision state, between coffee and tea or other new products, are not at present paying their way. The subjoined schedule will enable our readers to form an independent judgment on the question:—

Estates.	Total.	Acreage. Cultivated.	Coffee.	Coffee & Cin.	Cinchona.	Tea.	Tea & Coffee.	Cardamoms.	Coffee & Cocoa.	Grass.
Looleondura and	1,130	594		296	100	108	89	1		40
Waloya	301	185	60			176				14
Kudaoya	754	170		59		79	62			30
Wattewelle	690	690		250		375				40
Darawella	492	492		359		133				
Craigie Lea	253	158		128						
Dodangalla	517	210	30			35		35	140	
Kondesille	490	155		85		175	54			154
Daug Kande	311	272		151	26	227	146			
Glendevon	986	612		209	179	249				
Nilloomally	299	474		50						
Forest Creek	158	88	88			250		23		30
Donoughmore	511	430		67	228			10		50
Havilland	700	488	60	140		190				
Naranghena	587	190			140	75				
Simnapitiya	178	140			22	157				
Summer Hill	165	165		40	91	104				
Stellenberg	352	591	213	183						
Delmar	1,382									
	10,245	5,929	151	2,017	786	2,533	351	69	140	358

Note.—The figures for tea in the above table represent the acreage under this cultivation on 30th of June last, but the figures in the other columns are taken from Ferguson's Directory for the current year, probably corrected to 30th of June 1885, and some little alteration has taken place since then. Thus there was an increase during that interval of about 600 acres under Tea, part of which is taken from the land previously under coffee and cinchona.

The amount of cash payable to the liquidator, on account of these properties was £87,600 which is equivalent to an average of about £8 10s per acre or considerably less than the current price of the primeval forest fifteen years ago. But if we now

estimate the forest reserve and grass land on these estates at £4 per acre, or about £20,000, there remains only a balance of £67 to be spread over close upon 6,000 acres under various forms of cultivation, or just £11 per acre, which is, of course, a very low average value. Or, if we put it in another way, there are, roughly speaking, 2,300 acres of tea, which certainly ought to be worth £30 per acre, or £69,000, so that the Company obtains the coffee, cinchona, cocoa, and cardamoms for nothing! There can be no question that the Company enters on possession under most favourable circumstances. Ceylon has now passed through the crisis which coffee-leaf disease involved her European enterprise, and capital is once more seeking investment there in the new industries created by the indomitable pluck and preseverance of planters, combined with great natural resources. Every year the value of the estates will steadily improve under judicious management, and the Company will presently be able either to sell them outright at a handsome profit, or to continue working them on its own account, and we have no doubt that the result to the shareholders will be highly satisfactory, whichever course is adopted.

The Mauritius properties acquired by the Company are so circumstanced that it is impossible for us to give particulars, consisting, as they do, of claims and charges upon different estates, shares in estate companies, &c.: but we are assured, by those who have gone through the calculations, that the purchase consideration, viz., £65,350 in cash, besides a proportion of the Deferred Stock of the Company was very moderate, and that this part of the bargain ought to turn out quite as profitable to the Company as the other.—*Planters' Gazette.*

COFFEE AND ARECA IN MYSORE.

From a Correspondent.

From the official report of the Kadur district for the year 1885-86—one of the best coffee-growing parts of Mysore, we note that the total number of plantations are reckoned at 23,238, comprising an area of 138,185 acres, of which coffee covers 136,439 acres, cardamom 1,646 and cinchona 100 acres. The cultivation of cardamoms is much on the increase, while cinchona is also finding favour with the planters.

The Arecanut is grown very extensively in the Kadur district of Mysore and is almost entirely in the hands of natives. The total receipts by the Durbar on the tax from the arecanut produce was R95,000 in 1885-86, being an increase of over R23,000 on the preceding year. The increase was due to a good crop consequent on a favourable season and an almost complete absence of "rot" to which this produce is so subject. The arecanut sold at R10-8-0 per maund of 80 lb. locally; much of the produce is exported into the neighbouring districts of the Madras Presidency. Still more largely is arecanut cultivation carried on in the Shemoyah district, which lies to the N.W. of Kadur. The amount of tax collected in this district for 1885-86 was close upon R2,10,000 being an increase of nearly R50,000 on the previous year.

INDIAN MACADAMIZED ROADS.

[In copying the following article from the *Indian Engineer*, it may be well to mention that *Kunker* or *Kankar* is an impure nodular limestone common in many parts of India where siliceous rocks do not exist.—Ed.]

Macadamized roads in India are of two sorts—(1) kunker roads, and (2) stone roads. It is by no means a very easy thing to produce a good metalled road. It is considered by most people that all that is necessary is to "shove in the metal and ram it down." If well rammed, this method will, of course, produce a hard surface; but unless an ordinary "pucca" road even is made on scientific principle, the *traction* can never be reduced to a minimum, which is the object to be aimed at in the construction of macadamized lines of communication.

1. Kunker Roads.—The existing practice is to break up the metal to 2" cubes and to consolidate it with iron or wooden "door-mats" or rammers.

2. Stone Roads.—The present plan is to break up the stone to pass through a 1½" ring and to consolidate it with rammers. In some parts of India ordinary iron rollers are used, and in some places steam rollers. In consolidating stone, "mooram" (decayed rock) is freely used as a binding agent, and also for dressing the surface after consolidation.

4. Now, this practice appears to be defective If a kunker road is dug up after consolidation according to method (2), it will be found that the 2" cubes have been crushed and reduced to ¼" and ½" cubes, thus reducing fearfully its power of resistance. Hence it is that (1) the top layer of kunker does not last long, and (2) the cost of maintenance is greatly enhanced, and (3) the surface of roads is never *even* and *smooth*, thus increasing the traction. On stone roads the surface is so very rough that the greater number of country carts pass along the earthen siding during the dry months of the year.

5. The writer ventures to offer the following suggestions, which if adopted in constructing metalled roads, will, he is sure, produce profitable results.

6. Kunker roads.—Kunker should be of hard texture and broken to 1½" cubes. Consolidation to be done with lots of water and one of Aveling and Porter's steam rollers of 15 tons. The advisability of using a roller is obvious. The gradual pressure will *not break up the kunker into small particles*, but jam it together, leaving the original nodules practically intact, but closely knit together.

7. Stone Road.—Stone (granite, quartz or other hard stone) should be broken up as small as practicable, but certainly larger than 1" cubes should never be used; ½" and ¾" cubes would be better. It should be closely packed and rolled with one of Aveling and Porter's steam rollers of 15 tons. "Mooram" should not be used, and the *first* rolling should be done quite dry until the layer of metal is firmly compressed. The surface should now be freely sprinkled with a mixture of "mooram" and water, or a layer of ¼" mooram spread over the surface, well watered, and the road rolled thoroughly over again until the surface becomes perfectly smooth.

The last process is to lay a *thin skin* of mooram, say ¼", dry over the surface and the traffic allowed to pass over it.

It is obvious that, unless the stone is broken up *small* and to a *uniform size as practicable*, (1) a smooth surface will never be obtained, and (2) the cubes will *never bind* and *hold together as a solid mass*. "Mooram," or any other binding agent should never be used with the stone *before the first rolling*, as it absorbs moisture and the road would break up during the rainy season.

R.

The Soap Tree.—The soap tree grows freely in Tallahassee. This tree bears a large number of berries, which are about the size of an ordinary marble, having a yellowish, soapy appearance, with a hard, black seed, from which the plant is propagated. Sometimes the soap is obtained by boiling the berries, but in Japan, and other tropical countries, the berries are used as a substitute for soap just as they are taken from the tree.—*Burgoyne, &c.'s Monthly Export Price Current.*

Acid (Boracic).—The experiments to preserve fish by curing it with this acid (to which attention was called in the *Chemist and Druggist* sometime ago) are, we hear, proving remarkably successful, some fish having recently been inspected in London which had under the boracic acid treatment retained all its original freshness. We hear that the idea is entertained in some quarters to introduce the boracic acid treatment of fish to Ireland. It is thought that fish so cured would command a ready sale in England and contribute to the revival of a drooping Irish industry.—*Chemist and Druggist.*

Artificial Diamonds.—A correspondent of *Inventions* (Mr. J. Palmer) states that he obtains crystallised carbon in the following manner :—Carbonic acid gas is liquefied by pressure in a strong wrought-iron cylinder, which has an insulated carbon rod fixed at each side of the lower end. The end of each carbon rod projects into the vessel about an inch. A current of electricity (about E.M.F. 30 volts and 15 ampères) is then passed through the liquid gas, by means of the ends of the carbon rods, outside the cylinder, being connected to an electric battery. Electrolytic action then takes place on the liquid gas, and pure crystals of carbon are gradually deposited on the carbon points. What becomes of the liberated oxygen, the iron vessel, and the operator is not stated.—*Chemist and Druggist.*

Cocoa Drying &c. in Matale.—What has become of those perfections of drying apparatus—the American evaporators? Is cocoa still stewed and desiccated in these machines? I hear that on one large estate a tea drier is being utilized as a cocoa-drier also. The drying of cocoa artificially is not by any means simple affair. I have seen a small room economically arranged with stove and fan turn out very efficacious and a more ambitious scheme of Clerihew (with no limit of care and thought and expenditure) yet turn out a failure. There is no doubt but that cocoa suffered terribly from the drought of 1883-84, and that even old trees in the open were not able to recover for a long time. The bark seemed black and "bound." I may mention an experiment made upon trees to effect some relief to this. They were cut as deep as was safe (the bark merely) along the older branches, but chiefly on the stems, straight down, in four lines so as to allow the tree to expand more freely. They all appeared to derive much advantage from this, and there is one tree at the Peradeniya Gardens which was so treated that it is literally crowded with fruit upon all its branches, as if the cutting had somehow made the sap fly to the branches in superabundance.—Local "Times."

Agriculture in the Southern Province of Ceylon.—Mr. Wm. Jansz, the retired head clerk of the Batticaloa Kachcheri, who has had 15 years' experience of Agricultural operations in the Eastern Province, has indented fot a supply of seed paddy from Batticaloa with the objec of introducing it into the Galle district. He is so convinced that before a good crop can be got, the seed must be brought from some distant place (which it appears the Sinhalese cultivator does not recognise), that he is desirous of experimenting with the Batticaloa seed paddy. The field selected is at Ganegama in the Gangaboda Pattu, and three kinds of seed, maturing in three, four and six months will be used. We trust that Mr. Jansz's efforts on behalf of the agriculturists of the South will meet with all the success which such a public-spirited attempt deserves. According to Mr. Green (Agricultural Primer) "the Sinhalese cultivator recognises this principle of rotation without knowing it when he tries one kind of paddy seed for one crop, and another kind for the next crop." In case the present scheme result satisfactorily, we shall be curious to know if the native cultivators will adopt the experiment. Mr Jansz's opinion is shared by an experienced European planter, who states that the present meagre yield can be quadrupled by employing imported seed.

The "furious" Ceylon Cinchona Planters.—Such is the way in which the *Chemist and Druggist* in reviewing proceedings of the Pharmaceutical Conference refers to our cinchona cultivators. An interesting reference is also made to the Nilgiri Gardens and to the scientific work going on there :—

Last year Mr. David Hooper gave good indication in a paper read at Aberdeen that there is good stuff in him, and that he is a worthy successor of Broughton. The importance of the Government cinchona plantations has, from a commercial point of view, diminished considerably since Ceylon planters have gone in for cinchona so furiously; but for that very reason the Government venture has increased in scientific importance. The work of a quinologist in a cinchona plantation is in the highest degree interesting, and of great practical value to the cultivator, since it reveals the effect on the bark of the various artificial means which are adopted to improve the drug in quantity and quality. Naturally, such a paper as Mr, Hooper's may be little discussed, but that is no reason why it should not get a good place in the programme.

Cinchona and Tea in Java.—From translations in *Straits Times* received today we learn :—"The Planters' Association at Sukabumie in Java has taken steps to test a newly invented process found out by Dr. Eydman for cheaply extracting medicinal alkaloids from *cinchona* barks. Should the experiments result satisfactorily, a problem of the utmost weight to cinchona planters in that island will be solved. Dr. Eydman is fully confident and sure of success so that there is every prospect of arriving at a solution favourable to the interests of cinchona growers there. Another welcome bit of news to them is the assurance on good authority that, in Ceylon, the export of cinchona bark has reached its utmost limits, attended by a heavy increase in that of root bark, one consignment of which was secured by digging up about fifty thousand trees. Bark exports show such evident signs of approaching decrease that one out of three agents of European firms buying up that article at Colombo is said to have made up his mind to settle down in Java. His coming thither is only deferred until that island produces cinchona bark enough to admit of his establishing himself permanently there.—Tea growing in Java as pointed out by an expert in the *Bode* has a bright future before it. Yet capitalists, for some reason or other, shrink from embarking money in this line of business. As matters now stand, of all the kinds of cultivation carried on in Java, that of tea is certainly by far the most remunerative. Should seasonable rains continue to fall, the dividends of many tea companies will assuredly prove this at the end of the year."

Water Purification.—At a recent meeting of the Institution of Civil Engineers, the paper read was on "Water Purification: Its Biological and Chemical Basis," by Percy F. Frankland, Ph. D., B. S. C., F. C. S. The earliest attempts to purify water dealt simply with the removal of visible suspended particles ; but later chemists turned their attention to the matters present in solution in water. Since the advance of the germ theory of disease, and the known fact that living organisms were the cause of some, and probably of all, zymotic diseases, the demand for a test which should recognize the absence or presence of micro-organisms in water had become imperative. It was, however, only during the last few years that any such test had been set forth, and this was owing to Dr. Koch, of Berlin. By this means the only great step which had been made since the last Rivers Pollution Commission had been achieved. It had been supposed that most filtering materials offered little or no barries to micro-organisms ; but it was now known that many substances had this power to a greater or less degree. It had also been found that, in order to continue their efficiency, frequent renewal of the filtering material was necessary. Vegetable carbon employed in the form of charcoal or coke was found to occupy a high place as a biological filter, although previously, owing to its chemical inactivity, it had been disregarded. Being an inexpensive material, and easily renewed, it was destined to be of great service in the purification of water. Experiments were also made by the agitation of water with solid particles. It was found that very porous substances like coke, animal and vegetable charcoal, were highly efficient in removing organized matter from water when the latter came in contact with them in this manner. Also, it was found that the well-known precipitation process, introduced by Dr. Clark, for softening water with lime, had a most marked effect in removing micro-organisms from water.—*Indian Engineer.*

Correspondence.

To the Editor of the "Ceylon Observer."

LIGHTNING AND COCONUT PALMS.—No. 1.

Colombo, 23rd August 1886.

Sir,—"Fact" has gone beyond facts when he does not doubt that it was the Telephone wires that attracted lightning. How does he account for the lightning ferreting out the few Telephone wires passing under the cornice of Messrs. Aitken, Spence & Co.'s office and not being *attracted* by the massive 30-feet iron post with its greater number of wires and brackets only a few yards off?

I think "Fact" may with advantage learn a few electrical facts especially with regard to Telephone and its wires.

Fact No. 1.—If the Telephone wires had attracted the lightning, they would naturally have received at least the greater portion if not the whole of the discharge, which was not the fact.

Fact No. 2.—The Telephone wires are so constructed, that, should they receive a discharge of lightning, they will be fused and cut off the further progress of the fluid, which fact did not happen.

Fact No. 3.—All the Telephone instruments are protected by very sensitive lightning protectors which act by fusion, and so sensitive are they that a discharge several hundred yards away from the lines causes them to act. In the thunderstorms of the 3rd and 4th May last over 80 of these were destroyed, in fact every Telephone Office was cut off.

Fact No. 4.—So small was the quantity of electricity taken up by the wires passing A. S. & Co.'s office that only their lightning protectors at one end were affected and the annunciator coils on the switch boards were not in the least injured.

Fact No. 5—Is that if the Telephone wires had the propensity of attracting lightning as "Fact" *no doubt* believes, I should certainly not expose myself in a Telephone Exchange from which so many wires radiate, whereas the fact is that since the Telephone was worked in 1877 there has not been an accident in the thousands and thousands of offices over all parts of the globe.

I will not take up more of your space, but if "Fact" wishes to learn some more facts I will be happy if he call round at the Telephone Exchange to show him all the precautions to guard against accidents taken by THE MANAGER, O. T. C. Ltd.

Colombo, 23rd August 1886.

Dear Sir,—I must thank "Fact" for correcting me as to the effect of lightning on the whole tree in front of Messrs. Aitken, Spence & Co.'s office, but what about the branches killed on the N. W. corner of the tree? For the information of the Manager of Ice Manufacturing Company, and others who should require t, I shall describe the way to put up a good ightning protector on a chimney; those for other buildings vary only as to size, quantity and position, according to the bulk and shape of the building. First, starting from the top it should consist of a copper rod from ¾ in. to 1 in. in diameter divided at its upper end into three or more points which should all be well electroplated or heavily tinned to keep them from oxidising; next, the rod should be about 5 feet above the top of the chimney; then it should be attached to a ribbon of copper 2 in. by ⅛ in. running down the whole length of the shaft, it must be attached directly, to the masonry by copper staples, it must be buried in the ground (or down a well preferably) to water-level in dry weather, on reaching which it should be cut in two equal strips and attached to a copper plate 6 feet by 3 feet by 1-16th in., each of the strips being attached 2 feet from either end and down the whole breadth of the plate. The plate should be brightened up and buried perpendicularly with 6 in. of charcoal pressed down well all round it. The plate should be well below dry weather water-level. A most important point is to have all joints screwed or riveted *and soldered*. It should when finished, be, if possible, electrically tested. The use of two metals is decidedly bad, and it must be remembered that a bad lightning protector is worse than no protector at all—Yours faithfully, Q. E. D.

THE DOUBLE COCONUT AND VARIETIES GROWING IN CEYLON.

Central Province, 25th August 1886.

Sir,—Does the Coco-de-mer or double coconut grow in Ceylon? It is said to grow luxuriantly in the Seychelles Islands. If we have none in Ceylon, perhaps Mr. E. H. Edwards who is down in those Islands will send up a few young plants in the shell. It would also be well to ascertain if the common coconut grown in those islands and in South Africa are the same as those we have in Ceylon. It is only lately I became aware of the several varieties there are among the coconuts grown here: the only difference seems to be in the size of the nuts. I am told some trees never yield large nuts, however good the soil may be. I should like much to know where the best and largest grow, in what part of the island.—Yours faithfully, LATCH.

[Our correspondent will find a good deal of the information he wants in our publication, "All about the Coconut.]" Dr. Trimen says of the *Coco-de-mer*:—

Coco de-mer.—In response to an application made in 1882, I have received from the Chief Civil Commissioner of the Seychelles, through His Excellency the Governor of Mauritius, 10 seeds of this rare and magnificent palm. They arrived in April (1884) and were at once planted 7 at Henaratgoda and 3 at Peradeniya. As yet there are no signs of germination, but the usual period occupied in this process is from 18 to 30 months, so that this is not to be expected. Peradeniya already possesses two beautiful specimens of this unique Palm, about 30 years old, but in the case of so extremely local a plant as this and one of such peculiar interest to naturalists, it is much to be desired that a larger stock should be in existence, so that in time it may be possible to propagate by seed from another centre. This palm, being, like the Palmyra, dioecious, it is necessary to have sufficient plants to make it probable that both sexes will be represented among them.

Mr. E. H. Edwards sees the *Tropical Agriculturist* regularly in which this letter will appear, and he may perhaps respond. We have no doubt our Hapitgam Korale correspondent will have something to say about where the largest nuts are found in Ceylon.—Ed.]

THE CROTON-CATERPILLAR ATTACKING TEA.

Dear Sir,—You will be sorry to hear that the croton-caterpillar does eat tea leaves, baring the bushes rapidly when there is no more suitable food for it to devour. Of course it prefers croton, but when that is exhausted it takes readily to tea and even Liberian coffee. The ravages of this pest have not been at all exaggerated, and those who have both tea and croton will find it desirable to decide which to keep, for if tea is held by, then the presence of croton becomes dangerous as tempting the pest to settle, The Madatiya (*i. e.* the wild charcoal-tree) also affords a tempting feeding-ground for the grub. NEW PRODUCTS.

[It must then be a case of '*Delenda est Carthago*' croton-oil trees taking the place of Carthage. "Out with them" will be the cry of our tea-planters, and the only question will be that of compensation to the croton-oil tree cultivators.—Ed.

Charcoal of the coconut shell is specially used by native goldsmiths in melting gold and silver. Why? Is it that it yields more intense heat? Charcoal is variously used in electric lighting. Professional or scientific men might try different kinds of Indian charcoal and ascertain if any of it is specially fitted for the purpose. There is the *yercum* charcoal, that of the coconut shell, that of *oomi*, the husk of rice, and the arecanut, and so on. If I remember aright, charcoal is also used in forming galvanic batteries. Trials might result in some useful discovery which might yield a little fortune to the discoverer!—*Madras Mail.*

Gutta-Percha.—Sir John Kirk, writing in December last, forwarded a sample of native African gutta-percha, the produce of a yet unknown tree which he found at Mombasa. From the papers now published, it would appear that after examination of the specimen there remained no doubt that the substance would prove an acceptable addition to the present supplies, its value being about 10*d.* per lb. At the same time Sir John Kirk also forwarded specimens of some Indiarubber taken from plants supplied from Kew Gardens about five years ago, these having flourished and propagated freely at Zanzibar. The report on this specimen valued it, if taken from the trunk of the tree, at about 1*s.* 9*d.* to 2*s.* per lb as Sir Joseph Hooker, late Director of the Royal Gardens at Kew, remarks, "the attention of Her Majesty's Consular officers in these countries (India-rubber producing states) cannot be too closely addressed to matters of this kind, which are not merely of great scientific interest, but may from the basis of a lucrative and beneficial trade."—*Indian Agriculturist.*

Planting Prospects in St. Lucia.—A. St. Lucia correspondent thinks King Sugar is dead, and blames, the Government and the planters for not initiating other industries which it will pay to cultivate. This is all very well, but it is very difficult to get out of an old groove. It cannot be done in a day, neither can it be done without money. Still, if there be no prospect of reviving King Sugar, then, obivously, something will have to be done if the estates are not to run to seed. From the market returns it will be seen that tamarinds, turmeric coconut oil, cinchona bark, chillies, cloves, ginger, and mace sell at rates which would pay for the trouble and expense of their cultivation. Now, as it is well known that the soil of St. Lucia is friendly to the cultivation of all these articles, might it not be as well if the good people there were to give some of them a trial.—*Planters' Gazette.*

Ceylon Tea Gardens.—Messrs. Rucker and Boncraft, the well known brokers, of 37 Mincing Lane, have just published a second list of Ceylon Tea Gardens, shewing the names, districts, and acreage, of about 900 different properties arranged in alphabetical order of districts.* In presenting this list to their clients they remark:—"When our first list was published in November, 1885, about 13,000 acres were under Tea. Now, including as Tea Gardens those estates which are growing tea among coffee and cinchona, the figures approximate 120,000 acres, or nearly three times as much. We have written so fully from time to time to urge upon Planters the great necessity of striving after quality, that we risk appearing wearisome by reminding them that very strong brisk flavory China Tea, with a fair leaf, can be bought at from 7d to 8d per lb. in this market, and that if Ceylon Tea is not kept away above this class in quality, the results must be simply disastrous. It must be borne in mind that such a list as this is necessarily incomplete, as fresh ground is being broken every day, but it may be of some use if only to signal 'Caution' in view of what must be regarded as a certain over production of Tea."—*Planters' Gazette.*

* Made up from our Directory.—Ed.

Making Tea in Japan.—The Japanese host never intrusts the making of tea to his servants on high occasions, and the fine art of the process was fully shown us in the dainty management of every article of the service before the host. The teapot was a little jewel-like thing that could be set—handle, spout and all—inside of one of the common-sized coffee cups that a foreigner draws once or twice at a breakfast, and the cups were of fine cloisonné, with plain enamelled linings, each no larger round than the circle of a tulip's petals could inclose. With them was a small pear-shaped pitcher, a beautifully wrought bronze teapot in which the boiling water was brought, and a lacquer box containing the caddy of the choicest leaves from the fine tea gardens of Uji district—a tea so rare and expensive that none of it is ever exported or known abroad, and only the wealthiest Japanese can afford to buy the precious leaves. Our host, taking an ivory scoop carved in the shape of a large tea leaf, filled the little teapot full of loosely heaped leaves, and then having poured the hot water into the pitcher that it might cool a little, poured it into the teapot. That part of the tea-making was most puzzling to us of the Occident, who had been taught, as the first principle of tea-making, that the water must be boiling at the minute it touches the leaves, and that unless at boiling-point, tea made with it is flat and unprofitable. Our Japanese friend explained to us that to the most critical and epicurean tea-drinkers of his country boiling water was an abomination, as it scorched hte leaves, drove out the fine fragrance in the first cloud of steam, and extracted all the bitterness instead of the first sweet taste of the young leaf. "It may be all well enough for the coarse black tea of China to pour boiling water on it," said this most delightful Japanese, "but the delicate leaf of our cultivated tea plant does not need it." And we bowed submissively and promised never more to apply Chinese processes to Japanese tea-leaves.—*Miss Scidmore's Kioto Letter in the Grocer.*

Tea Coffee, and Sugar in the United States.—The other day, says the *Pall Mall*, we printed statistics showing a great increase in the consumption of beer and tobacco in the United States during the past financial year. As the *New York Tribune* points out, a still better test of the condition of the entire population, however, is the consumption of tea, coffee, and sugar. Well, the consumption of sugar last year was 10 per cent. greater than the previous year, which means a consumption of more than 50 lb. for every inhabitant yearly, a quantity that has never been used except in one year in the entire history of the country. Twenty years ago the people used only 30 lb. each. The consumption of tea was over 1.27 per capita, as against 1.17 lb. in the previous year. This is a consumption less than was recorded in the years 1881-83. But in 1866 the consumption was scarcely more than a pound for every person. The quantity of coffee consumed last year was probably 9.17 lb. per capita. But that is more than was ever consumed in any previous year. It is nearly 1 lb. more than was consumed in 1881, a year of great prosperity, and 2 lb. more than was consumed in 1876, ten years ago, and more than double the quantity consumed in 1866, twenty years ago, when the consumption was only 4.37 lb. per capita. Surely, says the *Tribune*, these are not evidences of starvation. If the people drink two cups of coffee where they needed one in other years when general prosperity prevailed; if they take more cups of tea, at least four where they formerly used three; and if they use for sweetening the tea and coffee five pounds of sugar where they used to be content with three, if is safe to say that they are not in absolute want of the necessaries of life.

A CINCHONA SYNDICATE FOR CEYLON.

We have to call attention to the letter of Mr. James Sinclair on page, 276, a subject of very great importance to cultivators of Cinchona in Ceylon. It strikes us that one of the indispensable preliminaries to the successful working of the scheme proposed would be the acquirement of reliable and full information as to the exact position of the Cinchona enterprise not only in India and Java, but in the States of Central and South America where systematic cultivation has been attempted, and also the conditions under which the further exploitation of the native cinchona forests would be permanently discontinued. In this connection we may quote the summary in the *Pharmaceutical Journal* of a paper read by Mr. David Howard at the British Pharmaceutical Conference:—

"Cinchona Cultivation in South America was the title of a paper by Mr. David Howard, who belives that it is to other countries than Ceylon, which occupies at present the most prominent position of all the countries where cinchonas have been cultivated, that we must look for the solution of the scientific points involved in the cultivation of cinchonas, owing to the little care that has been taken in Ceylon to avoid the danger of hybridization. Unfortunately, very little scientific information can be obtained from South America, the natural home of the cinchonas, except what little can be derived from the study of the cultivated bark which reaches us from that country. Among the cinchonas under cultivation in South America are two new species, *C. Thomsoniana*, named after Mr. Thomson, who discovered it in the Central Cordilleras, the home of the well-known *C. lancifolia*, and another discovered by Senor Pombo in Ecuador. *C. Thomsoniana* gave on analysis of the bark of a two-year old tree 3·3 per cent. quinine sulphate, trace of cinchonidine, and 0·55 per cent. cinchonine. The bark from the other species of the same age gave 5·7 per cent. quinine sulphate, 0·43 per cent. cinchonidine, with no cinchonine or quinidine. The improvement brought about by the successful cultivation of the cinchonas is further shown by the results obtained from the same plantations in 1872 and 1881 of the several kinds of cinchonas grown in Jamaica and these results were even more favourable in the cultivation in Columbia of descendants from the Jamaica plantations. In the case of a succirubra cultivation in Columbia from a Jamaica plant the bark yielded as much as 7·0 per cent. quinine sulphate, with only 1·9 per cent. cinchonidine, and 0·67 per cent. cinchonine and Mr. Howard remarks that this succirubra is one of the finest he has tested. In Mr. Howard's opinion it cannot be too clearly borne in mind that the prospect of future profits in the cultivation of cinchonas depends entirely on the cultivation of high testing bark, for in the face of the importation of such highly valuable cultivated bark from Bolivia, as well as from Java, the profitable growing of inferior bark is impossible."

If the Ceylon Syndicate were fully supported, a special agent might be employed to collect information in the several countries, and if in addition the gentlemen in Colombo named by Mr. Sinclair in a private letter as likely to give their services, took a managing interest in the Syndicate we should be very hopeful of success. Of course there are other difficulties in the way, many of which are detailed in the letter under notice; but probably all could, by persevering and united endeavour, be overcome.

LETTERS FROM JAMAICA.—NO. XIII.

A STORM AFTER A CONTINUANCE OF UNSETTLED WEATHER —COFFEE CROPS—THE ANNUAL FLOWER SHOW IN KINGSTON—JAMAICA FRUIT TRADE—PROTECTION OF PRODUCTS AND MANUFACTURES.

Blue Mountain District, Jamaica, July 1886.

Since I last addressed you about the 20th ult., we have had a continuance of very unsettled weather. Sunday night, the 27th June, we had a storm which most people believe to have been the tail-end of a hurricane, for more mischief was then done in that one night, than had been caused by the previous fortnight's bad weather: not only was the rain heavy, but the gusts of wind were fields have suffered much; some estates worse than others, and it is strange that the wind from the Northward which usually does us most damage most severe. It is pitiful to see how it has blown off the leaves in all unsheltered places, all high this time was not the evil-doer, but S. and S. E., so that fields facing West have not suffered so much. In the lowcountry, especially the central part of the island, St. Mary's, Clarendon, Manchester, and St. Ann's, the floods were very heavy; cane fields were turned into lakes, boats had to be sent to rescue the settlers, and those living at the estates works, and great houses; several deaths took place from people being washed away and drowned. As to the Railway, especially the two new extensions to "Porns" and "Ewarton," it suffered very severely: bridges, walls, embankments being carried away, proving the contractor Mr. David Reid, our old Ceylon friend and his Manager Mr. G. M. Campbell, with their Ceylon experience, were right in protesting that the work as specified to be done by the Government Engineers was not sufficiently substantial, and it will no doubt be a cause of great expense to the Jamaica Government, for I cannot see it would be fair to make the contractor suffer for damage done by such very exceptional weather during their term of upkeep, especially after he had pointed out to the Government Official Engineers, and Public Works Department they did not consider the works sufficiently strong to stand against tropical floods: it would be injustice to make the contractor a sufferer under such circumstances.

As to coffee crops, last year's have not quite equalled expectations. I have only heard of one Blue Mountain Estate that exceeded its estimate and that was a very low one, and only exceeded by some 8 tierces; many others were short. No doubt some coffee was lost during the continued gales and winds in June; there seems also to be loss from rats and birds; then there are so many vacancies to the acre that it is very difficult to make correct estimates, even old stagers are often out in their calculations; the quality, however, of the 1886 crop is excellent, and there not being so much as was expected should cause prices to be all the higher. As to next year's (1887) crops, the settlers' coffee and lower fields will do well, as there has been so much rain, but I fear all upper fields will be short as the wind has cut them up so much; yet the coffee is so healthy and vigorous (like Ceylon, Udapussellawa and Haputale) that they are doing their utmost to put out blossom, and already producing a mass of young shoots.

The Annual Flower Show took place in Kingston a few days ago and it was not considered equal to other years,—no doubt the bad weather of the previous six weeks had something to do with it. It is not unlikely this Society will suffer from the absence of Mr. D. Morris, whose experience as a scientific

botanist, good taste in arrangements, and happy way of putting matters *en train* will be sadly missed. This reminds me to mention that Mr. Hart has been appointed *pro tem* superintendent of the Cinchona Plantation. What the council will decide as to the future management of the place will not be known till next session, it is to be hoped, they will not abandon the place, or let it be sold below its value. Mr. Morris' former residence would make a very good Government sanatarium: there is no such place in the Jamaica Mountains where officials can go to for change, when laid aside by sickness.

Our Jamaica fruit trade flourishes best during the winter and spring months before the American fruits are ripe; just now is a dull time and prices low. In January, £12 is given per 100 bunches bananas ready for shipment, now prices are down to £6 and £7; this added to the number of trees blown down during the gales and damaged by the floods, will cause considerable loss to growers. Cacao, and coconut trees must also have suffered from the late stormy weather.

The *Gleaner* newspaper has lately published several leaders on the subject of protection, pointing to the decadence of agriculture and manufactures in England as compared with America advocating the levying of heavy dues locally on all goods that can either be grown or manufactured in the island; this is no doubt a very wise advice *if* it can be carried out, but at present there would be a sad lack of experienced hands, so protection would only tend to a large increase in prices. It does seem an anomaly that Jamaica with hundreds of acres of fine land lying idle should have to import corn from America, also ice which can and is by one company manufactured cheaply at Kingston. Thousands of pigs could be raised here, and fed on sweet potatoes and turned into pork. Ham and bacon, milk and butter, could be got in quantities from the cattle pens; boots and shoes, furniture, clothing, &c., &c., might be made in the Island, and import duties saved and the money kept circulating in the island employing men, who, because our colonies, our sugar, coffee and other products are not protected, have to go to that deadly climate on the Isthmus for employment. I have always thought free trade a mistake, unless it was generally adopted; England cannot alone fight the battle of free trade and ruin her colonies and farmers, and manufacturers. This fact must at length be dawning on such men as Mr. Bright and his school and may reconcile them to a policy of reciprocity: allowing all colonial goods duty free except those necessarily taxed for purposes of revenue, and on these the import dues should be double to foreign countries that tax our products and manufactures. W. S.

COFFEE IN THE S. STATES' CONFEDERACY.

Coffee had been almost the sole table beverage of the South, and no privation caused more actual discomfort among the people at large than the want of it. There was nothing for which they strove so eagerly and unceasingly to procure a substitute. Few, indeed, were the substances which did not first and last find their way into the coffee pot. Wheat, rye, corn, sweet potatoes, peanuts, dandelion seed, okra seed, persimmon seed, melon seed, are but a few of the substitutes which had their turn and their day. "A fig for the difference between Ri-o and ry-e," said the wits. "Eureka!" cried an enthusiastic newspaper correspondent. "Another of the shackles which holds the South the commercial thrall of the world is severed. Let South America keep her Rio and the antipodes its Java. It is discovered to be true beyond peradventure that as a beverage the seed of the sea-island cotton cannot be distinguished from the best Java unless by its superiority; while the seed of the ordinary variety is found to be not a whit behind the best Rio."

What a flutter of excitement and joy it raisd in many a household—and doubtless the scene in ours was typical—to find that the great national plant, the very symbol of the Confederacy, was indeed was so many-sided! It gave us greater confidence, if it were possible to have greater, in the power and possibilities of the South, now that cotton, the great king, had had another crown laid on his brow. So opportune was the discovery, too, that it struck us as almost a divine revelation, indicating the interpositon of Providence in our favor. So eager were we to test it—or rather to confirm it, for it was too good, not to be true—that we could not await meal-time. Residing in North Carolina and up the country, we had never seen any sea-island cotton, but the prospect of being confined to Rio was by no means appalling. A pickaninny was forthwith hurried off to the cotton patch, then sparsely flecked with newly opened boles. The apronful of precious stuff, now a veritable manna, was hardly indoors before a dozen hands, of all sizes and colors, were tearing, picking at the discredited fibre, in quest of the more priceless seed. The Rio was made and drunk. Despite the sorghum sweetening, the verdict was unanimous in its favor.

I hope that the communication of this stupendous discovery to our neighbors added as immensely to our happiness as to our self-importance. But if in the last respect we sinned, retribution could not have been laggard. For although, owing to the fact that happily the recollection of disappointments and humiliations is less abiding than the opposite feelings, I am unable to tell exactly why and when we returned to parched bran, it is nevertheless true that we did.

Recipes for making "coffee without coffee" (when the real article was alluded to strong emphasis on the word left no doubt as to which kind was meant) were extensively advertised in the newspapers, and in some instances sold by canvassing agents. But rye, okra seed, and meal or bran held in the long run the popular favor. Those who could afford an infinitesimal quantity of the real article counted out by the grain, to flavor the substitute, were the envy of the neighborhood. A cup of pure and genuine coffee would in the eyes of many have been an extravagance akin to Cleopatra's famous draught itself. The contents of a small gourd, which held our entire stock of the genuine article for many months before the close of the war, must have gone towards the making of an incredible lake of coffee.—*David Dodge, in the "Atlantic."*

PETROLEUM AS FUEL.

In several issues of the *Journal of the Society of Arts*, a lecture on Petroleum has been published of an exhaustive nature. The latest portion deals with petroleum as a fuel, and we extract as follows:—

The "pulverisers" of Artemeff, of Brandt, of Nobel (which is a modification of Brandt's), and others, will be found fully described and illustrated in *Engineering*, vol. 35 (1883), by Mr. Thomas Urquhart, Locomotive Superintendent of the Griazi-Tsaritsin Railway of Southern Russia. The burner which is stated to have given the best results in use on the locomotives of that railway company, is Karapetoff's; and that which has been adopted by the Russian Government as best adapted for use in torpedo vessels is Kaufmann's. All these pulverisers depend for their action upon the

principle illustrated in the description of the Lentz apparatus, and differ only from that burner in details of construction and in the shape of the flame produced. They are all, in fact, similar to the apparatus patented by Messrs. Wise, Field, and Aydon, in 1867, and used at the works of Messrs. J. C. and J. Field, of Lambeth. In a valuable paper, which will be found in the "proceedings of the Institute of Mechanical Engineers" for 1884, Mr. Urquhart gives the results obtained in the practical use of petroleum residuum on the railway already referred to. Comparative trials, made in winter, showed that the economy of petroleum, as compared with anthracite, was 41 per cent. in weight and 55 per cent. in cost; and, as compared with bituminous coal, 49 per cent. in weight and 61 per cent in cost. As compared with wood, petroleum was 50 per cent. cheaper. At a speed of 14 miles an hour up an incline of 1 in 125 the steam pressure was easily kept up at a pressure of 8 to 8½ atmospheres, with a No. 9 injector feeding the boiler continuously. In summer the mean evaporation per lb. of fuel was 11·35 lb. of water from an initial temperature of about 55° Fahr., the theoretical evaporative power being 16·2. The useful effect was, therefore, 70 per cent. The comparative trials in summer gave a difference of 56 per cent. in weight and 66 per cent. in cost in favour of petroleum as compared with bituminous coal, and 52 per cent. in weight and 63 per cent. in cost as compared with anthracite. The results for the entire year gave for petroleum, as compared with the mixture of half bituminous and half anthracite coal used, an advantage of 38 per cent. in weight, and 46 per cent. in cost in the case of the goods trains, and 25 per cent. in weight, and 33 per cent in cost in the case of the passenger trains. Mr. Urquhart remarks that he has successfully used petroleum as an anti-incrustator, and also finds that the presence of oil in the boiler tends to reduce the tendency to priming, unless too much is employed. Petroleum is more difficult to use in a locomotive boiler than in a marine or stationary boiler, and at first it was found impossible to prevent leakage of tubes, accumulation of soot, and inequalities of heating of the fire-box; but by the use of properly arranged brickwork inside the fire-box these difficulties have been overcome.

Petroleum residuum is the only fuel employed for steam generating purposes in the steam-ships on the Caspian Sea, and I observed that, both in the case of these vessels and of the locomotives on the trans-Caucasian Railway, the combustion was smokeless, though occasionally a slight odour of imperfectly consumed oil was perceptible.

It is reported that the Central Pacific Railway Company have recently commenced the use of liquid fuel on their steam-ships, and have obtained results which show the cost of the oil to be 56 per cent. of that of the coal previously employed.

In this country experiments are now being made at Portsmouth with the object of determining the relative economy of liquid fuel and coal for use in the belligerent navy. At the end of last year the cargo steamer *Himalaya*, of 800 tons burden and 100 horse-power nominal, which had been fitted with Mr. Percy P. Tarbutt's oil-burning apparatus, made a successful trial trip to Leith and back, making 8¾ knots per hour under disadvantageous circumstances, her mean speed when fired with coal having been 6½ to 7 knots. The boilers in this vessel have three furnaces, each of which is lined with fire-brick and provided with a fire-brick baffle, and a combustion chamber beyond. Within the chamber is a coil of pipe to superheat the steam used in spraying the oil. Messrs. Tarbutt and Quentin, the managers of Tarbutt's Liquid Fuel Company, inform me that experiments made by two engineers of the Compagnie Francaise des Diamants du Cap, at the works of Messrs Oliver and Company, Chesterfield, with a Robey boiler fitted with the Tarbutt burner, showed a mean evaporation of 16·3 lb. of water per lb. of oil, the highest result obtained being 17·2 lb. Another test made by Oliver and Company gave the relative efficiency of coal and oil as 1: 2·6. In a marine boiler fitted with the same apparatus, the engineer of Messrs. Wigham, Richardson, and Company is stated to have obtained an evaporation of 15·57 lb. of water per lb. of oil. The liquid fuel which has been employed by Mr. Tarbutt in this country is the residual product known as "dead oil." In the use of the various steam-spraying apparatus it is necessary first to raise steam in the boiler by the use of some other fuel, or to employ an independent steam-generating appliance until the boiler has been sufficiently heated.

It is well known that Admiral Selwyn claims to have obtained in the use of liquid fuel far more satisfactory results than those which I have given. Liquid fuel occupies only slightly less space than coal, but its greater steam-generating power obviously enables a steamer to make a much longer voyage without taking in a further supply. Liquid fuel can also be placed on board far more quickly and with far less annoyance to passengers, advantages which will be appreciated by those who have made a long sea voyage in a steam-ship. Besides which, nearly the whole of the labour expended in trimming the coal and stoking is saved; and in the case of ships of war the smokeless character of the combustion is a feature of no small importance.

Cooking Gorakas.—The following extract is from the proceedings of the Horticultural Society of India:—From Mr. J. Buckingham, Amgoorie, Assam, presenting some plants of the "Rupi tikora," a shrub which he describes as "growing into a very pretty plant; the fruit also adds much to its appearance, and is, when cooked, extremely palatable. I think the plant is a species of *Garcinia*." Mr. Buckingham, in a later letter says: "We have three or four species of *Garcinia* up here. *First*, Garcinia pedunculata (Tikur, or Tikul, as you say); it is called by the Assamese, *Bor Tikora*. Second *Garcinia cowa*, called by the Assamese *Koojee Tikora*. Third, a *Garcinia sp*, called by the Assamese *Moh Tikora*. Fourth, the plant I sent you called by the Assamese *Rupi Tikora*, not identified by any one yet that I know of. The first three are trees, the last is a very handsome shrub about 10 or 12 feet high if allowed to grow."—Query, whether the last mentioned may not be what is known in Ceylon as the *Ratu Goroka*, of foreign origin and with foliage akin to that of the mangosteen, which the fruit so closely resembles?

The Natural Beauty of Burma is thus described in a letter to the *Times of India*:—Coming down the river from Bhamo, one is struck with the natural beauties of the country and the promising future still before it. More especially beautiful is the second defile, a score of miles south of Bhamo, but to me the first defile already mentioned in this letter is the grander of the two. Going down the river through the defile, the ship swishes along gaily at the rate of thirteen or fourteen knots an hour, and when the river is rising there are regular maelstroms in which the ship dips her bows in homage to the river nymphs and gods; and then it requires steady steering and hard going to keep her head from swerving, for nymphs of all sorts are famous for making heads to swerve. And coming along you get a good view of the rest of the surrounding country and see how beautiful Burmah is, perhaps all in all the most beautiful country in the world, more especially the portion of it lately annexed to the British Empire. Nothing, however, appears to be perfect and without blemish, and you think, with reluctance, that the very characteristics that largely impart to Burmah its beauty, also imparts to her bane, such as the rich alluvial soil, the swamp from the stately river, and the profuse vegetation, all more or less associated with sickness. No doubt cultivation, sanitation, &c., &c., will do much to diminish these spots on beauty or beauty spots. The majestic river, dotted over with island gems, the wooded plains and the tall blue hills in the distance are well worth a long, long lingering look. Not a river in India, if any in the world, can touch the Irrawaddy in its grand magnificence at this time of year. Neither the holy Ganges of the east nor the "Indus" of the west can at all approach this noble current.

Correspondence.

To the Editor of the "Ceylon Observer."

A CINCHONA SYNDICATE FOR CEYLON PROPOSED. IN ORDER TO REGULATE THE EXPORTS OF BARK.

Bearwell, 20th Sept. 1886.

Dear Sir,—"The price of Cinchona depends entirely on the shipments from Ceylon" is the remark of a leading firm of London brokers in a recent Fortnightly Report. This being so, surely a combination of those interested here for the purpose of regulating the supply which shall be sent from the island, is far from impracticable. Self-interest in this instance, would, I think, serve to bring the grower and his agent into harmonious action, and thus secure probably double the present price of the unit of quinine to those who so much require it. Judging from the ready way in which sales for the past year have gone off, notwithstanding the fact, that the most sanguine estimates of exports will nearly be doubled before the year is out, I take it that it is not so much the enormous increase which continues to depress prices, as the feeling that we may not yet have reached the highest point and that next year may see this year's exports once more doubled. Hence if a Syndicate could be formed having for its objects the storing of bark, and the regulating of shipments, in such a way that the unit of quinine could be kept at sixpence instead of about threepence, surely there are but few, be he mortgagee, agent, or planter, who would not give it his support.

I think I am not far out in saying that one and all of us have the idea that if we could keep up our bark for a year or two, very much enhanced prices would be obtainable.

With your permission, sir, I shall as briefly as I can lay before you the outline of a scheme, which I think would prove at once practical and economical, and to some extent, if not entirely participate in the better prices that will doubtless be ruling some time hence. Let everyone in the island who has an acre of cinchona form a Syndicate, and rent one or more of the many unoccupied coffee stores in Colombo, to which, all bark would be sent from the baling press (having been previously analysed) to be stored there until its turn come for shipment.

On the bales being handed over to the Syndicate storekeeper, a warrant—on which the variety, weight and analysis of the bark taken in would be marked—would be handed to the owner or agent, which warrant would be a document on which dealings might take place similar to those in respect of Pig-iron on the Glasgow exchange, by which the grower would get his money at once, or the Syndicate itself or one of our local branches might arrange to advance up to fully half the value of the bark, charging a low rate of interest.

The Syndicate would keep itself well-advised as to the trade requirements, and would have the entire control and regulating of shipments; not however to the extent of depriving the Colombo Agent of his commissions or charges in any way, but it would fall on those managing the Syndicate to say how much should be shipped during any one month.

I by no means underrate the difficulties that would have to be overcome before the scheme would prove a success, and I shall enumerate some of the more prominent ones, and endeavour to show how they could be met:—

1. I am assuming that self-interest would serve to rally the planting body to a scheme which can e shown to be of so much immediate benefit to them,

2. The fact that a considerable portion of the bark is hypothecated to people out of the island, who might be averse to even a temporary alienation of their security which storing with the Syndicate would imply. Even if self-interest did not induce their support, their agents in Colombo could hold the warrants until the bark was released or in other ways procure their sanction to a scheme which they could not fail to see would be of immense service to their constituents.

3. The fact that most planters require the full value of every harvesting, the moment the article is ready for the market, and that no bank or syndicate could with safety give an advance of much over half the actual value. For this difficulty, I would merely point out that if the operations of the Syndicate raised the price to 6d per unit an advance of fully the present quotation would be procurable, so that besides the ultimate advantage of getting 6d per unit, they would receive as an advance as much as the bark would sell for with no regulating Syndicate.

4. That of making a selection of bark for shipment would probably give rise to more discontent than any of the other difficulties, and yet I think a method at once fair and just could be devised. For example, suppose the stored bark consisted of that from 100 different estates, each proprietor, mortgagee, or agent more anxious for a realization than the other Directorate would proceed to select the barks that arrived up to a certain date of the previous month, and in the event of that being insufficient for the market requirements then take the next in order and so on; and on the other hand in the event of their being unable to send all the bark to the date mentioned, a proportion of each could be taken and the balance held up, and so on.

5. Then comes the possibility of Java, India, or South America, stepping in to upset our scheme, I would remark with reference to this that our object is a perfectly legitimate one; we seek only to get a fair value for an article which another combination, composed of canker and hard times, has unduly depressed, a value probably which may be raised even another 100 per cent the moment our extensive fields become exhausted as they assuredly will before many years pass over. We do not seek to operate to the extent of raising the fever powder up to, far less over its proportionate retail value, nor do I think that the extent we purpose, manipulating for, would cause shipments to be resumed from South America or more to be harvested from India or Java.

But even in that case, according to Messrs. Brookes & Green "the price of cinchona depends entirely on the extent of shipment from Ceylon," hence the Syndicate could at once render abortive any outside attempt to upset their aims. I trust that you will be willing to give your support to this, or some such Scheme, the outline of which I have sketched. There are gentlemen in Colombo I could name, who, were they to take the matter up, could work it out in all its details to a perfectly successful issue. I trust therefore, you will find space for my proposal so that the subject may at all events get ventilated.

Unless we again take to planting cinchona a very few years will exhaust the existing fields; we shall then feel similar chagrin to that most of us must at the moment be experiencing, now that coffee is fairly on its way to the three figures. That, most men could not help; but I maintain that we have it within ourselves to prevent our remaining cinchonas, from which so much was expected, from being sacrificed.—Yours faithfully,

JAMES SINCLAIR.

BEST SEASON FOR PRUNING TEA?

21st September 1886.

Dear Sir—The question, "What is the best month in which to prune tea on estates exposed to the south-west monsoon" is often asked and various answers with reasons which appear conclusive to each advocate, are given making the matter rather confusing to a new hand at the work. One man will advise a commencement in June, another in July, others at different dates up to October; a few preferring the north-east monsoon to prune in.

Judging from the growth on coffee and other plants throughout the south-west monsoon together with the short experience we have of tea, June and July pruning is I think a mistake, except on places under 2,000 feet. In these months there is a good yield of leaf and what is of great importance, the tea made—where the withering accommodation is sufficient—is of finer quality than is made earlier in the season. On the other hand, nothing appears to be gained by this early pruning, unless when the bushes require a lengthened rest after pruning.

To make the most of the bushes, I would prefer doing this work from middle of August to middle of September: the first plucking would thus fall to be taken in the first half of October and would escape injury from the burst of the north-east monsoon which usually comes on about 20th October. The second growth would start in November and the tea afterwards be in fine bearing condition for the best plucking months—March to June. Later pruning than this would shorten the yield from the small surface there would be to pluck from in the best months.

On estates approaching sea-level where in the wet season there is sufficient heat to induce the bushes to flush, pruning might with advantage be done in the dry season, but perhaps the prolonged drought immediately after pruning would have a damaging effect on the tree and probably cause a portion of the wood to die back. Has pruning been tried at this season in low-lying districts?

ALFYSO.

Indian and Kaffir Labour in Natal are thus noticed in the London letter of the *Indian Planters' Gazette*:—

The following information *re* Indian labour in Natal will not come amiss after what has already been sent you in reference to Natal. The necessities of the Coast plantations have led to the introduction of East Indian or coolies labourers in considerable numbers by Government agency, chiefly at the employers' expense. Several laws have been passed to regulate terms of payment, and to provide for the due care and protection of the immigrant. Indians are engaged to their employers for the term of five years, after which they are free to engage in any occupation they choose, and at the end of ten years from their first coming to the Colony they can claim to be returned to their country by the Government or to have an equivalent in land to the amount of their passage money. A sum of £10,000 is annually set aside as a Government contribution to the expenses of this immigration. The interests of the coolies thus imported are looked after by an officer specially appointed ("the Protector of Immigrants," a familiar term to your readers) and a complete medical and general staff. From the 17th November 1860 to the end of 1885, there arrived in the Colony 34,582 Indian immigrants including men, women, and children, of these nearly 5,000 have returned to India, on completion of term of service, or have left for elsewhere by license. Of indentured Indians, there are now, including women and children, about 10,000 in the Colony; and of "free" Indians, about 19,000 Indians are now to some extent employed in the midlands and up-country. Considerable numbers of the "free" Indians are at work on their own account as farmers, market-gardeners, traders, and hawkers. As a rule, all the Indians adhere to their old habits in diet, dress, social customs, and religious observances. Hence an old *cha sahib* going to Natal would, so far as he employed Indian labourers, feel quite at home. The native population I have already alluded to in a former letter; it comprises various tribes, but all of the Zulu type, and all use Zulu language, with slight dialectic differences. The experience of 50 years shows an unbroken record, except in a few unimportant instances, of submission to law and order and of good social relationships with their white neighbours and employers. Naturally good tempered, docile and honest, they appreciate just and fair treatment and many friendships have been formed between the two races. The Government of this large population (361,766) has been carried on with scarcely a disturbance and taxes amounting to a considerable sum have been collected from them year by year without friction or serious difficulty.

"Artificial Quinine."—Here is how the *British Trade Journal* deals with this subject:—

No sooner does the "silly season" set in than the daily press astonishes its readers by announcements of "remarkable discoveries" which are to "revolutionise" either this or that particular industry. Last autumn a London journal published the startling intelligence that the present sugar industry—beet as well as cane—was to be annihilated by the wonderful returns of sugar which it claimed could be obtained from the *Mahwa* or *Mowra* tree of Hindostan. As was pointed out shortly afterwards, this was nothing but a Munchausen story, since the flowers in question contain only 1·04 per cent of saccharine matter, and even that small quantity is fit for nothing but brewing and distilling purposes. We believe it was the same morning journal that reproduced the American hoax of the new species of cotton tree with pods weighing each from 2 to 3 lb., by which the cotton trade was to be "revolutionised." This year the same newspaper brings forward a "remarkable discovery" of the artificial mode of making quinine, which will, we are seriously told, bring down the price of that drug to something like 3d per oz. We are also told that this important discovery "was made by the accidental breaking of a medicine bottle." But, as we are well aware that all great discoveries are usually the result of accident, this need not surprise any one. The really extraordinary part of the story is that good quinine "can now be manufactured without limit by a very simple process from an article which can always be got in abundance in any part of the World." In order to round off the story it should have been stated that the artificially-made drug had been administered in cases of fever with the most satisfactory results; but to this extreme the inventor, doubtless with a discreet regard for his patients, appears not to have gone. We have the best authority for stating that the announcement that an eminent firm of manufacturing chemists has expressed itself favourably with regard to the alleged discovery is entirely false. It has yet to be proved that anyone has really succeeded in producing so complex a body as quinine synthetically; and it is extremely improbable that even if produced at all it could be made at any very low price. Before such statements are accepted and published by any newspaper it would be strongly advisable to have certain evidence of their correctness

Still more interesting is it to learn from *Chemist and Druggist*:—

Artificial Quinine.—Referring to the alleged discovery of artificial quinine Mr. J. C. B. Moens writes from Haarlem:—"The French chemist who in 1882 claimed to have discovered a synthetical process of quinine manufacture was so confident of his discovery that he actually submitted samples of his preparation to the Academy of Sciences for inspection. The almost incredible fact was then revealed that the so-called sulphate of quinine was nothing but sulphate of ammonia."

NEW RAW ARTICLES OF COMMERCE:—KAPOK.

(Australian Report.)

Pursuing the course adopted some time ago in publishing a series of articles on some "New Raw Articles of Commerce" we thought that a brief review and history of a commodity, which, from its importance in Australian commerce, must be classed among its most staple imports, may not be without general interest. Possessed of the knowledge of its origin and sources of supply, about which there is almost comparative ignorance, a few observations thrown together on the subject may serve a useful purpose in the encouragement of so important a trade, and may possibly suggest some means of attempting to meet at least a part of the enormous demand there is in these Colonies for it.

Kapok is both a Malayan and Java term for the *Eriodendrom Anfractuosum* and *Gossampinus Alba*. It belongs to the *Bombaceæ* family, of which there are several allied orders known botanically as *Byttneriaceæ*, *Chlenaceæ* and *Ternstræmiaceæ*, of which latter family the *Bombax Gossipinum* belongs. Amongst the most remarkable of the *Bombaceæ* family is the Baobab, the largest known tree in the world, whose trunk measures 90 feet in circumference and the Durian of the Indian Archipelago, the most delicious of all fruits, also the Ouatier (*Bombax Malabaricum*) so extensively planted in India as a shade tree. In their growth and products there is very little difference, all are intertropical and exogenous, perhaps no trees in the world have a more lofty and imposing appearance, the untutored children of Africa are so struck with the majesty of their appearance, that they designate them the god-tree, and account it sacrilege to injure them with the axe, they are also remarkable for their splendid inflorescence, their capsules on bursting display a flocculent substance often mistaken by travellers for cotton, and the tree hence called Cotton Tree, but as the substance is more silky than cotton, it has been distinguished by the name of Silk Cotton, or as more generally known in Eastern and Australian commerce, Kapok.

The fibre most imported here is of moderate length, although some varieties are short, remarkably elastic but unfortunately so very tender that it may be said not to possess any staple. It was first brought into notice in Europe on the occasion of the Great Exhibition of 1851, beyond being recommended for upholstery purposes, and in combination with other substances in the manufacture of mixed fabrics, to which there were many practical obstacles, it was generally considered as possessing little or no value, consequently it was looked on with distrust, "it was not in the market," "Brokers did not know it," no pains were taken with it, and from want of attention the article never gained more than notice. In Holland it grew rapidly into favor, and until the Australian Colonies became a customer, that country was the only market for it. At the late Amsterdam Exhibition it shared a much better fate than when exhibited in 1851, it was described as "vegetable wool," commanded considerable notice from all classes, and was valued at a very high figure. The effect of this exhibition was to excite the attention of merchants in Java, India and Ceylon to the article, for almost up to this time its qualities and capabilities remained unknown or so badly neglected that little or no progress was made in it, large consignments were made to Europe and to these Colonies, but the result so far as Europe is concerned, placing Holland aside, seems not to have been encouraging.

The extraordinary success which has attended its introduction, or literally speaking its establishment into Australian commerce, is, perhaps, without saying too much, without a parallel, for only those who have tried it know the difficulties of introducing a new article of trade however good, traders and manufacturers cling with tenacity to old customs and practices, and have almost a thorough disinclination to entertain new substances or new processes, hence the rapid and increasing demand for the product is unmistakable evidence of the favourable manner it has been received by merchants, the furniture trades and the general public.

It is now about fifteen years ago since the first shipment of Java kapok came to this market; but in consequence of the trade in it at Java being confined to Dutch and native hands, regular shipments were not kept up, and, when they did arrive, it was only in small lots; consequently, the trade was so unimportant as not to deserve more than notice here, except a passing reference to one or two eventful facts in connection with it. The price which it fetched in those days must have been different from now, for it is said that the purchasers of the first consignment netted a profit of £7,000 on the transaction. So firmly did it establish itself with the trade on its introduction, that when supplies were not regularly forthcoming they sought out a substitute. Various fibres were experimented upon, and much valuable information obtained, till, at last the trade settled down to the use of "Pulu," from the Sandwich Islands, which grew rapidly into favor; but after a few years' trial, though not until the trade had assumed considerable dimensions, was it found to be totally unfit for bedding and upholstery purposes. In a very short time it went to dust; in fact it possessed a peculiar property of dry decomposition until nothing was left, thus pulu had a short but curious history, being of a fibrous silky substance. It was thought to be of the same order as kapok; but an examination of the plant proved it to be of the *Cibotium* species, a quite distinct family altogether from the *Bombax*, and possessing none of its elasticity and durability. In proof of the lasting qualities of kapok, we have to relate that recently a pillow was shown us by a gentleman in this city, who was a non-commissioned officer in the imperial service engaged in the Mahratta war of 1843, who on noticing the tree, picked sufficient of the fibre to fill a pillow-case, which has been in constant use ever since (43 years), and still retains its elasticity and fulness, and who assures us he has found nothing so cool or healthful to sleep on in warm climates as this article. Such testimony is most valuable. It was not until the year of the Melbourne Exhibition (1881) that the first shipments arrived from India and Ceylon. It is difficult to obtain reliable statistics concerning the trade, for there appears to have been a determination, which by some houses is maintained to this day, on the part of shippers and local merchants to keep the whole thing a secret. We find it entered at the local Customs under all manner of names, such as "vegetable fibre," "vegetable wool," "silk cotton," "tree cotton," "raw cotton," and "Simool cotton." Even now, all the imports from India and Ceylon are entered at the Customs either as raw or Simool cotton; only the Java imports are described as kapok.

Tabulating all the values described under the above headings passed through the Customs in 1881-2-3 the trade seems not to have been followed up or prosecuted to any great measure of success, it may be said that no decisive and important progress was made with it until the year 1884, when the firm of Messrs. Catherwood, Welsby and Co. of this city went largely and solely into the trade, Mr. F. A. Catherwood when passing through Ceylon in 1883 became attracted by the article, and at once perceived its economic uses, and the future there must be for it. On returning to Victoria his firm entered with zeal upon the trade, and it is due to Mr. Catherwood's foresight and tenacity of purpose, as well, perhaps, to his firm's enterprising and venturous spirit for the wonderful development by leaps and bounds the trade has assumed today. Not only may it be said with truth that Messrs. Catherwood, Welsby and Co. control the market throughout Australia and New Zealand, but also the Java market their large purchases abroad are not only felt on the spot, but have a corresponding effect on the market in Holland. Had it not been for the heavy purchases of this Melbourne firm, it would have been a sorry time for both Java and Holland, at the opening of the last season December 1884, Holland had stored up in its warehouses 12,000 bales with a strong "ring" formed by dealers to bear

down the market, both merchants and dealers remained firm; as the season advanced the latter hoped, in fact expected, shipments would arrive when merchants would be bound to ease down stocks. They had reckoned without their host, their action, as is too often the case, was the result of a miscalculation, other competitors had entered the field abroad, Messrs. Catherwood, Welsby and Co.'s orders alone for the Australian market amounted to three-fourths of the entire crop. What a relief this must have been to the Dutch merchants who through the operations on this side of the globe were put in a position to withstand the tactics of the "ring." Some small consignments were made to Holland from Java towards the close of the season, stocks by our last advices from Holland dated April 27th had worked down to 2,000 bales, so that next season at Java a rise may be looked for, the crop will be keenly competed for by Dutch and Australian houses.

Satistics show that Messrs. Catherwood, Welsby and Co. imported duting the season now closed 7,815 Java bales; we notice some very large parcels arriving in one bottom, the S.S. "Khandalla" bringing 1375 bales; the S.S. "Tanmadice" 1442, both within a fortnight of each other; in January and February. The bark "Rachel" arrived in May with 1320 bales, the first vessel that has ever carried a full cargo of this product.

The following comparative tables containing statistics for the past three seasons will be found interesting to this part of our subject:—

Importation (in bales) of Kapok into Melbourne.

Country.	1884	1885	1886
Java	500	1300	7,995
Ceylon	86	150	200
India...	450	900	650

Note.—A bale of Java kapok average weight is about 80 lb.; a bale of Ceylon about 200 lb.: a bale of Indian about 400 lb.

Value of Entire Produce.

Country.	1884	1885	1886
	£	£	£
Java	1400	3700	22,600
Ceylon	430	700	1000
India...	3750	6000	3250

While values have been comparatively steady for the past three seasons, for both the Java and Ceylon article, viz., 8½d. and 6d. per lb., free Melbourne, there has been a gradual and serious decline in the value of Indian kapok, receding from 5d. in 1884 to 3d. today. It is understood, we only allude to merchants' parcels in original bales, the retail trade has not been affected much by the fall. Even at the low price Indian kapok is today, the trade find it to their interest to pay 8½d. and higher for Java, than 3d. for the former. The Indian is frequently received in such a filthy condition as to be almost unusable, more than 40 per cent of the whole being waste—composed of sand, dirt, seeds, &c., which necessitates the bales being sent to a kapok mill to be cleaned and teased, for which the cost of milling is 1d. per lb. on the gross weight put through. On working out the relative values of the Java and Indian article at current market prices, in original bales as above quoted, basing our calculations on the experience of experts, we find that 21 lb. of the Java fill as well as 29 lb. of the Indian in its teased and prepared state, the filling being the true test of respective values, resulting in a percentage of 38 in favor of Java. Therefore manufactured articles of this commodity, filled with the Java, are much lighter and more easy to handle, which is a great desideratum for bedding in warm climates, for which purpose this product, at the present period, is almost solely imported.

This notice treats it only as an article of commerce; in some future paper we hope to review it in its sanitary aspect.

We have not gone minutely into the Ceylon product, as the imports are so small as to be almost inappreciable.

The Indian product in its present state is thoroughly objectionable. First, as regards staple on fibre, it is both short and inferior in other respects to the produce of Java. Second, the inequalities of the stuff found in each bale, good and bad mixed together, added to which is the too frequent fraudulent practice of water packing, putting seeds, sand, and other foreign substances in the interior, in a manner not to be detected without opening the bale. Third, the form of packing is not the least obstacle which has so far acted detrimentally upon the quality. Hydraulic or steam-press packing of bales totally destroys that peculiar elasticty to which kapok may be said to owe its value—without this springy nature it is unsuitable as a stuffing material. Moreover, it is found by hard packing uncleaned stuff a dark-coloured oil is expressed from the seeds which is suffused over the kapok, and consequently stains it, hence the noticeable difference in colour between the Indian and beautifully white Java product. We might go on multiplying facts in support of the position we have asssumed, but we think sufficient has been said to satisfy the reader that when merchants complain of the inactivity and declension of the Indian kapok trade as compared with the rapid progress of its great rival of Java, they should at least remember that a portion of that declension is traceable to their own sins of omission. Of the causes which have brought it about, we have the opinion and experience of a gentleman who has been connected with the trade in Ceylon and India from its inception. We give it in his own words. Speaking of buying at Calcutta, he says:—"The crop begins to come in about May. Dealers go to the boats that bring it from the interior, and bargain. They screw the boatmen down to the lowest possible figure, stipulating for quantity rather than quality, and as it is generally disposed of before it is seperated from the seed, the boatmen gets much the same price for it, no matter in what condition it may be. They have no inducement to pick it more carefully; so that the truth is, the "middlemen" are more to blame than the natives for the filthy condition in which it reaches here. Little encouragement is given to them. So badly thus it pay that during June, July, and August there is always a cessation of deliveries at Calcutta, on account of the natives turning to more profitable work, being busy with their mango season."

At Java the trade has assumed a uniform practice. No unclean stuff is shipped, but the different grades of cleaning denote standard of quality; the first, "extra cleaned," being cleaned by machinery and the first picking of the crop; the second, denoted as "best cleaned picked," being all hand-picked and free from seeds, except an odd one here and there; the third is simply designated "*cleaned*." It contains a few seeds, together with the "slubs," or little knotty, curly lumps, which are cast aside from the higher grades. Quality of any one class is found most uniform throughout the bales. Packing is all done in straw mats, and never tight pressed; the first quality "extra cleaned," weighing about 65 lb.; the second and third, from 75 lb to 90 lb. Bales over 90 lb. to 95 lb., on account of having to be dumped by machinery, destroying the elasticity of the fibre, are reckoned not to be worth within ½d. to 1d. per lb. in value of bales of lesser weight.

In fact, it is a peculiar feature of the Java trade that weight of bales from an essential condition of price—the lighter the highest, and *vice versa*.

The article is of a kind that admits of a deal of speculation. Its unparallelled development and firm hold on Australian commerce hazards the belief that it will take many a season before supply overlaps demand.

The price of any raw article, especially one of this nature, never remains long at one fixed rate. In kapok, much depends on the season. If wet, the crop is small and poor. Again, with the fact that the demand more than keeps pace with the increased

supplies, and others, entering the market with orders for Europe, make prices fluctuate from day to day. The history of the late rise in value at Java and Ceylon was solely and sudden and unexpected enquiry from these parts for a product that no previous attention had been paid to.

Like most articles, kapok is not without its adulterations, imitations, and frauds. The practice recently brought to our notice of mixing "cotton fly," the refuse of cotton with it, which is worth in this market only from 1d. to 1½d. per lb., is a gross fraud upon the trade and consumers. Two lb. of the mixture is not equal in filling to ¾lb. of the true article, besides being devoid of its elasticity, for no vegetable substance is so dead and hard as cotton fly. We have been shown the ordinary Hessian bags filled with kapok, as used by the trade. We notice the bags of Indian and Ceylon were alike, 48 lb. A bag was then filled of the Java, especially for us, as the latter is only sold in "the original" straw bales—this weighed 30 lb. Then we were shown a bag of the spurious stuff, which had not even the appearance of fulness as the others we examined, but this to our surprise weighed 72 lb.—it was merely an illustration of weight between kapok and the refuse of cotton mixture. We asked the firm showing it to us how it could be detected. Were the trade aware of the fraud? They replied, very few; they only knew it did not fill so well, meaning it required more to do the same work, and as a consequence some would take nothing but the Java, but its real defects was its deadness and lumpy nature.

Underselling and cheapness being the mother of this nefarious device, we can only characterise such counterfeits as the surest means of killing a promising trade, like other modes of adulteration, in becoming established and universal, they cease to be profitable to anyone. Once the more honest trader commences to find he stands alone in selling an apparently similar article at a higher price, and that his customers as a consequence are going elsewhere, he will soon begin to furnish a like substitution to cope with competitors, till quality and price becomes so diminished that the trade succumbs to its own vices and follies. Let us hope the kapok trade will not meet this fate.

The following method will enable one to discover whether kapok is mixed with cotton fly or other substances of its kind:—The principal feature of kapok is the total want of strength of the fibre, being soft almost like eider-down, brittle and elastic—the fibre of the cotton fly on the other hand is broad and harsh, possessing great strength, with a tendency to twist. In examining a small sample where a mixture is suspected, it should be drawn out slowly between the fore-fingers and thumbs of the two hands, observe how on the slightest pressure the kapok fibre easily separates, if mixed with cotton fly, the latter will be detected by its strength in resisting this pressure, then by drawing the staple in the other direction and thus alternately from hand to hand, the kapok successively escaping pressure leaves the cotton fly exposed and intact. This is merely a rough and ready test, but examining the sample through a microscope, the difference between kapok fibre and the staple of cotton fly is observed without difficulty. We might animadvert on this subject further, but we have called attention to the iniquity, and we hope our remarks may be felt in the proper quarter. To speak mildly, it is most unfair to those houses who have won a justly earned reputation in the trade for honest dealing. We could wish that our calling attention, not only to the unfairness of such competition, but to the dishonesty of such action would lead to its being totally discontinued. Those, however, adopting such means have not usually any compunctions of conscience, and appeals to their commercial morality seldom leads to satisfactory results; however, we can but do our best in the matter, and that is to caution the trade and general public to exercise care in buying, and pay attention to the few hints we have thrown out.

It has a bright future before it, and we have little doubt that, with the invention of proper carding and spinning machinery, it will be used in the fabrication of articles of clothing, and prove a formidable rival to its allied substances. It has already been used for making gun-cotton, a substitute for beaver fur, converted into half-stuff for paper-making, making silk buttons and fringes, and by the Indians, who make beautiful fabrics of it. In Bombay, the fibre of the bark is used as a substitute for flax, and in Bengal the natives collect the milky juice as a substitute for shellac and gutta-percha. The seeds have almost the same value as cotton seeds, being exported to Europe to extract the oil, and fetch from £3 to £5 per ton.

A kapok mill has been erected by Messrs. Lynas and Gwynne on the Sandridge road, in this city, which is kept constantly going. To these gentlemen we are much indebted for being allowed to inspect the process of cleaning and teasing the article, and for their lucid explanation of trade matters.

In our next we shall give an account of another new fibre, the Dook of the Areng-tree, which Messrs. Catherwood, Welsby, and Co. have introduced here as a substitute for curled hair, the coarser fibres being employed for cordage and brushware.—*Buchanan's Monthly Register.*

Acorn Coffee.—In Germany "acorn coffee" is used, and greatly, liked, as a substitute for ordinary coffee, and is considered to be very strengthening for consumptive people and delicate children. The acorns are gathered in autumn, when they are ripe, shelled, and, after being cut into pieces of the size of coffee berries, they are thoroughly dried in front of the fire, or in a cool oven. They are then roasted like ordinary coffee, until they become a cinnamon-brown colour. Immediately after roasting, the acorns are ground or pounded in a mortar, to prevent there becoming tough. Whilst the coffee is being ground or pounded, a very light butter is added, and the coffee is then placed in air tight bottles. For children, prepare in the same way as ordinary coffee, using a quarter of an ounce to a pint of water, adding milk and sugar to taste. Young children should take it with two or three parts of milk. For adults, half an ounce of the coffee may be used to a pint of water. Acorn coffee and ordinary coffee are frequently mixed, and the decoction is found very palatable. In their raw state, acorns are known to be powerfully astringent, but they lose this quality in the process of roasting. In some respects acorn coffee is preferable to coffee proper, having none of the drying properties attributed to the latter.—*Cassell's Dictionary of Cookery.*

The Wedding-Flower.—This is what is known botanically as Iris or Morxa Robinsoniana, the giant Iris of Lord Howe's Island, and one of the most disappointing garden plants even introduced into English collections. Many have tried, and perhaps a few are even yet trying to induce it to flower, but, so far, no one in Europe has yet succeeded. We began to suspect that there was some condition peculiar to Lord Howe's Island and essential to the flowering of this Iris, till we learned that in the Hakgala experimental gardens in Ceylon plants of it had been raised and flowered in about a year from seeds produced from Australia. This is what Mr. Nock says of the Hakgala plants:—"Planted round a pond are several interesting plants, among them being the Wedding-flower, a gigantic Iris. One flower-spike contains from 120 to 200 blooms, which come out a few at a time, but only last 24 hours: the plant is in flower for several months." Hakgala is at a high elevation in Ceylon, the temperature being perhaps somewhat similar to that of Italy. Many interesting plants are growing there, amongst them being the splendid Tree Fern found only in Ceylon, viz: Alsophila Crinita, of which several fine specimens may be seen at Kew. In Ceylon, however, high-up the sunlight must be much more intense than anything we get, still the Wedding-flower may not really require all this light to make it flower. What does it want that we fail to give it here.—*The Garden.*

INVESTING IN PRECIOUS STONES.

ALL ABOUT THE FIVE PRIMARY STONES.

Collectors of stones are apt to have their nerves agitated by rumours of new mines, or threats that the market will be deluged from the looted treasury of King Thebaw, or destroyed altogether by some discovery of how to make one ruby worth 10,000 fr. out of ten worth 1 fr. each; but I have never found persons who may perhaps have from £100,000 to £200,000 worth of the stock so threatened to be in the least disturbed by these alarms. Even the astonishing increase which has taken place of late years in the supply of diamonds seems only to have increased, in still greater proportion, the demand for them. Good stones are as dear as ever they were, and really first-class stones dearer. Nor is there the remotest chance that "real," though "non-natural," rubies will ever be produced by any process of fusion, welding together, or otherwise. The products would not be ruby, though, chemically, exactly the same substance. Crystalline formation is of the essence of the ruby, sapphire, emerald, and diamond; and though exceedingly minute diamonds—less than the one-hundred-and-fiftieth part of a grain—appear to have been produced by allowing the vapour of carbon to cool under enormous pressure, it seem practically certain that large crystals have been the product of extinct telluric forces operating through enormous spaces of time, the effects of which art will never be able to copy.

Crystalline constitution is the condition of the dischroism or double colour, and the power of dispersion of light, which make all the difference between the mystic and ever-varying beauty of a true stone and a piece of white or coloured glass. The ruby may be softened by heat, and small rubies may perhaps be thus welded together, as they are said lately to have been by some cunning persons at Geneva; but in this process the crystalline character of even the welded bits would be destroyed, and much less would the whole have any such formation. Again, the ruby seems to owe much of its extreme beauty and variety of colour to a fact which has not been sufficiently dwelt upon in this connection. The ruby and the sapphire are chemically the same substance, or very nearly the same. Alternate layers of sapphire and ruby are even sometimes found in the same stone; and erroneous cutting has been known to damage immensely an inestimable ruby by "bringing out the sapphire"—that is, by bringing out a third and distinctly blue tint in the "table" over and above the twin colours of the pure ruby. Now it seems to me that some unequal mixture of the colour of the sapphire in the body of a fine ruby may account for one of the most inimitable beauties of very fine rubies—namely, an exceedingly slight and changeful inequality, or sort of smeariness in the deep carmine of the lower facets, as seen through the "table" and upper surfaces of the stone; a quality which gives to its colour the same kind of mystery and animation as is given to a space of blue sky by the ever-present but all but invisible and ever-changing shreds of white mist, with which the clearest sky is always covered and without which the blue would be as dead and hard, however bright, as the splendid red of the imitation rubies now manufactured in Paris: specimens of which may be seen in a jeweller's shop where Piccadilly joins the Regent's-circus. This effect must for ever remain beyond the power of art to copy; as also must another with which a great expert has told me that he considers the colour of the ruby to be somehow connected.

Very beautiful pink-rose-coloured rubies of great size, four to six carats or more, are sometimes absolutely flawless; but no ruby of the true deep and glowning carmine and of more than three carats in weight has probably ever been seen without flaws. Even in very fine and valuable rubies such flaws are perfectly visible at the first glance of the naked eye: but the most perfect "specimen ruby" ever known as far as I have been able to ascertain, though "perfect" in the sense that it is perfect to the unassisted vision, will reveal, under a strong magnifier, at least one or two such little points or planes of irregular reflection in its substance as those which quite fill the body of a fine opal and cause its many-coloured iridescence. It is a most curious fact that similar "flaws" seem to be similarly connected with splendid colour in the emerald though not so invariably as with the ruby. Large, light-coloured, and flawless emeralds are so common as to be comparatively worthless; and "aquam, arine," which is nothing but a very light emerald is found in absolutely faultless mass weighing pounds, or even hundreds of pounds. Fine sapphires, like emeralds, have usually some flaw or "feather" in them; but, like emeralds and unlike rubies, are sometimes to all appearance absolutely perfect. These characteristic flaws of fine stones are imitated by fraudulent manufacturers, but in vain. The cracks which they produce in their silicious or aluminous glass are too gross to escape detection as the work of artifice, and they do not affect the colour. But, while these imitated flaws are quite unlike those of real stones, the substance of the imitation stone, produced by fusion of alumina and other earths by great heat, has unavoidable flaws of its own, which easily distinguish it. On the whole, it may be safely assumed that the chances of any imitation or "production" ever endangering the value of natural stones is so small that it need not be taken into account by investors in them.

Pearls, though inferior in indestructibility to any of the precious or semi-precious stones, have at all times, on account of their extreme beauty ranked with rubies, sapphires, emeralds, and diamonds in value. They are subject to various kinds of injury, none of which affect the four primary gems, which are practically indestructible. They are easily scratched, are subject to discoloration by absorption of effluvia, and to actual and sudden decomposition by the presence of acids, even in the atmosphere. An instance came under my own observation in which some lustrous pearls were changed in the course of a few days, into things just like the eyes of boiled cod-fish, by the accident of a vinaigrette having been placed in the jewel-case with them. Notwithstanding this serious drawback, their beauty is so surpassing that a fine pearl of large size exceeds in value every other gem except the ruby. A short time ago I had the pleasure of being shown at Messrs. Garrard's a necklace of forty spherical pearls, not at all so large as to look vulgar and ostentatious, the largest being only forty grains. The price was £14,000; and the other day I saw two pearls, one of fifty-four and the other of about ninety grains, which were respectively valued at £1,600 and £4,000: that is to say, at about £140 and £180 a carat of four grains. Black and pink pearls are just now of even greater value; but this is rather on account of their singularity than their beauty, which is incomparably inferior to that of the pure white pearl, with its faint and changeful "photosphere" of all hues.

The pearl is even less capable of being successfully imitated than the ruby or the emerald. In a fine pearl, though there is not the slightest transparency or translucence, you seem somehow to see substance and not superficies. It is an organic surface, and cannot be copied by art. So with the forms of pearls, which, though often mathematically perfect, have a vitality and character of growth from within which, though easily felt by the practised eye, is not so easy to account for. The parabolic and hyperbolic curves of fine pendant and egg-shaped pearls seem somehow to be incapable of being copied. I have one of about the shape and size of the egg of the golden-crested wren; and the beauty of its form is a feast of which my eye is never weary. Science is quite as much at a loss to account for the formation of these exquisite gems in the pearl oyster as it is to account for the hues of the finest-coloured stones. Mr. Church, in his scientific little tract, says: "That there are small quantities of magnesia, oxide of iron, and silica in rubies and sapphires of all hues has been ascertained; but this

fact does not furnish the clue to the cause of the blue of the sapphire or the red of the ruby." Similarly though it has been sought to explain the formation of the pearl by the irritation caused by a foreign substance, "there are many pearls which betray no sign of such origin."

A fact of which the amateur investor should not be ignorant is that the carat by which the weight of all precious stones is reckoned is a variable quantity, as is therefore the "grain," four of which go to make the carat. There are only 3·17 grains of troy weight in the English carat, and Mr Jackson, in his "Modern Metrology" (quoted by Mr. Church) gives a list of sixteen different carat weights for different parts of the world. These weights range between ·2135 and ·1886 of a French *gramme*. There is an understanding between the merchants of London, Paris, and Amsterdam to use the carat of ·205 of a *gramme*; but it is not at all an inconceivable case that the amateur investor should be buying or selling very different weights. He ought therefore to possess a pocket set of diamond scales and weights of the London standard, and to use them when he conceives that there is ground for doing so.

The amateur who invests primarily for the pleasure of possessing a collection of the most precious and beautiful objects in nature, and to whom their character as safe and portable property is only a secondary consideration though a necessary condition in so laying out his money, must of course cut his coat according to his cloth; but, whatever may be the amount of money to be spent—two thusand or two hundred thousand—he ought to have definite views of what he proposes to do. Though he may lay out a regular forty thousand a year on his hobby (as a dealer lately told me that a client of his was in the practice of doing), if he be a true amateur there will be no superfluous repetition, no heaping up of treasure upon treasure merely because it is treasure. If his tastes are simple, he may easily spend a hundred thousand pounds upon a dozen specimens of the five primary gems—ruby, emerald, sapphire, diamond, and pearl; and a few thousands more would buy corresponding examples of all the quasi-precious stones—spinel, tourmaline, peridot, cat's eye, opal, etc. If he goes in for variety in each kind, he may easily spend any sum he pleases; for the individuality of character in precious stones is far greater than is commonly supposed. I was once examining some rubies in company with an uninitiated friend, at the house of a City broker, and my companion inquired how one was to be sure that a stone deposited for sale was not changed? "Surely a man would know his own ruby!" answered the broker, with such a look as one might cast on a man who should suggest a similar difficulty in identifying his wife. The aurora red and the carmine of the fine ruby exist in so many shades and proportions, that it would take many specimens to illustrate the various beauty of which the stone is capable: and it is so with the emerald and, in a less degree, with the sapphire. Several pearls—spherical, "button," pendant, and egg-shaped—would be required to show off these mere varieties of pure form, and several more the differences of colour. Cutting introduces another source of variety in precious stones.

The first thing to be attended to, in choosing stones for a specimen collection, is the colour; the second their interior soundness; and the third their cutting. The power of appreciating their colour can only come from practice, which, however, may be assisted by such hints as I have already given concerning the colour of rubies. The darker an emerald is, the better, provided it is perfectly clear; but to be a fine dark green is not enough. It must have a peculiar oily play of colour, which many have tried but none have succeeded in describing. Isodorus, Bishop of Seville (quoted by Strecter), says, "It surpasses in its greenness all green stones, and even the leaves of plants, and it imparts to the air around it a green shimmer; its colour is most soothing to the eyes." Pliny says: "If the sight hath been wearied and dimmed by intently poring on anything else, the beholding of this stone doth refresh and restore it again." Dante, describing the grass in a pleasant spot of Purgatory, says it was "as green as broken emeralds." Psellos (eleventh century) says it is "leek-green, playing easily into gold and blue." Heliodorus speaks of emeralds as "gems green as a meadow in spring, but illumined with a certain oily lustre." Another ancient writer describes them as "playing with a quivering green." This peculiar and indescribable beauty is owing to their strong dichroism; the double colour showing some different shade or mixture of shades at every slightest change of position, and, even when the eye and the stone are fixed, filling the different "steps" or facets of the stone with indefinable animation.

Sapphires of a bright, dark, and hard blue should be avoided, as well as those which show a pale strawish tint at the thinner edges. The right colour is the dark and soft ultramarine of the cornflower; but this hue is rarely, according to my experience, found without some "silkiness." Clear stones of this colour and without a flaw fetch very high prices; but those of the harsher blue of ninety-nine sapphires in a hundred can be got for £10 or £12 a carat.

An emerald or sapphire of very fine colour may have several internal cracks or "feathers," and still be of great value. Yet flawless emeralds and sapphires are not so extremely rare as to justify a collector of first-class stones in putting up with flawed examples; but he may have to wait for ten or twenty years, if he cannot put up with a ruby which does not, by some obvious irregularity in the reflection from the lower through the upper facets, indicate the existence of interior unsoundness. He may be well satisfied if he is lucky enough to obtain a ruby of three or four carats of the true colour, without any brown or grey "marks" in it or serious chips or chasms in its surface.

A stone may be of the best colour and perfectly sound and yet be worth only half the value of another stone of like constitution and colour, because the cutting and shape are not so good. The "steps" and lower facets should be in such numbers and at such angles as to send their reflected sheets of light through all portions of the upper part of the stone, especially the table. If the stone is too deep or too shallow the table will be lustreless, showing only a dull transmitted light instead of bright reflected planes. It is the fashion now, and is likely to remain so, to give the "girdle" of the brilliant a circular form. This is certainly more beautiful than the old brilliant shape, which was a compromise between a circle and a square. It requires sixty-six facets, instead of the fifty-eight of the old brilliant. A fine large stone thus cut is worth some pounds more per carat than another of the same weight and quality of the old shape.

The value of all first-class specimens of precious stones has greatly risen and is still rapidly rising, on account mainly of the eagerness with which they are bought up by wealthy Americans for their collections. Unless you get the first offer of an as yet uncut ruby promised to you, on the chance of its turning out a "specimen," you are scarcely likely ever to get a faultless stone of even one carat, and for that you will have to pay at least £100. Should a three-carat ruby of such character turn up, you may be asked, or you may ask, almost any price for it. Eleven hundred pounds has been given for such a stone—that is, nearly £400 a carat.—*St. James's Budget.*

Vegetable Cultivation near Colombo.—We have to thank Mr. Atapattu, "Agriculturist," for an excellent basket of vegetables, the products of his garden at Dehiwala—comprising five specimens of the famous snake gourd, brinjal, and chillies &c. The radishes are somewhat large for ordinary use, but doubtless would have been very tender and palatable a fortnight ago. Let us recommend to the notice of this enterprising gardener, the choo-choo gourd introduced by Mr. Nock, also the tree tomatoes, both of which would probably succeed under his care and prove a great acquisition to our country gardens.

PLANTERS' ASSOCIATION, TRAVANCORE.

To the Editor *of the* "*Tropical Agriculturist*," *Colombo.*

1st September, 1886.

Sir,—The members of our Association have drawn my attention to the misleading nature of the statements in regard to Travancore which appear from time to time in your paper and the "Observer." While entirely agreeing with you that Ceylon has little to fear from Travancore, I hardly see for instance the necessity for the deliberate perversion of facts to which the *Tropical Agriculturist* for April last, pages 704 and 712 gives currency. Only two Estates Penshurst and Nagamally were at that time sufficiently far advanced to export Tea, which teas, unassorted sold @ 1/6½d., Pekoe @ 2 2½d. and averages of 1/6J. and 1 8d. for shipments, prices with which we, in our humility are satisfied although you may not consider them to compare favourably with Ceylon.—I am, Sir, Yours faithfully, Robert T. Miller, *Chairman.*

[This is the most extraordinary letter we have received for a long time, and we should be inclined to treat it as a hoax played off on the Travancore P. A.; for on referring to pages 704 and 712 of our *T. A.* for our "*deliberate* perversion of facts," we cannot on page 712 find Travancore mentioned at all in the only paragraph that can be pointed to, and this paragraph is not ours but the Calcutta *Englishman's*! So again, on page 704, the extract is from the *Grocer*" and all that is said is "In Madras and Travancore the plantations remain much the same as before!" This is based on the *official* figures and report. We recommend Mr. Chairman Miller to send us a report of the facts as they stand in place of accusing us or the editors we quoted of deliberate perversion. How are the facts to be known if the Travancore planters do not report them?—Ed.]

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special Letter.)

BEET CULTURE—CHEAP CORN—SUGAR IN BEET—CLOVER FUNGI.

Paris, Sept. 4.

Today beet replaces colza, and autumn sown wheats are the most productive. Lucerne is followed by two consecutive wheat crops, then succeeds oats, and next wheat again. This wheat crop suffers from the excess of nitrogen left in the soil, so the straw has to be stiffened by doses of potash or phosphate manures, which impart rigidity to the stems and corrects lodging. Red are generally found to be stronger in stalk than white wheats. Cultivating in drills, weeding and hoeing, produce the largest yields of wheat. It is thus that Messrs. Nicolas and Raimon reap 35 to 40 bushels of wheat, and 60 to 70 of oats per acre. Their soils are analysed before being cropped, and when they indicate a provision of 4,000 to 5,000 kilog. of nitrogen per acre, no nitrogenous manures are given, such as sulphate of ammonia and nitrate of soda. About 10 fr. per acre is expended on mineral manurings. The chief varieties of wheat grown are the blue and white Bordeaux. Victoria, Autumn red, Chiddham, golden drop, and Australian poulard. The above gentlemen cultivate a mixture of wheats, the Bordeaux and Chiddham, which gives three rows of ears of different heights, a plan they assert, which secures them 4 bushels more of grain per acre. The Chiddham, Victoria and Dattel wheats are remarkable for being exempt from the attacks of rust.

At the French Association for the advancement of Science, just held at Nancy, the chief subject of interest was the condition of French, indeed one might say, of European agriculture, in presence of the augmenting competition with the products of the United States, India, Australia, and South America. The concensus of the meeting inclined to the belief that the future of French farming depended not on fiscal measures, but in the augmentation of yield, and in the adoption to culture of scientific methods, parallel with such as have benefited industry. The freight per hundredweight of corn has fallen since some years from 5. to 1 fr. for United States, and 10 to 4 for India. This reduction is due to the general employment of, and improvements in steamers to the Suez Canal route, the ameliorations in harbors, the machinery for the loading and unloading of cargoes, and the multiplication of railways. These facilities cannot be undone, so lower prices must be expected in the case of grain, as in every other industrial product, Russia, at Odessa has tried the half-and-half-plan. On the quays of that port the railway waggons can shoot the grain direct into the holds of the ships; but in order to conciliate the prejudices of the porters, the lifting machinery is put aside, so that porters may carry the grain on board. In the employment of improved implements of cultivation, much remains to be done in the reduction of expenses. The old plough, still so general, only performs in the day of ten hours one-fourth of the work that a modernised plough easily accomplishes. Sowing grain in lines permits the use of the scarifier or hoeing machine to stir the soil and cut down the weeds, which, like parasites, appropriate the nutrition destined for other plants. Nearly one-half the quantity of seed is saved by machine as compared with hand sowing. Similar economy is to be obtained in harvesting; one man will mow say two-thirds of an acre of corn daily, while a reaper will cut down 12 to 13 acres. In threshing with the flail too, a laborer can beat out 4 to 5 cwt. of grain per day, while a machine does its 550 bushels. Large and small proprietors can alike benefit by these economic processes; the first, by his large capital or his credit, and the others by grouping themselves into co-operative societies to obtain the best and cheapest goods that certain payments and independence of sellers always command. France has plenty of home wealth to develop yet; she has 6 millions of acres to bring under irrigation; she has 80,000 to enclose from the sea, and 2½ millions to break up and reclaim. M. Benoit, of Bousquet, has practically tested several of these guiding ideas by furnishing precise information to wheat-growers—a grain occupying one-seventh of the cultivated surface of France. Now several reasons concur that France must rely on wheat as her staple, her national crop; hence the necessity to raise it better for the future by the choice of the best seed and the application to the soil of phosphate and nitrogen, wherever these indispensable agents are wanting. And these essential conditions are limited neither by climate nor soil. Where they have been applied, the yield of wheat per acre has risen from 15 to 35 bushels per acre. M. Benoit's soil is a calcareous—clay, poor in all the elements of plant-food, save lime. He tried no less than 17 different varieties of wheat to ascertain which suited his district best. He prepared the soil by four ploughings and two harrowings; sowed in autumn with an application of phosphates, and in spring top-dressed with 130 lb. of nitrate of soda per acre. The average yield of wheat in the neighbourhood of Bousquet is only 13 bushels per acre. M. Benoit obtained by improved processes 28 bushels with the Dattel, Blood red, and Bordeaux varieties of wheat; while the White Hunter, Square head, and Chiddam yielded only 12 to 15 bushels per acre. Now in other regions these varieties have given as high as 40 bushels per acre! Hence, the importance of selecting the appropriate seed grain for a locality. By employing natural phosphate in powder, the phosphoric acid will not cost more than seven sous per lb.; and the nitric acid about fourteen sous. It is only natural from these facts that the French government is fully justified in organising, as in Germany, a corps of ambulatory farming instructors, to impress on agriculturists to prepare the land well for wheat, to choose the best and most appropriate seed, and advance to the land phosphates and nitrates. At the same time, the banks will stretch many points in favor of small proprietors uniting themselves into syndicates for the purchase of the best materials for their industry.

M. Aime Girard continues his experiments relative to the formation of sugar in the beet. He concludes that the pivot and radicals of the bulbs only serve to pump up and convey to the organism the min-

eral matters required for the development of the plant—and which can convey during a season of 120 days, a total of two-thirds of an ounce per plant—this is in the ratio of 2 grammes of mineral food for the formation of one gramme of sugar. M. Girard demonstrates that the formation of the sugar takes place in the aerial part of the plant, that is to say, through the medium of the leaves; that it is in the veins of the leaves, not in the stalks, and under the direct action of light, that the saccharine phenomena take place. Supposing a tuft of leaves to weigh 20 ounces, and these represent 66 per cent of stalks and 33 per cent of veins; and that the latter contains 2 grammes of saccharine matter during the day, of which the half disappears during the night, the bulb can thus receive daily one gramme of formed sugar, pending 100 days. One hundred grammes, over 3 ounces of sugar, is thus stored up, which means for a root weighing 26 ounces, a richness of 13 per cent.

About twelve years ago clover was attacked by a parasitic fungi which seemed to cut the stem close to the surface of the soil, when the stalk blackened and the leaves yellowed. It is complained that lucerne presents similar symptoms in the east of France, and is more general where rye is cultivated. Could it be ergot? And are vegetable diseases contagious?

THE CACTI OR "PRICKLY PEARS" OF SOUTHERN INDIA

are thus noticed in the proceedings of the Agri-Horticultural Society of Madras:—

Read the following extract from a letter from the Honorary Secretary, dated Madras, 23rd June 1886, to the Director, Royal Gardens, Kew:—

"Your reference to the *Cactaceæ* brings me naturally to a subject which has been interesting me greatly for some time. Dr. Bonavia wrote to this Government some time ago, and advised the introduction of "the prickly pear" of Malta and that it should be grafted on "the prickly pear" of India. In previous years, suggestions had been made by others, to get rid of prickly pear, which intrudes on cultivable land, by the introduction of the Cochineal insect to eat it; while many attempts have been made to introduce Cochineal for its own value. In some cases it was asserted that *the* prickly pear was so and so, and "varieties" were spoken of by writers who should have known better, so when Dr. Bonavia's letter was referred to me, I set to work to study the subject. I first satisfied myself that most writers and authorities speak of *Opuntia Dillenii* as, or as if it was *the* prickly pear of India, or at least the only one of any importance. See Hooker's Flora of British India, Roxburgh Flora Indica, Wight and Arnott Prod., p. 363, Wight's Illustrations, fig. 114, and innumerable Proceedings of the Government of Madras, the Board of Revenue, Madras, and this Society. "I knew we had about a dozen species in the Gardens, and I knew where to find clumps of at least four species wild and used as hedge plants in Madras; but being here in the last hot season when the plants flower most abundantly, I undertook a series of long rides to inspect all thickets of prickly pear of which I knew or heard, 10 or 15 miles from these Gardens in all directions. "I found at once that the species, which appropriates whole fields and village sites near Madras, is not *O. Dillenii*, that *O. Dillenii* is comparatively rare, and that there is a third distinct species nearly as common as *O. Dillenii*. "I have little doubt that *the* plant in and round Madras is *O. spinosissima* Haw. mentioned in Brown's Hand-book of trees, &c., in Madras, Voigt's Hort. Sub. Cal. p. 62, Dons, Miller's Gardeners Dictionary, Vol III, p. 172 and Grisebach's W. Ind. Fl. p. 302. It is a very distinct plant. It grows *erect* ten to fifteen feet, often assuming quite a tree-like character, with a thick woody stem. Its colour is *blue* green. Its long *grey* spines are very numerous, and they and the small thorns surrounding them so easily detached that they stick and work into every thing that touches them. The flower before it opens is a beautiful rose colour, when fully open almost orange from the quantity of yellow intermingled. The fruit is oval; pulp very rich in colour and probably sweet, as though thickly studded with thorns, birds and beasts eat it greedily.

"What I take to be the true *O. Dillenii* though not in all particulars agreeing with the figure in Wight's Illustrations, Vol. 2, is over the considerable tract of country through which I have specially looked for it, comparatively rare—probably not found once for the other's hundred. It is a *prostrate* shrub, rarely struggling up four or five feet by resting its upper branches on those below. Its colour is *pale* or *bright* green. "Where clumps of the two species stand out on a bare plain, side by side, as I have found them, you can tell which is which, a couple of hundred yards off by the colour as well as by their different habits of growth. Its thorns are far less numerous, two or three in each cluster, yellow and generally *curved*. The flowers before they expand are straw-coloured, when open the most exquisite and intensest, clear, bright yellow. The fruit is nearly the shape of a jargonelle pear, and usually eaten by animals before it is ripe. The shape of the fruit is well shown in Wight's plate. "The third species is rarer than the last; in colour and habit of growth it is similar, but perhaps its green is brighter, and I think I have seen it grow higher. It grows in the hedges in Madras; but I have found it outside 15 miles from these Gardens, and far from native houses or cultivation, where there could have been no object in planting it, so it probably grew from seed. The thorns are few, growing generally *single*, and *grey*; the unopened flowers are rosy; when open, yellow, streaked or suffused with rose. The fruit is somewhat the shape of a swan egg pear. "The flowers and fruits of the three species are about the same size and the pulp of fruits much the same colour. "We have unfortunately no work yet in our Library which enables us to identify the plants here, so are sending you in a box, specimens numbered in the above order—flowers of each carefully dried in sand, and a branch or two of each which will, I hope, reach you in good enough order to grow if the matter interests you. We sent you seed of the first two some months ago.

"Several of the species we have in the Gardens do not flower, including a spineless one (possibly degenerate *O. Cochinellifera*) which is not uncommon in Madras, but we are making a new rock-work in a sunny corner for them and hope to indentify them all in time."

Read the following extract from letter, from the Honorary Secretary, dated 8th February 1886, to W. T. Thiselton Dyer, Director, Royal Gardens, Kew:—

"I was amongst the Prickly Pear again yesterday, and find my account of the fruit not quite accurate. No. 1, *O. spinosissima* gets purple all over and has pulp of the deepest of purple magenta or scarlet; No. 2, *O. Dillenii*, the fruit, from many opened yesterday, is often ripe when quite green *outside*, and usually seems to have only a pink or rosy cheek, while the pulp is the same rich colour, hard to describe—purple scarlet; No. 3, which I think must be *O. Cochinellifera* degenerate, has sometimes a pink cheek, but seems to be usually yellow, with green pulp I was surprised by this, and felt rather confused over it as to how I before concluded the pulp was purple. I could not find a good ripe fruit yesterday, but ordered a look out for one for me. "There is a very striking difference in the unopen flower buds of Nos. 2 and 3. "Yesterday I found flowers of No. 2, streaked and strained with crimson or rose, nearly as much as those of No. 3."

Read the following extract from a letter, from W. T. Thiselton Dyer, Esq., dated Kew, 31st March 1886, in reply:—I have your letters of January 23 and February 8. The box of *Opuntia* specimens has arrived in good order. "My colleague, Professor Oliver has been so good as to report upon them. He says that they are plants of unusual difficulty from the muddle in their literature. He identifies your No. 1, as *O. vulgaris*, Haw.—very nearly allied to *O. Tuna* (=*Cactus Tuna*, L.) and to *O Elatior*, Mill.; No. 2, is *O. Dillenii*, Haw.; No. 3, is *O. monocantha*, Haw. (=*Cactus indicus*, Roxb.). You will

observe that Professor Oliver does not agree with the synonymus of C. B. Clarke, in Fl. Brit. Ind."

The Honorary Secretary observed on a recent journey from Bombay that the *Opuntia* Professor Oliver names *O. nigricans* was the common species all along the railway after ascending the Bhore Ghaut, and possibly all the way from Bombay to Madras. Recorded with thanks to Mr. thiselton Dyer and Professor Oliver, for their assistance. Read the following letter from J. T. Ward, Esq., dated Nellore, 5th June 1886:—"I find from the report of the Committee of the Madras Agri-Horticultural Society of last year, that allusion is made to the seedless Bread-fruit (*Artocarpus incisus*) and the Tree Tomato (*Cyphomandra betacea*). May I enquire whether you can furnish me with root cuttings of the former and a few seeds of the letter. Also a few seeds of the Cherimoya (*Anona cherimolia*). They could be sent by post, and I would like to know their cost including postage." "I have found the thornless Prickly Pear in some hedges here. I have fed Cattle, Buffaloes, and on it Pigs relish it very much. Cattle refuse it at first, but if made to fast for a day, take to it and relish it afterwards. Buffaloes take to it easier than cattle. When cut up and thrown into a tub of water, the water becomes very glutinous, and is much relished by cattle. Can this plant be the "Kew Nopal" which was introduced in the Northern Circars and in Tinnevelly in the year 1792, and was even eaten by the people of latter place in that year's famine. It was introduced from Kew Gardens to St. Helena in 1807 for the nourishment of the Cochineal insect. It is said to cure and even prevent scurvy and to be excellent forage for cattle, &c." "The Mangrove plant grows luxuriantly on the Coast, and by the banks of salt streams. Buffaloes are very fond of the leaf. I believe a revenue is derived from the cuttings of this plant for fuel in Masulipatam." Resolved that Mr. Ward be thanked for his interesting communication and asked to be so good as to send to the Society specimens of the thornless Prickly Pear and Mangrove to which he refers.

ROOTS AND THEIR WORK.

Applications to Methods of Cultivation.

Seeds and seedlings.—We have seen how delicate is the structure of roots after first being developed. The soil must be light, easily penetrated, and damp at the surface, for all plants whatever their habitat may be when fully grown. Air must have access to soil—it must not "cake," as stiff clayey soil is apt to do—the mere shaking of soil down in the seed-pot is sufficient for the purpose, except just a little pressure after sowing to flatter the surface.

Branching.—The branching rootlets are apt to get broken, they should be removed from the seed-pot before of much length, and in pricking in the seed it is easily seen that a displacement of the soil to one side instead of boring a hole and shoving the roots in, is the preferable plan.

Potting.—At potting, if we cannot indeed judge from the seedling what is the habit of the plant, we can at least see of what nature the perfect plant is, and act accordingly. Had the plant a creeping habit, easily rooting from the stem, what folly it would be to press the soil firmly around the seedling. Were the roots very smooth and fibrous, plentifully produced, we should judge that the plant wanted plenty of water and a moisture-retaining soil. If our root branched readily we might judge that it liked a fairly loose damp soil. If there were naturally delicate long hairs and a hard root, stony places would be likely enough its natural home, and we should pot it firmly. As to wedging plants (alpines) between stones, there is the danger of drying them to death—the stones and small pots if not plunged becoming soon very dry. It is an excellent help in cases where there is no danger of this drought.

Repotting.—In repotting plants great care should be taken to get the old and new soil of the same density, else if the new is looser the water passes through it when watered and leaves the original ball dry. Some potters slope the surface of the soil from the centre to the circumference, considering that the roots are mostly formed at the edge of the pot, or on the further side of the old ball, therefore it is best to send the water to the side. Others prefer that the soil should be quite even, so as to secure an equal distribution of the water. This seems reasonable when it is considered that the slope of the pot will cause the outside to get most after all. It is, however, very objectionable indeed to see a hole in the surface of the soil into which the water always runs, and so goes only through one part of the "ball" thoroughly. If the ball be dusty it should be shaken out or else water never penetrates it, although as a rule there is not much root in the centre of the ball of pot plants. In cases where the roots are very fine indeed and make but slow growth the roots penetrate right through the ball. The best known case of this is to be met with in the Cape Heaths. Where the growth is so, it stands to reason that the "shift" in potting on should not be great, and where the root is very fine it may be taken for granted that it naturally grows in a hard, somewhat dry place. These fine roots and long root-hairs need the more careful treatment. In repotting also, except among coarse, easily branching roots (those of not too hard texture), care should be taken not to break the "ball," or the chances are that the greater part of fibrous growths of the root are broken away, when the shock caused by evaporation subsequently is too much for the plant. Nor in slowly growing hard roots, which do not give off branch roots, as Heaths, should the fibre be disturbed more than possible, certainly not broken by poking among them with pointed sticks.

Watering.—Watering is considered about the most difficult part of plant-culture to manage well. That the soil shall not be too much saturated with water is quite as important as that it shall not be too dry: in the latter case the flagging is readily seen. Where saturated with water the soil is cold—if not decaying—and the needful warmth is absent which causes the delicate growing roots to develop. Especially should this be taken care about where a plant is newly "potted on." The larger mass of soil retains the water more readily, and the roots cannot take it up quickly enough; and similarly, if a "ball" is not fairly well covered with roots, it is hurtful to water it much even if the leaves are large and appear as though they would draw water up quickly.

Drainage.—As to the drainage in pots, it is well to have a considerable amount where the roots do not—as, for instance, in Gleichenia—penetrate deeply. The plant may like a great amount of water about it, but it does not want stagnant acid-generating soil, which if the drainage is clogged is apt to occur. To pour water on freely and left it pass off freely is a better plan. For the same reason it is well to have the soil porous, not to allow too much fine soil to remain in the potting mixture, though among common plants—and coarsely rooting plants especially—it of course is not worth while to riddle the fine away. We may notice that when the drainage is blocked up the roots have a tendency to grow to the surface again. At times we may see pots well filled with roots at the surface, and roots absent entirely from lower down the pot. This shows that the roots object to a water clogged soil. A considerable length of root, as in Imantophyllum, indicates great capabilities for absorbing water. In many cases one is tempted to moisten the surface only of the soil in small pots. This, though beneficial, on account of the damp, to the leaves, is likely, unless very carefully managed, to be productive of harm. The bottom of the "ball" may be dry whilst damp at the surface—a most ruinous state of things, quite contrary to Nature. Top-dressing is very much to be deprecated also, for a somewhat similar reason—the fresh soil looks dry, and water is given, saturating to a hurtful extent the old soil of the ball below. It is much more advisable where possible to plunge all small pots in

sand, which keeps them uniformly damp throughout, and is more natural as ensuring that the dampest part shall be at the base of the pots.

Syringing.—Syringing, though invaluable in many respects, has just this drawback, that the surface is damped, the base of the ball not; if well managed, however, it is a most necessary aid, especially just after potting plants, where, through the roots being broken, and the leaves continually evaporating, there would not be a sufficient amount of water in the tissues, did not syringing allow of its entering largely by the leaves.

Planting.—In planting care should be paid to the physical nature of the soil especially. For example, there can be little pleasure in seeing a creeping plant growing on a dry sunny place. Wherever roots grow freely from the prostrate stems there must be a fair amount of moisture in the very surface soil which will attract them and admit them readily into the surface. Trees moved should be as little injured in the fibrous part of the root as can be; and it has again and again been pointed out, that as the ascent of the sap is more vigorous in the Spring and Summer months, when also evaporation is excessive from the leaves, transplanting should be done in Winter or Autumn, when there is no great amount of leaf in deciduous trees, or less evaporation.

Roots moving before Leaves.—Many plants make vigorous roots and do not produce leaves until later. I remember lifting in some rare plants (Ranunculus Lyalli) growing in a boggy place because the leaves were poor, and as winter was coming on it was thought as well to take the plants under glass. After having dug them up we noticed how vigorous and strong the roots were. The planting and lifting in such conditions ruined the plants. It would have been much better to have slightly protected them in the open place where they grew, had we judged from examination of roots as well as leaves before disturbing them. Roots of many rhizomes, as in Anemone fulgens, A. nemorosa, &c., move before the leaves do; therefore it is well to plant or pot these in the Autumn, that growth of root may have taken place before the conditions favourable to leaf growth are present in the spring time. An example of the dependence of root and leaf was given me the other day by one who had grown Vines. They made leaves vigorously the first year, and were not cut back until late; the grower knew that whilst making leaves they were also developing strong roots, which would be of great help the next year after the stem had been cut back. This was an example of thoughtful pruning. The grower allowed all the leaves to be developed fully before cutting back his stem, which is generally the case in pruning, I believe.

Pruning.—In cutting stems either for pruning or grafting great attention should be paid to the strong ascent of the sap before noticed. In one plant the time for the strongest ascent differs somewhat from the time for it in others. I am told that this bleeding from a tree has been known to continue even after the cut end had been painted and treated in many ways, the ground just under the branch being continually moist from the sap exuding. Early or late pruning would either be preferable to pruning in the middle of the growing season, but where possible late pruning seems to me the most recommendable as regards the callusing of the place cut, whilst early pruning is better where the parts left are wanted to "break" or make buds quickly. Illustrating the dependence of leaf and root, an old story is told by one of our nurserymen to the effect that he once was growing Asparagus a long time ago, and having to keep a walk clear through the bed he tied string on either side of it, which string supported the stems. The leaves or finely branching stem were produced more profusely, and the roots of the tied up plants were as a result by far the best in the plot. Those which had bent down had stopped the circulation of the sap, and therefore prevented the full development of the parts of the plants. Asparagus is now often grown against string supports.

Shifting Plants.—It is said to be well for [some] plants to be pretty frequently transplanted. Bulbs growing together and dividing, are of course enabled to swell to large sizes if shifted, and the soil below them has much of its nutrient properties extracted. All soil has a tendency to become close also, and this is hurtful, as the air so necessary to sweeten it does not have access to the particles of soil. It is harder for many plants to root if the soil be very close.

Manures.—In applying manures also, it is well to consider their effect upon the physical condition of the soil. Farmyard manure contains matter which has to decompose, and its effect is to split up the soil and keep it "lighter" for some time. When the roots are consequently benefited by these as well as by the chemical properties of the manure. No such effect is produced by the smaller quantity of phosphates, or the like artificial manures. A surface soil if well manured, should not be dug into a considerable depth; unless the soil is very light and poor, this trenching is not advisable to prevent it becoming too stiff. It is but a poor remedy, some very light sandy or rubbley material should be added.

Lengths of Roots.—Roots descend to different lengths; this fact is made use of by farmers on laying down grass land. It would be useful in our lawns, and I should think that a deeply rooting grass, for instance, would have a better chance of growing well in a place which was likely to be baked in hot summers.

Soils.—Also if roots thrive particularly in special soils, they should have some attention where possible given them in the way of supplying them with similar constituents. But far more important to my mind than supplying plants with soils of different chemical composition, is to give them those which retain more or less moisture in accordance with the positions in which the plant has grown. It is of no use to give a plant a peaty soil of a loose nature, and then expose it to the fullest sun. Peat and excessive moisture are generally associated in Nature, and we should not disassociate the two in practice. This is but one example out of many. Plants with running roots, too, should, of course, have a light soil, through which they will be able to easily send their shoots, and by way of practical advice I may say that peat, unless very sandy, or with leaf-mould, does not form the most easy substance for roots or runners to pierce; especially in pots it is apt to make a very tenacious "ball." Plunging in sand is a capital attempt to remedy the artificial isolation with which we visit plants when potted.

Growth.—I have thought that perhaps plants in pots, as is the case with many trees grown especially for fruit, did not at times produce roots vigorously at the expense of the rest of the plant. I have seen a Dactylis hanging over a bank, and sending out 15 inches of fibrous root without seemingly contributing any fresh leaves to its parent plant. In hoeing, we should not just cut off the tops of such roots as Dandelion and polygonum; we find that they grow again. The plant should be taken quite out of the soil, or at least the root cut well down, so that the greater part of the thicker tap-root is pulled out. We often ask, "What time should cuttings be put in, or grafts made?" We should look to the structures of the tissue, and see when such are fairly ripe, and not too woody. Where Orchids are grown in the air they should, of course, have a damp atmosphere kept up, and many of our pot plants would be better grown if we sprinkled water oftener on stands and about the pots. I have not been able in this essay to give any definite ideas as to how to judge from roots as to whether they should be placed in one place or another—whether, for instance, they are damp-loving or the reverse. This has been hinted at, but time has forbidden any minute examination as to these and similar suggestive questions. [This may often be seen from an examination of the microscopic structure of leaves and roots.—Ed.] We can all tell, for instance, if we see a root growing in moss at the surface rather than in the soil below

that such a plant likes open damp compounds of a light nature to grow in. Such facts and observations we can continually turn to account. In conclusion, however, I would say that we must not be too ready to throw over all "rules of thumb" because they are old and we are new, and cannot see reasons for them at first. We have many times in the investigations required for this essay been unable to find any reason, much less the right one, for various results we have met with: how important is it, then, that in our own practice that we should be reasonable enough to accept all rules of thumb when we see them producing good results, only breaking such rules when we can better the result. Our reasoning as to cause and effect should not be with the object of breaking down these old traditions of experience, but in the honour of our noble profession to show the common and resonable sense which underlies them.—P. Sewell.—*Gardeners' Chronicle.*

TALC IN CEYLON.

Talc is found in abundance in Ceylon and is very widely distributed. It is a component part of most of the primitive rocks and is found in all the crystaline limestone or dalamite of the country. Very beautiful and perfect specimens are found in the pure white limestone of the higher ranges of the mountains. This limestone is perfectly snow white and so compact it hardly shows a crystal in fracture. In this are found perfect cubes of talc, black in colour, sharp on the edges without sign of decay, in part bedded in its natural matrix; the cubes are small. I have never seen them larger than an inch and a half square. They separate perfectly clean and sharp on the edge from the lime rock and can be split into infinitesimally fine flakes.

Talc in larger quantities is found all over the country, generallyg in proximity to Plumbago, and like that mineral, to which it is nearly allied, is found in pockets, and is soon worked out. Ceylon talc is usually black in the block, but when split into flakes gives a neutral tint or a rich brown yellow. This talc is commercially inferior, but might be used by photographers as producing a subdued yellow light, and not easily broken in a travelling outfit. All Ceylon talc which I have seen is more or less broken and twisted in the strata in which it had originally been imbedded an thrown up. Talc near the surface is usually so decayed as to be worthless, and the deeper the deposit the better and more perfect it is. The best specimens I have seen are from near Haldamulle. They were pure, almost free from faults and nearly white, appproaching closely to what in commerce is called ruby talc, which is silver white with a faint pink tinge, and when split fine very transparent, giving to fire light or lamp light a bright warm ruddy glow in passing through it.

Talc is largely used in India and China for decorative purposes in Temples, for fans, screens, paintings, spangles on embroidery, and for lanterns &c., &c., In England and America, especially the latter country, it is principally and very largely used for light in an hracite stoves, lamp shades, and similar purposes. Like plumbago it is alsost indestructible by heat. Although the "waste" produced in dressing is now being used as a lubricator ground to an impalpable powder, talc is only valuable when got in good sized sheets free from faults and of good colour but there is an unlimited market for good qualities, and if attention were once directed to talc mining a very valuable native industry may spring up. I see no reason why finely ground talc should not be largely used in the manufacture of crucibles, either as an admixture with plumbago or free. It is far more pure and free from quartz and grit than our best plumbago.—James Irvine. [We have some samples from Haldummulle from 3 to 4 in. square. We can find a ready market for sizes from 4 to 9 in. square, packed in 1 lb. packets containing pieces of only one size.—Ed.]—"Ceylon Advertiser."

Coffee.—It is always a pleasure to chronicle really successful coffee planting. The *Daily Post* writes thus of a veteran planter of Kadur in the Mysore Territory. "The twelfth of this month will have completed a quarter of a century since Mr. Henry Courpalais set foot on the Sumpagay Estate, in the Terekere taluk. During this long term of a planter's life he has had what seemed to be, almost insurmountable difficulties to contend with; but he faced them like a man and his perseverance has been crowned with success. Few, if any, can boast of having been as prosperous as he has been; and now, at the end of a quarter of a century, he can point to estates in as flourishing a condition as it is possible to get them. He goes in largely for shade and abundant manure, but, better than al this, he superintends every thing himself. Herein lies the secret of his success." We congratulate Mr. Courpalais on his enterprise and success.—*Nilgri Express.*

Coconuts and Rice.—To return from controversy to my subject, the rainfall has been such as to delight the soul of every Coconut Planter, and where plantations are in proper cultivation and in good heart, the prospects for "next year" are cheering, always provided that drought does not destroy what the rain has helped to put on. Our *Yala* crops are fast ripening and becoming fit to be harvested. I do not think they will be large, as heavy rain at the time of sowing helped to wash away the thin coat of mud overlying fields, which helps to give the young blades a start. Fields generally are free from insect pests, though my field happening to seed early had all the flies concentrated on them. Through the courtesy of Messrs. Brown & Co., of Colombo, I received a small quantity of carbolic powder to be used as a remedy against the fly plague. Unfortunately it reached me too late to be of use, and the villagers prefer charming their fields and watching for results, to being daily engaged in dusting their fields with the powder. The one requires the expenditure of a few cents, and the other of a littleof their latent energy. I need not say they choose the former as least troublesome expedient. I shall give the powder a fair trial next season. Local "Examiner."

The Tea Question.—Arthur Young, the famous and most able writer on farming of the last century, hald very strong views about the tea question. Oddry enough they bear a curious resemblance to the waonings now being issued by various doctors and food reformers both in America and England. The following words were written more than 100 years ago by Arthur Young in the eighth of his "Farmer's Letters to the People of England":—"I therefore, am tempted to think that the present laws relative to the support of the poor are universal encouragers of idleness, drunkenness, and tea-drinking, and that as such they are highly pernicious to the welfare of the Kingdom, and here I cannot but observe that as low a figure as tea-drinking may make in this trio, it is, nevertheless, of wonderful extent and consequence. As much superfluous money is expended on tea and Sugar as would maintain 4,000,000 more subjects in bread. If it is considered what a fatal enemy excessive tea-drinking is to the human body, how much it impairs the vigour of the constitution and debilitates the mind, the pernicious influence of it will be apparent. It has been asserted that excessive tea-drinkmg is of more fatal consequence to the increase of the human speciesthan even the immoderate use of spirituous liquors, nor should it be forgotten that the trade we carry on for tea is totally against us in the balance. It is a branch of commerce by which we perpetually lose; thus burying our money in an unfathomable gulf for a pernicious commodity that tends to our very ruin. Our legislature taxes every necessary of life: surely this vile superfluity calls aloud in its abuse for greater restrictions. But what are we to think of a conduct, diametrically opposite, of lowering the duty upon this pernicious drug, that the people may be able so much the easier to consume their health, their time, and their money! To enable them universally to drink it twice instead of once a day. What wretched politics! Such an idea is congenial alone with the last ruin of the state!—*Agriculture.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, September 9th, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 a £7
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar per lb. and Ceylon	Clipped, bold, bright, fine	1s 10d a 2s 6d
Aleppee	Middling, stalky & lean	8d a 1s 9d
Tellicherry	Fair to fine plump clipped	1s 3d a 2s 3d
	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	8½d a 1s 11d
2nds ,, ,, ,, ,,		7½d a 1s 6d
3rds ,, ,, ,, ,,		7d a 1s 2d
4ths	Woody and hard	6d a 11d
Chips	Fair to fine plant	1½d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	75s a 79s
	Medium	68s a 72s
	Triage to ordinary	54s a 62s
COFFEE Ceylon Plantation per cwt.	Bold to fine bold colory	88s a 100s
	Middling to fine mid.	72s a 87s
	Low middling	67s a 70s
	Smalls	58s a 65s
,, Native	Good ordinary	50s a 60s
Liberian	Small to bold	33s a 55s
East Indian	Bold to fine bold	80s a 121s
	Medium to fine	68s a 78s
	Small	57s 6d a 62s
Native [per ton	Good to fine ordinary	50s a 69s
COIRROPE, Ceylon & Cochin	Mid. coarse to finest straight	£7 a £17
FIBRE, Brush, per ton	Ord. to fine long straight	£15 a £39
Stuffing	Coarse to fine	£7 a £20
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £35
Do [cwt	Roping fair to good	£9 a £13
COLOMBO ROOT, sifted ℔	Middling wormy to fine	16s a 32s
CROTON SEEDS, sifted	Fair to fine fresh	30s a 35s
GINGER, Cochin, Cut per cwt.	Good to fine bold	75s a 100s
,,	Small and medium	42s 6d a 70s
Rough	Fair to good bold	30s a 55s
,,	Small	23s a 30s
NUX VOMICA, per cwt.	Fair to fine bold fresh	8s a 12s
	Small ordinary and fair	5s a 7s
MYRABOLANES, pale, per cwt.	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	6s a 6s 6d
Pickings	Burnt and defective	4s a 5s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	¾ a 1d
LEMON GRASS ,,	,, ,, ,, ,,	1¾d a 1¾d
ORCHELLA WEED ℔ lb.	Mid. to fine, not woody	10s a 55s
PEPPER, Malabar blk, sifted	Fair to bold heavy	8d a 8¾d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	11s a 15s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	6s a 11s
Dust	Ordinary to fine bright	3s a 10s
RED WOOD, per ton.	Fair and fine bold	£5 5s
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £14
Do. chips		£10 a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	9d a 1s 5d
	Fair middling medium	5d a 8d
	Common dark and small	2d a 4d
TURMERIC, Madras, ℔ cwt	Finger fair to fine bold	11s 6d a 12s 6d
Do.	Mixed middling [bright	10s 6d a 11s
Do.	Bulbs whole	9s a 10s 6d
Cochin	Do split	7s 3d a 7s 9d
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 23s 6d
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches	5s a 9s
4th	Low, foxy, inferior and pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
ALOES, Soccotrine and Hepatic... per cwt.	Good and fine dry	£7 a £10
	Common and good	£4 a £6
CHILLIES, Zanzibar ... per cwt.	Good to fine bright	30s a 33s
	Ordinary and middling	26s a 30s
CLOVES, Zanzibar ,, 1st, per lb.	Good and fine bright	8½d a 9d
	Ordinary dull to fair	7½d a 8½d
CLOVES, Mother, per lb ...	Fair, usual dry	None
,, Stems ...	,, fresh	2d
COCULUS INDICUS ...	Fair	7s a 8s
GALLS, Bussorah blue & Turkey ℔ cwt.	Fair to fine dark blue	50s a 57s 6d
	Good white and green	42s 6d a 52s 6d
GUM AMMONIACUM per cwt.	Blocky to fine clean	15s a 40s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts,	£13 10 a £14 10
	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£ 7 10s
scraped ...	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden ... per cwt. Ghatti ...	Sorts	65s a 100s
	Fair to fine pale	42s a 75s
Amrad cha	Good and fine pale	80s a £7 5s
	Reddish clean	40s a 73s
ASSAFŒTIDA, per cwt.	Clean fair to fine	30s a 35s
	Slightly stony and foul	20s a 26s
KINO, per cwt.	Fair to fine bright	38s a 40s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 100s
OLIBANUM, Irop per cwt. ,,	Fair to fine white	45s a 55s
	Reddish to middling	32s a 44s
pickings ...	Middling to good pale	9s a 11s
siftings ...	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage per lb.		2s 3d a 2s 6d
,, ,, Ball		10d a 11d
unripe root		1s 10d a 2s 2d
liver	Ordinary to good	5s a 15s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz	Nearly water white	3½d a 4¼d
2nds ,,	Fair and good pale	2⅝d a 3d
3rds ,,	Brown and brownish	2⅜d a 2½d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	2s a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 7d
	Fair to good black	1s 10d a 2s
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	27s a 31s
,,	Common & middling soft	12s a 26s
Natal	Fair to fine	35s a 40s
ARROWROOT Natal per lb.	Middling to fine	3½d a 6½

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	65s a 68s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	29s a 31s
	Pressed	26s a 27s
Block [per lb.	Good	22s 9d a 23s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 8d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 6d a 3s 6d
Medium	83's a 95's	2s 1d a 2s 5d
Small	100's a 160's	1s 4d a 2s
MACE, per lb.	Pale reddish to pale	1s 9d a 2s 10d
	Ordinary to red	1s 1d a 1s 6d
	Chips	1s 2d a 1s 3d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 2s 9d
	Dark ordinary & middling	8d a 1s 1d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	7d a 11d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	12s 6d a 15s
medium	,, ,, ,,	12s a 13s 6d
small	,, ,, ,,	8s 6d a 10s 6d
Flour [per lb.	Good pinky to white	8s a 9s
TAPIOCA, Penang Flake	Fair to fine	1½d a 2½d
Singapore	,, ,,	1½d a 2¼d
Flour	,, ,,	1¼d a 1¾d
Pearl	Bullets, per cwt.	14s a 15s 6d
	Medium ,,	15s a 17s
	Seed ,,	15s 9d a 17s 6d

CEYLON UPCOUNTRY PLANTING REPORT.

BLACK OR GREEN BUG ON THE TEA—THE "MONARCH" TEA MACHINE—"ANOTHER RICHARD IN THE FIELD."

27th September, 1886.

Most planters have seen a tea plant here and there, especially when growing in the vicinity of coffee, covered with black or green bug, and have set the same down to evil companionship. There is always the fear, however, that the pest may spread, and that tea may suffer as the coffee has done. I was sorry to hear that in the Pussellawa district a considerable extent of tea can be seen now blackened with this plague. The effect on the tea is not such as it was on our weakened coffee trees, but if the bug follows the nation, and takes a liking to our new product he may be rather hard to satisfy. The effect of the bug in the meantime is that all flushing is stopped. I have seen a memorandum which Mr. William Gow has put out regarding his "Monarch" Tea Leaf Withering and Fermenting Machine, and which is about to be introduced into Ceylon. This machine, it seems, tries to do mechanically what the Chinese accomplish by hand when they toss and beat the leaf about. But it does more than this; it withers and ferments by means of a current of hot-air circulating through a rotating drum of special construction. It is self-acting, requiring only coolies to feed, and a man to watch the fire. By its means the leaf is oxydised and fermented *before rolling*, and can be kept for a time—some hours—without deteriorating. It is maintained that leaf withered by this machine rolls well, and when fired is handsome and wiry showing the requisite bloom, and being of a good bright black colour. It further multiplies the pekoe ends, by the convoluted leaf-buds opening out. The rolled leaf is said to take a shorter time to fire than is usually necessary and the expenditure on fuel is small. Extensive withering space is rendered unnecessary, and a machine 8′×8′ at a trial on Mohurgong estate, Sukna, prepared fourteen maunds of withered leaf and six maunds of 'cutcha' leaf per hour, and did its work to the satisfaction of some eight managers of tea gardens who had come to see it working. A fill of the machine is six maunds of unwithered leaf, and the time occupied to complete the operation depends altogether on the quality and state of the leaf operated on. From the above particulars it will be seen that the "Monarch" promises much, and we will be all interested in comparing the result of the coming trial in Ceylon, with what took place in India. This is how the planters there put it:—"The meeting found that all these conditions were fulfilled, and that a great pull was obtained, namely, that oxydization and fermentation were fully and chemically perfected before rolling: that extensive withering space was rendered unnecessary; that tea made from even coarse leaf gave a good black appearance and that generally it was most favourably affected. The meeting further found that a good twist was given to the leaf, and that all superfluous moisture having been removed the process of firing was much more speedily carried out."

The "Monarch" is however not be "monarch of all he surveys," for I hear that there is already "another Richard in the field," and that a pushing upcountry firm is soon about to launch another Witherer. But I have not heard any particulars regarding it, except that the price was to be moderate, which is a comfort.

PEPPERCORN.

BRAZIL'S COFFEE EXPORTS.

In the year 1722* the first coffee plant was brought into Brazil, in the Amazon district. The cultivation of the plant did not commence until 1761, extending to Maranhao in 1774, from which province some plants were introduced in Rio in a private garden. In 1820 the export of coffee was 97,500 bags of 162 pounds. Its cultivation rapidly expanded, as the following table of exports from Rio at intervals of ten years will show:

	Bags of 162 lb		Bags of 162 lb.
1830.....	391,785	1860.....	2,127,219
1840.....	1,068,418	1870.....	2,209,456
1850.....	1,343,484	1880.....	2,799,791

In 1874 bags to hold 132 pounds were substituted, and therefore we make the figures of 1880 to correspond with those used at earlier comparative dates. The civil war disturbed seriously the relation of supply to demand, and as the United States was the chief market, very naturally its trouble discouraged production in Brazil. The yearly average exports from 1861 to 1870 were, 138,537 tons, advancing to 155,912 tons per annum from 1871 to 1875.

For the seven years 1874-1880 the annual average shipments from Rio and Santos were 229,149 tons, of which 48⅔ per cent. came to the United States and 51⅓ per cent to Europe. Adding local consumption in Brazil, we had what was then considered by the author of "Coffee from Plantation to Cup" the "stupendous" average annual production of 558,093,760 pounds, or 249,149 tons.

Since then we have had a period of low prices, and it still continues. The natural tendency of such a state of affairs would be to check production; that such has not occurred is evident from the foliowing statement:

EXPORTS RIO AND SANTOS COFFEE CROP YEAR ENDING JUNE 30.

	To United States.	To Europe.	Total.
1882.....	2,536,457	2,774,008	5,310,465
1883.....	2,950,121	3,325,178	6,275,302
1884.....	2,447,759	2,558,180	5,006,239
1885.....	3,138,251	3,131,262	6,269,516
1886.....	2,952,322	2,350,049	5,302,371
Total, five years	14,024,916	14,138,977	28,163,893
Annual average	2,804,983	2,827,795	5,632,778

This represents, allowing 30,000 tons for home consumption and exports from Bahia, an average annual supply of 360,752 tons, or 818,081,180 pounds, against an annual average of 558,093,760 pounds for the period 1874-80.

Therein lies the sequel of cheap coffee. It is claimed that planters, whose plantations are free from encumbrance, can profitably raise coffee on the basis of prices ruling during the past three years. Unfortunately many planters are paying heavy interest on mortgages, and these have become more or less discouraged.

It is noticeable that stocks have been growing smaller for two years, giving strength to the belief that new plantations are not being set out in Brazil, and a survey in detail of the above table rather supports that idea. The 1883 crop was about equal to that of 1885; that of 1882 was abreast of 1886, and making allowance for the variation in crops, the indications point to the Brazil production having reached a maximum until some new stimulant is given the industry. If this proves to be true we must, with a steady

* One hundred and sixtyfour years ago.—ED.

increase in the annual consumption, conclude that production is beginning to fall behind consumption, and unless Mexico and Central America rapidly increase their supply, coffee must sell on a higher average basis.—*American Grocer*, Aug. 18th.

COFFEE IN VICTORIA.

(Duty. 3d. per lb.)

	1882.	1883.	1884.	1885.
	lb.	lb.	lb.	lb.
Imports	1,836,033	1,289,666	1,189,010	1,656,403
Exports	494,408	418,408	397,348	414,626
Transhipments	59,164	64,656	116,426	253,729
Home consumption (net)	868,225	947,424	1,193,982	978,867

—*Australian Trade Review.*

[The consumption of coffee, therefore, is a little under 1 lb. per *caput*, while tea is 7 lb. and cocoa and chocolate somewhat over ¼ of a pound. In all 8¼ lb. of non-alcoholic beverages.—Ed.]

TEA IN VICTORIA.

(Duty 3d per lb.)

	1882.	1883.	1884.	1885.
	lb.	lb.	lb.	lb.
Imports	11,438,456	7,363,122	11,524,205	13,679,952
Exports (from bound)	3,577,788	4,600,567	3,293,162	3,703,109
Exports (under drawback)	935,541	1,179,557	1,684,327	2,084,818
Transhipments	727,538	284,996	384,841	340,578
Home Consumption (net)	6,097,371	6,378,862	6,489,390	6,989,580

—*Australian Trade Review.*

[In round numbers a consumption of 7 millions of pounds by 1 million of a population, or 7 lb. *per caput*, against nearly 5 lb. in Britain.—Ed.]

Mangosteens and Litchis on the Nilgiris.—In the annual report on the Barliyar Gardens, which are somewhat over 2,000 feet above sea-level, it is stated that mangosteen and litchi trees have fruited well and it is added:—"It is odd that there should be so little demand for these trees, for, after the mango, they are by far the best fruits we have in Southern India, and I believe they would thrive and grow rapidly in almost any part of the country." There is no limit as to altitude here and we should like to know up to what altitude the mangosteen can be grown. We once tried plants at 4,700, but they failed. No doubt the depressed state of the planting interest accounts largely for the decreased demand for plants. As plants are plentiful and probably cheap, some of our local readers may be led to indent on Mr. Lawson for some Wardian cases.

Malaria Altitudes.—While malaria usually has its ordinary habitat in low-lying regions, it may, under favorable conditions, exist at great elevations. On the Tuscan Apennines it is found at a height of 1,100 feet above the sea; on the Pyrenees and Mexican Cordilleras, 5,000 feet; on the Himalayas, 6,400 feet; on the island of Ceylon, 6,500 feet;* and on the Andes, 11,000 feet. At present the elevation of entire security has been thus approximated for various places: in Italy, from 400 to 500 feet; in California, 1,000 feet; along the Appalachian chain of the United States, 300 feet; in the West Indies, 1,400 to 1,800 feet. In any of these regions, however, malaria may drift up ravines to an indefinite height.—*Indian Engineer.*

* This is entirely new to us. Is there a case on record of malarious fever *contracted* at such an elevation? Of course persons who have malarious poisons in their systems are liable to recurrence of fever at any elevation.—Ed.

Coffee-planters in Southern India who have been complaining of a lack of matter bearing on their staple in the *Tropical Agriculturist* will be gratified to find a series of reviews of the various branches of a coffee planter's work by an old Ceylon hand is now being published in the *T. A.* They were written some years ago but are revised to date.

Pinus Insignis for Nuwara Eliya.—*Cryptomeria Japonica* promises to grow well at Nuwara Eliya, but what about *Pinus insignis*? It ought to be largely planted at once, for Mr. Lawson reports that this conifer is established on the Nilgiris, trees of six years old being sixty feet in height (10 feet per annum), while trees fifteen years old yield an abundance of excellent timber. If Mr. Nock has not already got nurseries, he will no doubt at once procure seed in quantity of this pine which equals *E. globulus* in rapidity of growth and quality of timber at an early age. Our forest department ought also to pay attention to this tree. With proper seasoning the timber would doubtless be suitable for tea chests.

Can Artesian Wells be sunk in Jaffna?—Probably not:—Two conditions are necessary for artesian wells. There must be three layers of earth or rocks, the upper and lower impervious to water, the middle, pervious. If water can pass through the upper it will come out in springs when the middle layer is full. If it can pass through the lower it will sink. But if these layers are level, no water can of course either get into or out of the middle layer. The layers must be shaped like one side of a cup at the bottom of which the well must be placed. The top of the layer must be higher than the top of the well, else the water will no more come out of the well than it will out of our ordinary Jaffna wells. But Jaffna is on a bank of coral. If this coral rock could be bored through the rock beneath would in all probability be like that of South Ceylon and South India—not in layers. There is hardly a possibility that artesian wells could be sunk in Jaffna.—*Ed. M. S.*—"Morning Star."

Ceylon v. Indian Teas.—The latest *Produce Market Review* has the following pointed remarks:—

Although the market for Indian and Ceylon Teas continues to be liberally supplied, the demand has sufficiently improved to maintain prices. Some of the last arrivals of Indian Tea are of distinctly better quality, and there has been a general improvement in the Teas from most districts. This may indicate that as the year advances better Teas will arrive than has been the case, until quite recently, since the opening of the season. At any rate, it is to be hoped that the improvement in quality will increase, as, unless this is the case, the general position of Indian Teas in the London market may be less favourable than it has been of late years. There is every probability of a lower range of prices this season for the very finest grades, in consequence of the gradually diminishing demand for high priced Teas. This is a consideration equally applicable to all fine Tea coming from any country, but to give less attention to quality in consequence must prove prejudicial to the interests of Importers, and Ceylon Teas have been recently substituted for Indian Teas, simply owing to their superior manufacture and strength. If Indian Teas are to hold their own in competition here, it can only be by careful attention to the requirements of the market, and by supplying Teas sufficiently marked by the well-known characteristics looked for in these growths. Ceylon Teas were some time ago very disappointing in quality; but they have much improved of late, and buyers have not been slow to recognise the fact, as evidenced by the brisk competition for them now. With the increasing production, it was thought probable that the quality of Ceylon Teas would not be maintained, and it certainly appeared so a few weeks ago, but recent shipments have quite dissipated this idea, and most of the fresh supplies are quite up to the average of former years.

THE TEA LEAF.

Sir,—In these days of small things (so far as our knowledge of tea manufacture is concerned) the most insignificant hint is not to be dispised. I need not, therefore, apologise to my brother planters in inviting their attention to the following small items of information. In the young leaf of the tea bushes, when picked, a chemical change is faciliated by the "withering" process, which goes on throughout the twelve hours of darkness, whereby (in technical phrase) the proteids are coverted into peptones. The nutritive extractives, which give flavour and strength to tea, exist, primarily, in the young leaf as insoluble grains (proteids). Whilst the young leaf remains unpicked upon the bush these proteids slowly become soluble, but as fast as any portion becomes soluble (peptones) such portions are at once drafted away (into some other portion of the plant) and are lost to the leaf. The "withering" process not only hastens, but also artificially completes this solvent transformanion, and therefore the hint we have to bear in mind is that the more thoroughly our tea leaf is withered (not dried), the larger will be the proportion of the nutritive ingredients of the leaf which become soluble, hence the greater flavour and strength in the resulting tea. We have conjectured frequently the ultimate purpose that the large proportion of oil contained in the seed subserves. Analyses of seed and seedlings seem to intimate that this oil furnishes the extractive "theine" in addition to increasing percentage of albuminoids and cellulose.—Naduvatum, September 13.—Novice.—*Madras Mail.*

TEAK-WOOD AND PAPER-MAKING IN SIAM.

Referring to Teak-wood, in his report on the trade of Bangkok for the past year, Mr. Consul French says :—

Throughout the year the prices offered for Teak in Europe and China were good, and the export from Bangkok was, although below that of the two previous years, above the average of the preceding five years. The rivers have now for two years past been very low, and consequently much of the wood could not be floated down. There is now a considerable quantity of logs upcountry, the accumulation resulting from two bad seasons, awaiting favourable floods to get down. More European capital is now being invested in the working of the Teak forests, and it is to be hoped that the experiment will result successfully. Hitherto the forests have been leased chiefly to Burmese, very few of whom have sufficient capital. The result has been that the forests have been worked in a meagre and unsatisfactory fashion, and litigation between the foresters and the persons advancing their money has been bitter and constant. The export of Teak may be said to almost entirely depend upon the ship building business in Europe, and as long as the present stagnation in that trade continues the prospect before Teak merchants will not be encouraging.

Native paper, it is said, is manufactured from the bark of a tree called "Toukoi," the process of which is a simple one, described as follows:—The smaller branches of the tree are cut and steeped in water for two or three days. The bark is then stripped off, and brought in bundles and sold to persons who make the paper. The bundles of bark are put in water for two or three days by the paper-maker, and having been cleansed from dirt, are taken out and steamed over a slow fire for two days, a little clean stone-lime being sprinkled through the bark. It is then steeped in water in earthern jars, and more lime is added. After a few days it is taken out of the jars, and having been well washed, to free it from the lime, it is beaten with a wooden mallet until it becomes a mass of soft pulp. A frame of netting about 6½ feet long, and of width varying from 18 to 5 inches, is set afloat in water, and the pulp, having first been again mixed up with water, is skilfully poured out on to the frame, so as to be equally distributed over it The frame is then lifted out of the water, and a small wooden roller is run over the surface of the pulp. By this process the water is squeezed out and the pulp pressed together. The frame with the pulp on it is then set to dry in the sun. In the course of some ten hours it is quite dry, and the sheet of paper can be lifted off the frame. It now only remains to smooth the surface; this is done by applying a thin paste of rice-flour to the surface, and then rubbing it down with a smooth stone. A black paper, which is written upon with a slate or steatite pencil, is made by colouring the surface with a mixture of charcoal. The paper here described is made from the bark of Broussonetia papyrifera.—J. R. J.—*Gardeners' Chronicle.*

TEA DRIERS.

* * * * * *

Davidson made a rapid stride with his "Sirocco," which has served us very well, and from the number now in use, he must have had a good time of it since he started. Still he seems to have had steadily before him the old "chulah" system in designing his machines and this is very apparent when the T Sirocco is closely examined. I have often wondered why Davidson did not work out an automatic machine like some of those now in use. We hear less of Kinmond's and the Gibbs and Barry machines now. I daresay the letter would have a better run but for its requiring coke as fuel. It is a costly item unless one is situated near a "ghât" or railway, and we do not seem to be favoured with any of a superior quality, though we pay very dearly for it. Our wants seem to be met in the Jackson's new Victoria which burns any kind of fuel or rubbish. It is a machine that will suit the requirements of many who are short-handed, and have difficulty in getting either coke or charcoal. When one of the large machines now at work in Assam is compared with the number of "chulahs" and coolies required to keep pace with it, I can only say, that it is a happy deliverance from the olden days when we had to pass through the rows of perspiring "batty wallahs" and getting half roasted before reaching the end of the factory. Note also the number of men it sets at liberty for much needed cultivation outside. Three men with one of these machines will do as much work as thirty "batty wallahs" in the old days, and last, but not least, note the saving in fuel. I am not an expert at describing machinery, though I am very fond of it, so I had better not get beyond my depth in giving details. But I was greatly taken with the description of this machine given in the papers last year, and a recent visit to Gainsborough has shown me that they justly merit all that has been said on their behalf. It appears the first Victoria machine was sent out to the Jorehaut Company in 1884 and since then they have three more at work, and in addition a Venetian or small-sized machine has been sent to one of the small divisions of the Company. I was surprised to learn that altogether 50 of Jackson's Dryers (Victorias and Venetians) are at work this season and I was struck with the following novel features in them. The leaf is fed into a hopper, or well, and nothing more is seen of it until it emerges underneath from a fluted roller which delivers the dry tea. Although turned over for times in its course from tray to tray it is not crushed or broken and not a particle of "goorie" is lost. Now with the utmost care in working trays in any machine of the drawer tray kind one cannot overlook the fact, that from day to day a large quantity of good tea is trampled under the coolies' feet, which if seen at the end of the season in a heap would make him stare. And if this tea can be preserved and its approximate value put past at the end of every season one would be able in a few years to write off a considerable part of the cost of machine saved in "goorie" alone. As I have mentioned before I am not an engineer or know much about machine construction, but I think Jackson must have taken a leaf out of the book of the manufacturer of the potato dryers sent to Assam many years ago with

a view of their being capable of drying tea. The furnace pipes in Jackson's are very like the latter mentioned, and if they last as long without renewal they will not cost much to keep up. The reason why I confined my remarks to drying machinery is, that we are quite pleased with our rollers and sifters and I do not think they can be much improved upon. In concluding these I would recommend all Assam planters who would economise labour and fuel to have a good look at Jackson's Victoria and Venetian dryers before deciding to go in for new machinery of a like nature.—On "Chootee."—*Indian Planters' Gazette.*

THE CULTIVATION OF THE RAMIE IN FRANCE.

An article recently published by Mons. M. E. Fremy in the *Comptes-Rendus* must be anything but pleasant reading for our cousins across the water. A solitary Frenchman in some part of Egypt is said to have accidentally dropped a cotton seed in his garden, and thus has been the means of introducing the cotton plant into Egypt; and now M. Fremy, after devoting a number of years to the investigation of the nature and character of vegetable textile fibres, has come to the conclusion that Chinese ramie can be cultivated in France as a substitute for imported cotton. In view of the importance of M. Fremy's assertions, it may be as well if we give our readers a few particulars of this plant. The ramie of China is grown to the natives under the name of Tchonma; to botanists as the *Böhmeria nivea*; and more popularly in England as the grass-cloth plant. The genus is of the order of nettleworts, *Urticaceæ*, and allied to true nettles, *Urtica*. There are several species found also in Assam, Nepaul, the Sandwich Islands, and Brazil; and in each country excepting the latter, where it has a medicinal use, it is employed in the manufacture of textile fabrics. The Chinese plant reaches a height of about 3ft. or 4ft. Its leaves, growing on long hairy footstalks, are heart shaped, have serrated edges, and are about 6in. long and 4in. broad. They are green on the upper side, and covered on the under side with white down. The Chinese obtain three crops of stems annually. The second is judged to be the best. The fibre is procured by stripping off the bark in two long pieces, which are carefully scraped with a knife to get rid of the useless matter. These are then divided into fine filaments by steeping them in hot water or holding them over steam.

In the researches made by M. Fremy into the chemical composition of the skeletons of vegetables, his attention has been principally directed to the bodies which weld the fibres together, and which oppose their separation. He has known that the cement of the fibres and cells is chiefly formed of three substances, which he has studied under the names of *pectose*, *cutose*, and *vesculose*, or pectin, cuticle, and vesicle. Knowing that these can be destroyed and the fibres separated from them, he has tried to complete his researches by applying himself to the separation of the fibres which are found in the principal textile plants, such as the ramie, flax, hemp, and jute. The ramie was cultivated in France, for the first time, says M. Fremy, at the Natural History Museum, by the late M. Decaisne, and yields an abundance of fibres of an extraordinary tenacity, often possessing the appearance of silk. The ramie thus presents for France, in which utilisation of vegetable textile fabrics is perhaps the most important industry of the country a particular interest, and may one day become, says, the investigator, our French cotton.

France, he points out, buys enormous quantities of vegetable textile fibres from the foreigner, as is shown by the fact that the value of the cotton imports into France in 1885, was about 7,200,000 fr. The cultivation of the ramie would, M. Fremy is persuaded, relieve the country of the necessity of purchasing from the foreigner. It would also mitigate the depression caused in French agriculture, by the relinquishment of madder cultivation, and might be introduced into their colonies, to the assistance of their threatened sugar cane industry. M. Fremy's method of separating the fibres is to eliminate the objectionable elements by the ordinary reactive action of chemicals, the Chinese, as we have already described, accomplishing this by mechanical means. M. Fremy has laid before the French Academy samples of the ramie fibres thus treated, to prove that the process of elimination is successfully completed, and he expresses the hope that French agriculturists will not hesitate to undertake the cultivation of the ramie on a large scale, that French spinners will utilise the fibres, and thus afford a fresh example of the services which science is able to render when allied to agriculture and industry.—*Industries.*

REPORT ON THE HORTICULTURAL GARDENS, LUCKNOW, DURING THE YEAR ENDING 31st MARCH, 1886.

Financial.—Despite the forebodings of lasst year in regard to the effects of the hailstorm of January, 1865 on the income of the year under review, receipts exceeded those of last year and were R202-9-11 in excess of the budget-estimate of R10,000. Expenditure amounted to R14,454-5-5, or R454-5-5 in excess of the estimate of R14,000, leaving the net cost at R4,251-11-6; from this deduct R822-4-0, which represent the cash loss on plants, &c., sent out at reduced prices to public institutions, and we have actual net cost R3,429-8-4.

Fruit Culture.—The fruit crop was, with a few exceptions, poor, as had been anticipated would be the case. Great attention is being devoted towards forming a good representative collection of the orange family and success in introducing the blood orange of Malta seems at last in view. The yellow Almorah plum has been found to fruit freely, and more plants of it have been laid down. Of grafted carob plants only a few are left, but these are healthy. The Arabian date-palms fruited freely, but, as in former years a difficulty was found in preserving the fruit till it had reached full maturity. Date seedlings have been raised in good numbers, including some from a successful cross between the Arabian and the wild date; a difference in the time of flowering limits free crossing of the two varieties. An instructive table of profit and loss on the various crops shows how pine-apples grown in mango groves may redeem the loss on a poor crop of mangoes by fruiting abundantly. Of new kinds introduced, Barries' fig, tree tomato, mountain papaya, quinces, the edible prickly-pear of Malta, and a few American vines were raised with success.

Vegetable and farm culture.—Following past experience, more space was given this year to planting for seed rather than for market sale. Cos-lettuce, for which the gardens have always had a great demand, proved a failure. Hybrid Nankin cotton is pronounced to be of no importance, and its cultivation will be discontinued. Muzaffarnagar white wheat, grown as an experiment after cotton, proved very successful both as to yield and as to quality of seed. In country vegetables improvement by selection is being preserved with and time must be allowed for effect. Belgian carrot (white) proved, as it has done elsewhere, to be inferior in yield to the country variety, but to have advantages as a late variety. Of new kinds under trial, salt-bush (*Atriplex nummularia*) continues to do well, and Saintfoin, from seed received through the Government of India, gave a fair crop. *Withania coagulans*, prickly comfrey, hard white wheat from America, and *Shafdar*, a forage plant from Persia, have been proved unsuitable for these provinces. On the other hand, good new varieties of maize, tobacco, and early-maturing vegetables of various kinds were tried with more or less success. Distribution was much the same as to acclimatized seeds as last year, save in regard to silver-skinned onion and cos-lettuce, for which the demand was abnormal. For imported seeds the demand slightly increased.

Flower culture.—A good demand for acclimatized seeds exists. The improvement of Hippeastrums by hybridizing is being carried on with continued success. A large number of the best kinds of annuals were imported and grown with satisfactory results. Of new introductions may be named *Erythroxylon coca* and a timber tree (unnamed) from Bhutan. Distribution was nearly equal to that of the previous year.

Arboriculture.—Owing to the ravages of the hailstorm distribution was limited. A large number of young trees (23,700) were raised during the year, and the stock now in hand will admit of extensive distribution in the rains.

Exotic plantation.—The acre of *divi-divi* planted as a test for profits continues to flourish and a few trees have begun to pod. No irrigation was given and cultivation was continued in the open spaces; though, owing to the heavy rains, there was not much of a crop. There is no tree more suitable than this for covering the waste soil on lines of railway. Its low growth obviates all the disadvantages to be found in higher timber in regard to obstruction of air and danger from windfalls to passing trains; its dense shade kills down the coarse grass and lessens to danger to villages and stackyards from fire; and lastly, there is the profit, which is known to be good. We have large numbers of young trees in the nursery.

The paper mulberry (*Broussonetia papyrifera*) is likewise being planted out on a scale sufficient to test its potentiality for profit. It appears to grow freely and is well worth attention. As lately stated at the Society of Arts by Mr. Baden-Powell, C. I. E., this plant seems likely to become one of the best sources of paper-making material in India and can be commended for waste lands.

Date plantation.—In this plantation *Eucalyptus citriodora* and date-palm are being reared intermixed on Dr. Bonavia's plan. The date-palms are flourishing, but the Eucalyptus plants are proving difficult to rear owing to the persistent attacks on them by white ants.

Annual flower show.—As the weather for the year had been on the whole favourable for gardening, the flower show, which had been stopped in the previous year, was held as usual. In exhibits the results were not so satisfactory as they usually are, but the show was managed with economy and success.

Apprentices and applications for malis.—Eight applications were received for trained *malis*, and, from amongst the apprentices, one has found a good post at Ghâzipur. This branch of the garden work, *viz.* training boys, is a very useful one.

Mr. Ridley remained in charge of the garden throughout the year and has had very hard work to restore order after the damage caused in January, 1885. It is submitted that the results as now reported are most satisfactory and creditable to his management.

From the detailed report we copy the paragraph regarding the attacks of white ants on *Eucalyptus Citriodora*:—"I greatly regret having to record very limited success with Eucalyptus citriodora. Out of 2,350 seedlings planted out only 380 have survived, or, more correctly, escaped the ravages of white ants. The tree appears to have peculiar attraction for this pest, as I have never known any other plant so persistently preyed upon as these Eucalyptus trees have been, both in small and advanced stages of growth, and all efforts to find a remedy or protective have equally failed. Kerosine and soap emulsion, phenyle, decoction of madar leaves and asafœtida were all tried as remedies, but without success. Other substances are being experimented with in the hope of finding a protective". There must be something very attractive to the *termites* in the Australian tree, and the tenacity if life in the insects seems marvellous.

THE MADRAS GOVERNMENT CENTRAL MUSEUM,

which under Dr. Bidie became so complete and interesting, continues, under Mr. Thurston's supervision to be attractive, over 25,000 persons having visited the building in one day. We quote as follows from Mr Thurston's report:—

Museum Grounds.—The Mhoganies mentioned in the last annual report were planted out, and the experiment is being tried of planting the faster-growing rain tree *Pithecolobium saman* by the side of them to act as nurses of the tender seedlings. Some seedlings of the giant *Bambusa katang*, *Bixa orellana* and *Erythroxylon coca* were also planted, but the last are not thriving. The *Naudea cadamba* which was planted in 1881 flowered for the first time, but bore no fruit. Several of the palms which were set down a few years ago also flowered. The Andaman trees, presented by Captain Torrie, are all making satisfactory progress. I purpose planting some fruit trees—mango, jack and coconut—in the grounds over several barren areas, which are not pleasant to look on.

Artist.—The artist was mainly occupied with making a series of drawings of impressions of seals attached to copper grants. These he did neatly and accurately.

Ethnology and Antiquities.—Some Buddhist sculptures (174 pieces) were presented to the Museum through Major H. H. Cole, being a portion of the sculptures discovered at two small Buddhist topes near Mian Khan, Eusofzai. The excavations were made for the Punjab Government. The sculptures were conveyed by rail to Madras at the rate of 6 pies a mile per truck and some of the finer pieces will be set up in the sculpture gallery of the Museum.

It having been desirable to make a collection as complete as possible of impressions of the seals of the South Indian dynasties, an appeal was made to the various Collectors for copies of any which are to be found in their districts. In response to this appeal a number of copies in wax, and other material, were received and have been figured by the artist.

The Museum is indebted to His Excellency the Governor for the donation of an old Dutch manuscript and His Highness the Maharajah of Travancore for four shields. Herbarium.—The Herbarium was repeatedly visited in the early morning by His Excellency the Governor between the months of November and March. The work of the Herbarium-keeper, Mr. T. Abboy Naidu, was retarded by the collection of raw products for the Indian and Colonial Exhibition. He, however, systematically arranged, according to Hooker's Flora of British India, natural order Acanthaceæ to Amaranthaceæ and natural order Ranunculaceæ to Labiatæ (extra Indian plants) according to the Genera Plantarum. In addition sixty-one plants were collected in Vellore, 59 plants mounted, and 150 Indian and 220 British Plants poisoned.

Library.—The total number of visitors who came to consult books was 5,563 against 5,172 in the preceding year, being a monthly average of 463. That, if their duties allowed it, many more would use the books is shown by the greater number of visitors during the Christmas holidays than at any other time.

Madras Harbour and Beach.—Through the kindness of F. N. Thorowgood, Esq., Superintendent of Harbour Works, I have received many interesting specimens which were picked up during the diving operations. These include a red incrusting sponge, two other sponges, a zoanthus, several species of coral (gargonidæ) and a holothurian (sea cucumber). I have also obtained from the surface water in the harbour specimens of Salpa, Velella and Physalia (Portugese man-of-war) and from the beach a shell of Ostræa perforated by a boring sponge (cliona), a shell of Pinna Japanica with hydroids attached to it, and various other molluscan shells. Pieces of pumice stone have been repeatedly picked up on the shore, and I incline to the theory that they have drifted hither from Krakatoa. Similar pieces have been sent to me during the year, picked up on the shore of the West Coast at Calicut and Tellicherry.

Numismatics.—Through a catalogue of the Gold coins in the Museum collection had been issued, the arrangement of a great mass of silver and copper coins remained to be taken in hand. My first endeavour in this direction was to collect them all together and distribute them roughly into dynasties. This work was completed with the assistance of Captain R. H. C. Tufnell, who from his experience in Indian Numismatics was able to identify many issues to which I should have myself been unable to assign a place. The same gentleman then gave me great help in the arrangement of the different dynasties, and the Roman and Indo-Greek series are already completed. Among the former several coins of very considerable interest and value have come to light, notably an issue of Plautilla, wife of Caracalla, with Latin inscription PLAUTILLA AUGUSTA, and a fine green copper coin of Constantinus Magnus struck in London. The collection of Indo-Greek and Bactrian coins is not very rich, but I am in correspondence with a view to making it more complete. As the coins of each dynasty are arranged, I am compiling a manuscript catalogue, with a view to future publication, in which all issues, gold, silver, copper, &c., will find a place, but I propose to keep the gold coins, as at present, in the Museum strong box, and display the coins in silver and the baser metals in the body of the Museum, so that they may be seen by visitors without any special application.

As usual a large number of coins, amounting in all to 1,411 has been presented to the Museum during the year either by various societies or by private individuals. Among these I may specially mention a gold coin of the Gupta era presented through the Honorary Secretary of the Madras Literary Society, and a fine Rama Tanka presented by T. M. Scott, Esq., of Madura.

Natural History.—(1). *Arachnida.*—A large living spider (Mygale fasciata) was forwarded to the Museum from Hoonsoor where it was supposed to be causing death among the flocks. An experiment was made on a living sheep to see if the spider would produce any ill-effect on it, but the result proved negative, and the untimely death of the spider stopped any further experiments. I wrote requesting that some living specimens should be sent to me, but at the end of the year none had arrived. Mention was made in last year's annual report of a scorpion sent by H. R. P. Carter, Esq., living by preference in water. During the latter end of the year. I kept specimens of two other species of scorpion from Madras in jars containing some water, and though the animals were often seen above water on some stones which I placed in the jar, it frequently happened that they remained for long periods submerged beneath the surface of the water, so that our common scorpions may be considered amphibious in their habits. The subject is one which is worthy of study on the animals in their natural conditions.

Insects.—A large number of insects were sent to the Museum, among the most interesting of which were one which was proving destructive to the sugar-canes in North Arcot, and another which was inflicting its ravages on the cinchona leaves in the Wynaad, and of which specimens were sent, together with some of the affected leaves, by Messrs. Arbuthnot and Co., to whom I made a report suggesting certain precautions to be adopted and certain remedial agents to be tried, while pointing out that the expense of applying chemical re-agents where the infested area is a large one is often greater than the loss of money caused by the ravages of the insect pests, and further that in the interest of the planter, a prolonged and careful study in a practical manner, not only of the life history and habits of the parasites, but also of the cheapest and at the same time most effective means of exterminating them is much needed. I am much indebted to H. S. Thomas, Esq., for giving me specimens of the shells of *Avicula vexillum* and *Avicula fucata* in various stages of growth in illustration of his report on Pearl Fisheries.

The Order of Government on the Report stated:—Dr. Bidie gave over charge of the office of Superintendent to Dr. Thurston on October 12th, 1885, and His Excellency the Governor in Council took an opportunity of expressing his appreciation of the former officer's valuable services, in reviewing the report for 1884-85. The number of visitors to the Museum during the year again shows an advance, being 311,462 as against 272,968 in the previous year. The Government observe with satisfaction that there was an increase in the number of gosha ladies who visited the Museum on the days reserved for them. There was also a considerable increase in the number of books consulted during the year. The position of the staff has been recently much improved and the Government notice with pleasure the interest which the various assistants take in their work. His Excellency the Governor in Council is much indebted to the various gentlemen who contributed to the Museum during the year. In conclusion, His Excellency in Council desires to notice the evident zeal and interest of Dr. Thurston in his work.

REPORT OF THE DIRECTOR, GOVERNMENT BOTANICAL GARDENS AND PARKS, NILGIRIS, FOR 1885-86.

By M. A. Lawson, Esq.,

Government Botanist and Director of Cinchona Plantations, Nilgiris.

I. Season.—The weather during the past year was all that could be desired for carrying on horticultural operations. The amount of rain registered was 52·48 inches, spread over 142 days. The early part of the season was dry, but the monsoon broke unusually early, after which the rain was light and continuous. The frost during January was severe, but owing to the dryness of the weather, little harm was done.

II. General Conditions of the Gardens and Parks and improvements which have been made in them during the year—(1)—Ootacamund—(*a*)*Government Gardens.*—These gardens have improved in appearance during the past year, the lawns were kept constantly mown and are in good order. The trees and shrubs which had been planted during the two previous years are doing well, and are beginning to make a show. The ground at the entrance of the gardens has been laid out and shrubs and flowers beds have been planted with the view of improving this formerly unsightly piece of land. The ravine above the Doctor's house has been cleared of brambles and brushwood and will be planted up with shola trees as soon as the monsoon rains begin. The rest of the upper part of the gardens was planted up during the past year with a large variety of ornamental shrubs and trees. A considerable portion, however, of this land is still very rough and untidy, but I expect to be able during the next dry season to put this in order at a small cost. The ground lying around the old Cinchona laboratory has been levelled and sown with different kinds of grasses, the seed of which was presented to the gardens by His Excellency the Commander-in-Chief with a view to experimentation upon their value as fodder. Next year this ground will be laid down in permanent grass and form part of the gardens. The roads and walks in the lower part of the gardens are in fairly good order but want re-gravelling; some of the paths also in the other part of the gardens have been re-made or improved, but there is still a good deal wanting before they can be said to be in a satisfactory state. A tank to supply water for the fountain which it is proposed to place in the pond opposite the band-stand has been made, and pipes laid down to the pond; but, owing to the great difficulty of getting a proper jet, the fountain has not yet been started.

Kitchen Garden.—During the past winter, I converted one of the terraces in the upper part of the gardens into a kitchen garden which has been sown with all the more common kinds of European vegetables, and I shall report upon them next year. The vegetables obtainable in Ootacamund are very good, and I do not expect that they will be much improved upon. There is, however, room for improvement in our fruit

trees, especially the Native ones. The European kinds as a rule do not thrive.

Garden for Herbaceous Plants.—On another terrace adjoining the kitchen garden, I began an herbaceous botanical garden, but the plants have not done well, owing I think chiefly to its very exposed situation.

Nurseries.—The old nurseries having become overcrowded with plants, I am converting the remainder of the terraces into new ones, and these will be completed during the present season. Our stock of plants has increased enormously both as regards variety and numbers, as will be seen from a perusal of the price list which was printed for distribution last spring.

The witty practice of destroying labels or of changing their places is not confined to public gardens in England, as it has been manifested during the last year in these gardens.

(*b*) *Government House Gardens.*—These are in a better state than they have been hitherto. The lawns about the place are in fair order, flower beds and shrubberies have been planted, which make the place look less bare, and now that proper spouting has been put up around the roof of Government House and that of the Private Secretary it will be possible to plant creepers up the walls. In my last year's report I stated that many of the trees in front of Government House were in a bad condition, and that I thought they would not last many years longer, and I regret to say that my prognostication has only been too fully verified. Several scores of big trees have been cut down during the year, and as many more will, I am afraid, have to be removed during the present one. The green house which was put up last season has proved to be a good one for growing plants in.

The blue-gums which are in close proximity to the servants' houses ought to be removed as, in my opinion, they are dangerous. The trees are one hundred and fifty feet in height, and if during one of our high winds any were to be blown down and fall over these houses serious damage and even loss of life might be the result.

(*c*) *Stonehouse Park.*—The trees which were planted out on this estate the year before last are doing well. A little planting was done during the past year, and a little more which will be carried out during the present season will complete all that is wanted. Barbed wire for fencing this estate has been ordered from England, and will be put up as soon as it arrives.

(*d*) *Church Hill Park.*—The usual upkeep has been maintained.

(*e*) *Crewe and Ottley Hall Estates and adjoining ground.*—These estates were kept weeded during the year and portions of them planted with trees and shrubs. The land lying between Crewe Hall and Stonehouse was fenced to keep out cattle. This bit of ground is in a very rough state, and I propose digging or ploughing it up during winter and planting it perhaps with potatoes or some other such crop for one season with a view of cleaning it, after which it will be put down in grass.

(2) Coonoor—(*f*) *Sim's Park.*—The condition of this park is good. Several of the bridges have been substantially repaired, and the roads and paths have all been maintained in good order. The bridle road through the new shola has been finished at a total cost, including the bridge, of R842-9-1. This road is much frequented and is, I think, a great addition to the park.

Nurseries.—These have been established and are being gradually stocked with the indigenous plants of the neighbourhood.

(3). Barliyar—(*g*) *Experimental Garden.*—Things are looking well in these gardens. Several new plants have been put out here during the year, but damage was done to some of them by wild pig. Of the old plants, the Mangosteen and Litchi produced a quantity of fruit. It is odd that there should be so little demand for these trees, for, after the mango, they are by far the best fruits which we have in Southern India, and, I believe, that they would thrive and grow rapidly in almost any part of the country.

III. Proposed Museum of Natural History in Ootacamund.—In reviewing my report of last year, I was desired to obtain and submit plans and estimates for the building suggested by me. This has been done.

IV. Herbarium.—The number of dried plants collected during the last few years had accumulated to such an extent that the old office at the entrance of the gardens was inadequate for the purpose of properly storing them, and I therefore asked to be allowed to convert the old Cinchona laboratory into a new repository for the collection. This alternation Government sanctioned, and the herbarium is now housed in its new house. The building is roomy and all that I can desire.

V. Library.—R590-4-1 were spent during the year on books, R365-14-3 being spent on botanical works, and R224-5-10 on chemical works for the use of the Quinologist; the balance of the allotment of R1,200, or R609-11-11, was unexpended because it was not known what botanical works might be eventually obtainable from the library of the Central Museum, Madras. This will now shortly be determined, as I propose during the coming autumn to visit the Museum with the view of arranging for the transfer of the herbarium to this Department.

VI. Notes on some of the more interesting Plants which have been introduced or grown in the Gardens during the year.

1. *Erythroxylon coca.*—This plant grows very rapidly from seed and cuttings, and a large number were raised in the green houses at Ootacamund, but the demand for it has ceased, and I think wisely, for although there can be no doubt but that the plant would grow well in many parts of Southern India, it would not be likely to compete profitably with the vast tracts of country in South America where it is already so largely cultivated.

2. *Eucalyptus.*—Major A. C. Smith, R.E., Executive Engineer, Public Works Department, has frequently spoken and written to me about the desirability of growing the better sorts of Eucalyptus in this country for the purposes of timber. The following species flourish on these Hills:—

E. marginatus, E. sideraphloia, E. calophylla, E. piperita, E. obliqua.—All these are reckoned admirable as timber trees in Australia, and in the course of a few weeks I could supply the Conservator of Forests with seed of all of them.

3. *Castilloa elastica.*—Colonel Campbell-Walker in a letter to the Board of Revenue, No. 2,156, of the 27th January 1886, embodied in G.O., No. 231, of the 24th March 1886, Revenue, states that this valuable *Indian rubber* producing tree has at last been finally established by Mr. T. J. Ferguson at Calicut. I saw Mr. Ferguson's trees 18 months ago, and they were growing magnificently, and as it has at last been found easy to raise these trees from cuttings, I hope they will in the future form no unimportant item in the forestry of this place. The other rubber-producing plants have so far been a failure, either through their not yielding as much rubber as they do in America, or because we have not yet learnt how to tap the trees properly.

4. *Mahogany.*—In my last year's report I stated that I had received two casks of the seed of this plant from Mr. Thiselton Dyer. The seed arrived in magnificent order and was distributed chiefly to Colonel Campbell-Walker and Mr. Gamble of the Forest Department and to the Agri-Horticultural Society in Madras. Almost every seed germinated and tens of thousands of plants must have been raised. From a single pound sown in the green houses at Ootacamund between three and four thousand plants were obtained, some of these have been sold and the remainder will be handed over to Mr. Gamble.

I had the pleasure of visiting last autumn the teak forest in charge of Mr. G. Hadfield, Deputy Conservator of Forests, Nilambur. It was a treat to see the grand growth which the teak trees had made during the last 40 years. In the forest were many fine specimens of young Mahogany trees, but

they were suffering from the ravages of a grub which attacks the buds of all the leading shoots. In other situations the Mahogany might not suffer from these pests.

5. *Quilaja saponaria.*—This plant thrives well in Ootacamund and it is found that it can readily be propagated by means of cuttings, so that if it proves to be a tree of any value, it can be increased to any extent.

6. *Kumera.*—The tubers of this plant have been raised, and on being eaten, proved palatable.

7. *Ullucus tuberosus.*—I received this plant from Mr. Thiselton Dyer. It grows freely in the open air at Ootacamund, and it would seem likely to yield a heavy crop of small tubers. Its name is derived from the river Ullucus, a river in the north-west of South America, in the neighbourhood of which it is found growing wild.

8. *Arracacia and the Cochin tuberous-rooted Vine.*—On neither of these am I able this year to report, as the former has not yet produced any tubers, and the second, although it flowered at Barliyar, for the first time this spring, has borne no fruit.

9. *Hop.*—I am indebted to Mr. J. L. Holland, the Manager of the Nilgiri Brewery, for some cuttings of the hop, from which I purpose raising a large stock. I fear that the climate of these Hills is not likely to suit the plant, but I shall at any rate give it a fair trial.

10. *Ipecacuanha.*—In my last year's report I was obliged to confess that I had lost a large number of these plants, but during the past year, Mr. Jamieson, who has paid particular attention to again getting up our stock, has now about 200 plants. I saw a bed of Ipecacuanha growing very vigorously in the teak forest at Nilambur, the climate of which seems to suit it much better than that of Barliyar.

11. *Pteroxylon utile.*—Mr. Gamble gave me a considerable amount of the seed of this valuable timber tree, which is a native of South Africa. On dissecting the seed it appeared to be perfectly sound, but on attempting to germinate it in the green houses at Ootacamund, I failed completely notwithstanding that it was sown under several different conditions. I am glad to hear from Mr. Gamble that he has been more successful, so that this tree will, I hope, be added the long list of timbers which will in future years adorn our Hills.

12. *Mr. J. Gammie, Superintendent of the Cinchona Plantations, Darjeeling.*—To this gentleman I am indebted for the seeds of several useful or ornamental plants growing in the neighbourhood of Darjeeling. The chief of which are *Phœnix rupicola, Areca gracilis, Wallichia disticha, Calamus flagellum, Hollbellia latifolia.*

13. *Miss Baker of Peermaad, Travancore.*—To this lady the gardens are indebted for sundry *Impatiens* and *Souerilas* collected on the mountains of Travancore. None of them has yet flowered, but to judge from their leaves and their habit of growth, they appear to be different species to those which we get here, and as such will be of much interest.

Mr. T. Hanbury.—From the magnificent donation of seeds which we received from this gentleman through His Excellency the Governor last year, a very large number of plants have been raised in the green houses. Among the most interesting of the plants are the Acacias, many of which are new to the gardens, and bid fair to be very ornamental. *Fuchsia procumbens* also promises to make a fine basket plant.

15. *Coinferæ.*—Several of the Coinferæ grow magnificently on the Nilgiris. (1) *Pinus insignis.*—Trees of six years old are sixty feet in height, and those of fifteen years of age yield an abundance of excellent timber. (2) *Cupressus torulosa.*—Though not nearly so rapid in its growth as the former, this flourishes well, and at the end of twenty-five years makes a massive tree of sixty to seventy feet in height. (3) *Cupressus macrocarpa and its varieties* grows with surprising rapidity, but from their branching character are more suited for the purposes as fuel than for timber. (4) *Cryptomeria Japonica* grows well while young, and will, I have no doubt, grow into a fine tree, but there are none of any great age on the Nilgiris.

16. *Tristania conferta, Syncarpia, Laurifolia Angophora, subvelutina and Grevillea robusta.*—All grow rapidly and make fine trees. I was told that in the Wynaad there were *Grevilleas* which had been planted out only eighteen months, that were five and twenty feet in height. It ought, however, never to have been called *Grevillea robusta*, for it has in its living state the most brittle wood I know. The branches are always snapping off with the slightest breeze; * but grown in sheltered places, it becomes a noble tree. Its wood is beautifully grained and is well adapted for all the purposes of the cabinet-maker.

From the remarks of Government on Mr. Lawson's report we quote as follows:—

8. *Exotics.*—The Government approve of the proposal to grow the better sorts of Eucalyptus for purposes of timber, and the attention of the Conservator of Forests, Northern Division, will be drawn to the subject. The *Quilaja saponaria* thrives well in the climate of Ootacamund and can be readily propagated by means of cuttings. It still remains to be seen, however, whether the tree will prove as valuable here as in its native country, Chili. Tubers, of the *Kumera* (*Convolvulus chrysorhizus, Soland.*) have been raised and were found palatable. The Director does not say whether these tubers were grown at Ootacamund or, as purposed in his report for 1883-84, at Coonoor and Barliyar; nor does he give any information regarding their probable value as an article of diet for the people of this country. A new tuber (*Ullucus tuberosus*) a native of South America, which was received from Mr. Thiselton Dyer, has been found to grow freely in the open air at Ootacamund. The Government await further report on its properties and value. The director is not able to report upon the Arracacha (*Arracacia esculenta*) or the Cochin-China tuberous-rooted vine, as the former has not yet produced any tubers or the latter any fruit. Experiments in the culture of hops have been commenced; the Government await the results with much interest, for the successful cultivation of this product would probably prove of great advantage to the ryots of the Nilgiri Hills. The failure in the stock of Ipecacuanha plants which was reported last year has been effectually remedied, but Mr. Lawson thinks that the climate of Nilambur is more suited to this plant than that of Barliyar. The remarks on the successful growth of certain *Coniferæ* on the Nilgiris are interesting and will be communicated to the Forest Department. The Director has omitted to report the results of his experiments with the Medicinal Rhubarb plant, referred to in his report for 1884-85.

Ploughing and Manuring.—One of the most interesting results of the agricultural experiments carried out during the past two years at the Cawnpore experimental farm is the establishment of the use of woollen refuse as a manure. This refuse is turned out of the Cawnpore mills in large quantities, and great difficulty is experienced in getting rid of it on any terms. Recent experiments, however, have shown that as a manure for wheat it produces results only second to saltpetre. As saltpetre is an expensive manure, and the woollen refuse costs next to nothing, the discovery ought to be of some value to cultivators. Another point brought out is the importance of deep ploughing. The average for all the experiments showed that deep ploughing gave an increase over ordinary shallow ploughing of 53·5 per cent. when the land was ploughed 9 inches deep, and 43·5 per cent, when ploughed 5 inches deep, although the number of shallow ploughings was twice as many as of the deep.—*Bombay Gazette.*

---

* The tree grown in Ceylon as *Grevillea robusta* must surely be a different variety, as it stands wind without the snapping of the twig.—Ed.

STRAY BOTANICAL NOTES FROM A VISITOR TO THE SOUTHERN PROVINCE, CEYLON.

Galle, 27th Sept. 1886.

At about 12-30 yesterday a strong South-West '*blowing*,' accompanied by rain, began at Kalutara. The rain soon ceased, but the monsoon blew steadily and strongly nearly all the rest of the day till about 8 p.m., when the mail coach arrived at Galle. "Brucea Sumatrana" which the late Dr. Gardener found common on the Hantane range as an escape from the Royal Gardens of Peradeniya, is become a very common plant about Kalutara, and the "Scoparia dulcis," a West Indian plant, and known as a "ballest plant" which the writer of this first found growing at Galle when on a visit in 1871, has now spread in some mysterious way over considerable portions of Ceylon. It was very conspicuous at Kalutara and Galle, and whole fields of it were observed near some of the tea estates at Awissawella some years ago. The "Turnera ulmifolia,' with its conspicuous light, yellow colored flowers, is a roadside plant all over the Western and Southern Provinces, whilst the lantana of several hues seems to have taken complete possession of tracts of the country from Mount Lavinia to Galle. The fact that the portion of Ceylon from Kalutara to Bentota is the most exposed to the force of the S.-W. monsoon rains, is amply exemplified in the luxuriance of the bread-fruit trees growing here, some of which must be fully 60 to 70 feet in height, and coconut trees upwards of 100, and other plants and trees in proportion. In the Kachcheri grounds here, I noticed a solitary old tree of "Dalbergia Sissoo," which you will recollect, was introduced by the late Mr. Anstruther from India as a timber tree that would come to perfection in 20 years, and of which several hundreds were planted as avenue trees in Colombo and elsewhere about 30 to 35 years ago, but which have all died out and I do not now recollect where anyone in the Western Province exists. The late Dr. Boake is my authority for stating that in the seeds of this tree sown in the avenue of Queen's College it was that the now common "Lucœna glauca" first sprung up. This is the white-flowered Acacia-like plant now so common in and around Colombo with flat brown pods, the seeds of which are strung together for necklaces &c. I saw today at "Closenberg' where Mr. Scott now lives, the Doum palms planted by Captain Bayley some years ago, 3 or 4 of them in full fruit and a younger one just beginning to bifurcate. This is the famous "Hyphæne thebaica' of upper Egypt and is remarkable for the fact that it is a branching palm always divided into two. There are two of these which have divided four different times, so that each of these have 16 different heads bearing fruits, instead of the original single head. There are two of these singular palms in the Queen's House grounds in Colombo, one of which has begun to flower and bifurcate, and another at Temple Trees, the residence of the Messrs. Green, Kollupitiya. With the exception of the bifurcations, this palm is so like the palmyra, that it may be easily mistaken for this common palm.—About 28 people drowned here in the late storm.

The "Treasury of Botany" says:—

Hyphæne. A small genus of African palms confined to and widely distributed throughout that continent, more particularly upon the eastern side, extending from Egypt as far south as Natal. The genus is remarkable for having the stem branched, a peculiarity not frequent among palms, each branch terminating in a tuft of large fan-shaped leaves, from amongst which the branching catkin-like spikes of flowers are produced, the different sexes being borne on separate trees. The fruit is about the size of an apple, and has a thick mealy fibrous rind with a smooth polished skin, enclosing a single hollow seed of a horny consistency. *H. thebaica*, the Doum or Doom Palm, or Ginger-bread tree of Egypt, grows also in Nubia, Abyssinia and Arabia. It seldom exceeds twenty-five or thirty feet in height, and its stem is frequently three or four times forked or branched in old trees, though when young it is always simple. The fruits, which are produced in long clusters, each containing between one and two hundred, are beautifully polished, of a rich yellowish-brown colour, and of irregular form. In Upper Egypt they form part of the food of the poorer classes of inhabitants, the part eaten being the fibrous mealy husk, which tastes almost exactly like gingerbread, but its dry husky nature renders it unpalatable. The hard tough wood is used for making various domestic utensils; and rosaries are cut out of the horny seed. See Plate 18. The doom-palm of Egypt (*Hyphœne Thebaica*) has a trunk which divides in a dichotomous manner; its pericarp is used as food, and has a taste of gingerbread. In the parched districts between the rivers Dande and Zenza, in tropical Africa, Welwitsch came upon a palm forest five leagues in length, which consisted exclusively of the crowded stems of a branched palm belonging probably to *Hyphœne*. Like most African palms, this yields an excellent wine.

COLONIAL AND INDIAN EXHIBITION: BRITISH NORTH BORNEO.

North Borneo is a British colony unattached, in this respect occupying a position the converse of that of Cyprus, but similar to that of the Niger districts. It is a part of the British Empire by virtue of the charter granted to the company which owns it and governs it, and is on a similar footing to that of many of our colonies when first we began to expand beyond the seas, and indeed, to India in the early days of "John Company." But we have long ceased to make colonies after this fashion, and it might be well to put an end to the anomalous position of North Borneo by according to it the dignity, rights and privileges of the other members of our great colonial family. As it is, though only a company's property, it has all the paraphernalia of a Crown colony. It has its Governor, styled "Excellency by his subordinates, its colonial secretary and treasurer, its residents and sub-residents, and all the other officials whose designations form so prominent a feature in the Colonial Office List. Its interesting and well-stocked little court forms a continuation of that of the Straits Settlements. From a commercial point of view timber is the most prominent and most important exhibit. Like many of the other colonies in the Exhibition, North Borneo regards itself as the great timberyard of the world. Timber it certainly has in abundance; it is one vast forest, and of its timber there are several kinds of great economical value. One of the principal woods shown in the court is known as billian, a timber that sinks in water, is very hard and durable, and is already being exported in considerable quantities to Australia. Other timbers are exported to China and the Straits Settlements as well as Australia. North Borneo has a considerable number of other woods which are said to be of great utility where strength and durability are required, such as russak, tapang, paluwan, greeting camphor, sereah or Borneo cedar (used in Australia), &c. There are also several good furniture woods to be seen in the Exhibition, of fine grain and capable of beautiful polish, resembling mahogany and walnut. The Borneo forests are still practically virgin, and no doubt the company will take warning from other colonies that now lament the reckless destruction of their forests. Timber does not as yet figure largely among the exports of the embryo colony, but with its many converging streams, giving facilities for floating down logs, and its really fine harbours, much might be made of it in supplying some of the comparatively timberless countries of the Far East. So far as Europe

is concerned, there is so much timber of every description within easy reach that we doubt if Borneo can ever expect to do a large business in that direction. Another natural product found in considerable quantities, and figuring largely among exports, is a kind of native gutta-percha of several kinds, specimens of which may be seen in the court. There are also specimens of indiarubber in the court, and it also is stated to be found in abundance. We have also that rare Chinese luxury, edible birds' nests, which are found in enormous quantities and of various qualities, some of the finer kinds fetching very large prices. A considerable export trade is done in this product. Rattans, of course, grow in profusion, and they form one of the most important items of export. Tortoise-shell, bees-wax, vegetable tallow, gums, and beche-de-mer are other products to be seen in the court that can be turned to considerable commercial account. Of minerals, coal and gold are shown; and these and other minerals, —tin, antimony, iron, copper, and cinnabar, are said to exist in abundance. This is probably true with reference to coal, as the testimony of explorers proves, and, if so, the company will certainly be fortunate. But the interest and duty of the company at present are to demonstrate in a manner satisfactory to practical men and possible settlers that these and other resources do exist in the abundance conjectured. No mere vague statements will produce much effect.

As to cultivated products, there seems little doubt that the soil of North Borneo is well adapted for nearly all tropical cultures. Tobacco, sago, pepper, gambier, Manila hemp, sugar are shown in this court; while the natives largely cultivate rice. A German company has entered on the cultivation of tobacco, and a report we have seen speaks well of the results. It compares the Borneo tobacco to that of Sumatra, and we believe Sumatra tobacco has actually been introduced. No doubt the tobacco is good enough, and its culture deserves encouragement; but it seems to us premature to bring it forward as something exceptionally superior. The company certainly offer liberal terms to planters and settlers, and even advance money to those in want of capital, under certain conditions. We believe a Chinese company are at work with capital partly advanced by the company. It is doubtful whether the natives themselves will ever be of much service in developing the colony, and it would certainly be a good thing for the company if they could induce Chinese to immigrate in large numbers.

The court abounds in "curios" and in articles of native manufacture and ethnological interest. The clothes and apparel used by the Dusuns, the principal tribe of the colony, are abundantly represented, as well as implements and weapons and ornaments. There are a Dusun winnowing machine, plough, rice decorticator, harrow, reaping knife, distaff; a bamboo lyre, knives, war apparel, shields, a curious coat of mail, swords, kris, a pongun used in producing fire, and other such articles, interesting to compare with similar exhibits in other courts in which semi-barbarous features are prominent. The Malay execution kris is an ugly looking weapon; while we are glad to see the last pirate flag, taken in Darvel Bay in April, 1885, and a model of a pirate boat.

The company have certainly acquired one of the choicest bits of a fine island, including an area of 31,000 square miles, with a coast-line of 600 miles, containing several magnificent harbours. One of the best of these is Sandakan Bay, in which stands the chief settlement, Sandakan. On this area the estimated population is only 150,000.—Mahomedan Malays with an infusion of Chinese and Arab blood on the coast, and various aboriginal tribes, mainly Dusuns, in the interior. The country is well watered, some of the rivers being navigable for small craft for a considerable distance. There are picturesque mountain ranges averaging 6,000 ft., rising in Kina Balu to 13,700 ft., a picture of which forms one of the decorations of the court. Elephants, rhinoceroses, buffaloes, and other large game are found, and will doubtless afford fair sport for some time to come. The territory was ceded to Mr. Dent and others in 1877-87 by the Sultans of Brunei and Sulu, and the company, was formed, and chartered in 1882. The company, we understand, act only as administrators, preferring to rent the land to settlers able to develop it. The ports are free, but a royalty of 10 per cent is charged on the export of jungle produce; the bulk of the revenue, however, is derived from farming the right to sell opium, tobacco, and spirits. During the short time the company have been in possession of the territory the progress has been marked. The revenue has increased from $20,297 in 1881 to $106,190 in 1885, and is estimated at $127,886 for 1886. The expenditure has not increased in anything like the same proportion; in 1881 it was $108,294; in 1885, $202,075. The exports, again, have advanced from $145,443 in 1881 to $387,757 in 1885. To illustrate the hopeful prospects of this infant colony, the rapid progress of the commerce of Hongkong and the Straits Settlements is adduced. But it seems to be forgotten that this progress is almost entirely due to the importance of these two colonies as emporia for the trade of the Far East, and not to any great extent to the development of native resources, of which Hongkong has none. We doubt if there is room for a third *entrepot* so near to Singapore as North Borneo is. Let the company by all means endeavour to attract trade to its harbours, but it seems to us that the prosperity of the colony must depend mainly on the development of its natural resources, and the culture of the tropical products for which its soil and climate are so well adapted. As to climate, it seems fairly well fitted for European residence, under the precautions which should be taken in every tropical country.

It is to be expected that the colony will soon become an Imperial possession. And, if so, it might be advisable to consider whether an arrangement could not be made by which for administrative purposes it might be combined with Sarawak and Brunei; for we believe it would not be difficult to persuade the Sultan of the latter to part with his rights for a moderate consideration, while Rajah Brooke, of Sarawak, might not object to be placed under Imperial protection. The North Borneo Company certainly deserve credit for the very effective steps they have taken to explore their territory and take stock of its resources; and if they could only succeed in attracting capital and labour probably much could be made of it. They have had several zealous and competent officials, who have done good work for science as well as for the company. Among the names that ought to be mentioned in connexion with this court are those of the Executive Commissioner, Sir Rutherford Alcock, chairman of the company; Mr. Alfred Dent and Mr. William Kidner, Commissioners, and Mr. W. M. Crocker, Assistant Commissioner.—London *Times*.

TEA AS AN INVESTMENT FOR CAPITAL.

The *Statist*, in a recent article, called attention to the favourable prospects of Tea cultivation in India and Ceylon, stating that "The profits of the Indian Tea Companies," where there has been the combination of careful management and freedom from debt, have been very satisfactory in several instances. The Assam, the Darjeeling, and the Lebong Companies have yielded good dividends in face of claiming prices of the produce. The dividends paid are set out below for reference, and we add the price per lb. realised for the tea sent home for sale:—

"Dividends at per cent. per annum, and price per lb. realised (exclusive of exchange) for Tea sold by undermentioned Indian Tea Companies:—

Assam.	1884.	1883.	1882.	1881.	1880.
Dividends..	11	14	10	25	7
Price of Tea	11¾d	1s 1d	1s 1 7-16d	1s 1½d	1s 1½d
Darjeeling.					
Dividends..	7	7½	6	8	7½
Price of Tea	1s 5½d	1s 6½d	1s 3⅜d	1s 7¾d	1s 5⅜d
Lebong.					
Dividends..	9	9	6	7	6
Price of Tea	1s 4 1-5d	1s 5 2-5d	1s 5d	1s 6½d	1s 1½d

"Provided, then, that estates are acquired at reasonable prices, that able management is secured, and that

the capital raised is in the form of shares and no powers are given to mortgage estates, there ought to be some chances for the legitimate Company-promoter."

To the above list may be added the Brahmapootra Company :—

Brahmapootra	1884	1883	1882	1881	1880
Dividends	15	12½	9	11	7
Price of Tea	1s 2.9d	1s 1.5d	1s 3.62d	1s 4.77d	1s 1.94d

All these Companies fulfill the conditions laid down by the writer in the *Statist* as necessary for success, being ably managed, free from debt, and having their capital raised in the form of shares.

Since the above was written, three of the four Companies named have declared improved dividends, the Lebong Company remaining at 9 o/o, viz :—

	Assam Co.	Darjeeling Co.	Lebong Co.	Brahmapootra Co.
Dividend for 1885	20 o/o	8 o/o	9 o/o	16 o/o
Amount paid per Share	£20	£20	£10	£25
Approximate Selling Price	£42	£24	£12	£46

Yielding at these selling prices, and at the average rates of dividend for the two years 1884 and 1885, the following percentages, viz. :—

	Assam Co.	Darjeeling Co.	Lebong Co.	Brahmapootra Co.
	£8 1s 10d	£6 5s	£7 10s	£8 8s 6d
Equal to years' purchase	12⅜ yrs.	16 yrs.	13¼ yrs.	11½ yrs.

There is a liability on the shares of the Assam Company for a further call of £10 a share.

The Jorehaut Company have declared a dividend at the rate of 15 per cent, and their £20 shares are quoted at £42, thus showing a return of £7 2s 10d per cent on that selling price, or fourteen years' purchase.

The *Home and Colonial Mail* of the 16th July, in an article on Tea as an investment, remarks : "It is somewhat surprising that with such handsome results Tea is not a more favourite investment among English people. The shares it is true are not quoted on the Stock Exchange, and for this reason probably little is known among the general public of the advantages of Tea as an investment." August, 1886.

THE PROSPECTS OF CINCHONA BARK.

The most interesting Report we have seen for some time on the condition and prospects of the Cinchona Bark market is that of Messrs. Lewis and Peat received by last mail. It affords a very fair summary of the latest information from the different cinchona-growing countries and we learn from it for the first time, the important fact that Java shipped 1½ million lb. of bark in the 12 months ending 30th June last, while larger quantities are expected in the future. We give the report here in full:—

CINCHONA BARK.

CEYLON, INDIA, JAVA &C.

Mincing Lane, London, E. C., Sept. 17th, 1886.

The extraordinary and continuous increase in the supply from *Ceylon* shows no abatement, and has baffled the calculations of those who relied on previous experience, and on the information circulated from Ceylon itself, especially in the early part of this last year's harvestings.

Quantity (in pounds) offered since 1st January to date:—

	Ceylon	East India	Java	Total
1886	9,457,762	702.614	301,477	10,461,853
1885	7,890,702	495,738	95,659	8,482,099
1884	6,214,686	404,000	86,144	6,704,830

We expect the shipments from Ceylon from Sept. 1885 to Oct. 1886 will total 15½ million pounds.

Hence the greatly reduced price (about 3d per lb. per unit) which is today's value.

The range of future values will, as in the past, depend more on the supply than anything else ; for as we have frequently observed, the capacity of this trade, the greatly increased actual consumption of bark and its products, is shown by the facts of deliveries and stocks to be far in excess of the ideas of those new to the trade, few of whom have had, as we have had, the privilege of dealing personally for half a century in the disposal of a large part of this article. But so overwhelming and rapid an increase in the supply,—at a time when serious depreciation in the values of all produce was the order of the day, though startling and fatal perhaps to the prospects of many of our Eastern planters and friends,—has not resulted in anything approaching hopeless views for the future, as the manufacturers have adapted themselves to the altered state of things, and the novel mode of handling this article (too abundant supplies being forced on the market each fortnight) with wonderful composure and cleverness.

We think it apparent, however, that the limit for the present has been reached, and that *any further material increase of supply* would be disastrous to the trade and reduce values possibly considerably. No great war has occurred during the last year to increase largely the consumption of Sulphate Quinine, but the opening of Burmah to British rule, the settlements in Central Africa, specially on the Congo, and the new awakening of China, and consequent intercourse and sojourn in these countries of Europeans and Americans, will tend to greater demands in the future for this invaluable medicine, now so universally prescribed. The manufacture of the Sulphate the past year or two has, however, been excessive, and stocks of this too are large.

The imports from Ceylon have fairly maintained their quality, and the packing and condition of the Bark has left little to be desired. Spokeshavings and stem chips have formed a large and valuable bulk of our imports, and have met a ready sale, bright clean bold lots often realising high figures for other medicinal purposes besides quinine making. Of renewed Bark the proportion has been good. Root has sold well, especially Crown. Quills, when fresh silvery, of even lengths, *in cases* of 100 to 120 lbs. weight, have sold at high rates: press-packed, broken and ragged immature lots have sold very badly. Young branch and twigs have come in large quantities, and have sold at low prices, helping to swell the supply and our stocks ; and some of scarcely any value to Quinine manufacturers. It is said the great increase in supply is largely owing to the cutting down and pulling up of so many Cinchona trees for Tea planting, and that we shall see a great reduction consequently in the future supply ; time alone will shew.

The supply from *Java* shews a steady increase, but as yet nothing alarming, total shipments from Java 1st July 1885 to 30th June 1886, 1½ million pounds. The richness of quality, however, of much of it, will make this a very important factor in our supply, and we are told we may expect large quantities in future years. The general condition of mercantile affairs in that Island, mainly owing to the depreciation of the sugar industry, and consequently the reduced credits from Holland may help to retard the otherwise probable excessive outlay in this industry.

Our supplies from Central America have continued insignificant, and the great cost of transit from the interior (and according to their previous experience), the ruinous rates now ruling for Bark render it unlikely that we shall receive any appreciable quantities for a long time thence. The Bark is there, it must be remembered, in enormous forests of various descriptions, and when prices allow, and collection and transit are cheaper and easier, we may expect the United States of Columbia, Ecuador and New Granada to obtain once more a place of great importance in our supply of this product.

Bolivia continues her average supply, and of rich quality of quill bark, much being from cultivated plantations.

India, Darjeeling, and the Wynaad and Neilgherries are making still further developments, but current low values will not encourage them in great outlay for the present.

West Indies, Africa (St. Thomas), which has sent small poor lots, shews little prospect of becoming an important source of supply.

It must be remembered that it is more true today than ever, that the stocks for the world are in London, and the fortnightly regular auctions held here are the guide and controlling influence of values, and of supply and demand. Both New York and Paris hold greatly reduced stocks of Bark as compared with former years.

The consumption of Sulphate of Quinine in America is enormous and progressive.

The Statistics on the other side will be of interest, and we beg reference to our regular fortnightly Prices Current on this article.—Your obedient servants, LEWIS & PEAT, Brokers.

We cannot find room for the valuable statistics appended to this Report, but these will be given in our *Tropical Agriculturist*. We may mention however, that out of 12,241,600 lb. total deliveries of bark in 1883-4, as many as 5,320,000 lb. were of South and Central American barks; while in 1884-5 the proportions were 4,101,720 lb. out of 14,186,720 lb.; and in 1885-6, only 2,900,000 lb. of American bark out of 14,900,000 lb. delivered. As to Stock, the estimate is for 1st September, Ceylon, Indian and Java barks 2,229,840 lb. against 7,980,000 lb. American, doubtless being held for prices. But the total stock is only about the same as 1st September 1885 and 20 per cent less than on 1st September 1884.

As regards the prospects in Java, we have had the following placed at our disposal :—

Extract from Mr. G. Tolson's letter of 24th August 1886:—"We certainly shall be shipping more and more cinchona every year from Java, but nothing like what Ceylon has done. If we ship one million lb. during the next two years it will be A 1. But we don't expect higher prices so long as Ceylon sends such a lot forward.

We may also quote from the private reports of merchants in London as follows:—

"We have 250,000 lb. of real good stem and plenty more to come, and I am much interested in the future of bark. The stock here is not considered excessive, 60,000 bales, one year's consumption. They know more about Java in London than we do in Ceylon. Van Goorkem the man who has written about cinchona in Java estimates the acreage of that island at 20,000 acres and the production during the next 5 years at 1,000,000 to 5,000,000 lb. per annum. The exports from Java this year are 1½ million pounds and this is excessive as they have peeled up a lot of inferior to make room for Ledgers instead. I wrote to a reliable person in India:—"What is the probable production of Southern India, during next three years." He replied: 1, 1½, and 2½ millions per annum.

It is most difficult to learn anything satisfactory about cinchona. The Mincing Lane Brokers declare we have driven S. America out of the market and hardly any comes from there now. The production in 1880 and 1881 when 2½ per cent and 3 per cent stuff was worth 2s 6d and 3s, was 24,000,000 lb per annum and now it is not much in excess of that, yet price has gone down to 3½d a unit. Howard says that the price entirely depends on Ceylon exports.

"Cinchona.—Sales advertised for next week comprise some 2,200 lb. Ceylon, which is a large supply. The market for Quinine has developed further weakness and sales of German have been made at 1s 10d per oz. We fear this will affect the price of bark to some extent and we anxiously look for a material decline in shipments from your side."

From all this it may readily be judged how much depends on the outturn and distribution of the Ceylon Cinchona Bark exports and this brings us back to the proposed Syndicate, regarding which we shall have more to say in an early issue.

FROST ON THE NILGIRIS.—The *South of India Observer* of 18th September states :—The fall of frost at this time of the year is unprecedented. Not even in the recollection of that ubiquitous animal, the oldest resident, can such a circumstance be called to memory, yet we have to record a small fall of frost on the morning of Friday and again today.

RHEA.—The secrecy observed in connection with the cultivation and manipulation of Rhea fibre is causing great harm. It is strengthening the impression that the whole thing is a failure and a delusion. If the machinery is refractory, the fact should be known with a view to stimulate enquiry and inventive genius. If Mr. Minchin is now on the steaming and chemical processes, we presume, it is because the Death and Ellwood machines have not turned out according to expectation.—*Nilgiri Express.*

THE GOVERNMENT of Trinidad has taken a wise step to encourage local industry in forwarding $40 to each of the District Agricultural Boards. It is not a very large sum, to be sure, but it will encourage those boards to make an effort to develop the minor industries in their several districts. If good results should follow the action of the Governor, he may perhaps be disposed to make a further and still larger grant. Anyway, it is a step in the right direction, and ought to be the means of doing much good among the agricultural classes.—*Colonies and India.*

CACTUS EDGING is finding favor in Bombay. In an economical point of view it is an extremely cheap undertaking, and as a safe-guard and preventive against the inroads of animals or intruders, it is unparalleled. It is an erroneous idea that long rested in the public mind, that this genus of succulent plants afford harbourage for snakes. We should prefer *Aloe* fencing. [On the above, from the *Indian Engineer*, we would remark that cactus has an inconvenient tendency to spread laterally. Aloes, on the other hand, will, in about a score of years, or less, flower and die down.—ED.]

ALOES AND WHITE ANTS: IS IT TRUE? A recent traveller states :—I noticed that for the most part the hedges of the Madras Railway were composed of the common aloe plant. It is still a conundrum in my mind from which of two causes this came about. It may be that aloes form a good fence to keep cattle off the line. Possibly it originated from a knowledge of the fact that white ants will at once leave any place if you take aloe leaves and bruise them and place the bruised leaves on or near their runs as I know from experience, or as I have heard, if you mix aloe juice with the mortar when building a house, the white ants will never come near it. So it may be a well considered design to protect the sleepers of the railway.—*South of India Observer.*

EFFECT OF LONG-CONTINUED VEGETABLE DEPOSIT ON SOIL.—The following extract from an article in the *Indian Forester* on deterioration and recovery of forest soils, has a good deal of bearing, probably, on the history of some of our Ceylon patenas:—"Over large extents of Motipur and Chakia, the soil, now supporting vigorous sál growth, would be undoubtedly very stiff in quality, but for the large admixture, in its substance, of vegetable manure. It is my opinion, therefore, that we have in Bhinga nothing more than an instance of soil deterioration on a gigantic scale, a deterioration that has progressed slowly through generations of time, the inevitable consequence of unceasing destruction by man, of pasture, fires, exposure to sun and air, and the resulting exhaustion of *that only element of original fertility in this otherwise purely argillaceous soil.* Restore this vegetable manure, and, in my opinion, you restore the forest at one and the same time. But this restoration signifies no more fires, no more pasture, no more fellings, no more removal of produce—not even grass—for two score of years." If a tract of patena were enclosed and treated as a forest reserve, suitable trees being planted in succession as the soil was improved by the fallen leaves, in half a century we should probably have not only fine forest trees but land eminently suited for tea culture. Such an experiment ought to be made.

Correspondence.

To the Editor of the "Ceylon Observer."

WASHING COLOURED COTTONS SO AS TO RETAIN THEIR COLOUR.

Matale, 20th Sept. 1886.

SIR,—In reply to "Outstation" 's letter in your issue of 19th instant I beg to say that coloured cotton frocks may be frequently washed and their good looks retained by attention to a few simple precautions. A small bag of bran (1 lb. will be sufficient) should be left for some hours in the water (cold) in which they are to be washed. Very little soap should be used, and that little ought to be white curd soap, not the dhoby's inevitable "salt soap," which contains much free alkali and various crudities most destructive to delicate colors. A large handful of table salt should be dissolved in the water in which the frocks are finally rinsed, previous to the application of "congee". The salt "sets" the colours if there be more than one in the dress and prevents their "running into each other." The frocks should at once be put to dry in a shady place, if possible in a current of air. It is important that drying be accomplished with all speed. Any intelligent dhoby will carry out these directions, especially if he knows a "*santosum*" is forthcoming to reward his extra trouble. At the same time, from sad experience, I would remind "outstation" that many of the pretty, inexpensive cottons cannot be washed successfully, as in nearly every instance they derive their colours from aniline dyes. In this category may be classed almost all pale blues, creams, greys, fawns, and those delicate "tertiary" shades now so much worn, and if striped or spotted with a different colour, or colours, the dyes are pretty sure to amalgamate very inartistically in the wash-tub. Most shades of cardinal, strawberry, navy, or indigo, and notably pink zephyr may be said to be "die hard" colours, as with careful washing they retain their freshness till the last. I may add, that a pretty shade of cream may be communicated to lace and cotton frocks, etc., by substituting for the usual laundry blue a little of the liquid from a few bruised arnatto seeds.

VANITY FAIR.

INSECT PESTS.

Haddington, Hatton, 5th Oct. 1886.

DEAR SIR,—I am sending you by this day's post two caterpillars or grubs, which I found this morning on a tea bush in a 15 months' old clearing, on Kudaoya estate. The bush was entirely stripped of its leaves. The grubs seemed to have worked their way steadily upwards from the bottom of the bush, eating the leaves, old and young, as they happened to come across them. There were six of them on the bush. I send the twig also on which the grubs were. I have never seen anything like them in the course of my tea experience, and it will be most interesting to know what they really are.—Yours faithfully, T. J. TORRIE.

[Larva of Stauropus Alternus (grey coloured moth); family Notodontidæ: (pretty common and not much to be feared.)—*Entomological referee.*]

ON THE DESTRUCTION OF SMALL BIRDS, AND ON FEATHERS AND POOCHIES.

DEAR SIR,—In the May number of the *Tropical Agriculturist*, there is a long statistical article on the "Trade in Feathers," see vol. V. No. 11, page 782, from the *Journal of the Society of Arts*. The figures given are probably far below the actual amount both as to the money value of the trade, and the number of birds slaughtered, and it may be fairly stated that for every bird's skin which finds its way to market, four birds have been destroyed and that frequently or mostly in the breeding season. Many skins are rendered useless by being shot to pieces, many are spoiled by "bird lime," many are rendered useless in skinning and many more are spoiled for want of skill or the proper means of preparing them, so that they will keep. I quote from the article in question: "The average annual importation into this country and France of small foreign birds of bright plumage is no less than a million and-a-half. They come mainly to England for distribution. We import about quarter-a-million Humming-birds yearly. At a public sale in the Autumn of last year, besides the loose feathers, 147,386 bird's skins were disposed of during the two days sale among which were no less than 44,381 green or Amazon parrots and other species." Is not this wanton destruction? My poor little Humming-birds that used to nest every Spring in the yellow-scented flowering currant "Ribes Aureum," at my bed room window. I know not which was the most beautiful and pleasant after the long American winter, the beautiful little bird or the sweet scented shrubs they frequented. I consider the Humming-bird, perhaps, the most perfect and beautiful of all the feathered tribe. I will not even except the great bird of Paradise and the Lyre bird in their native habitat in the Malay Islands. The article and statistics I have alluded to, are well-worth the attention and careful perusal of all who take an intelligent interest in Agriculture, Horticulture and Arboriculture. It is useless to recapitulate the figures already published, but I may quote again as to the value of the birds and feathers imported. "In 1883 the import of birds was £155,240 stg., ornamental feathers £2,011,926." This seems an enormous sum to be derived from such a source, no wonder that our rice fields and our wheat fields are being destroyed by insects when we are ruthlessly destroying our natural protectors. How many of our Government officials or planters know that in Ceylon, there is a considerable trade in bird skins to India? In Badulla, often when coolies are sick or not to be found they are bird catching in the chenas or lowcountry. Where they sell the skins I do not know, probably to the Moor traders in the lowcountry. "Civilized" man is the most ruthless destroyer of all animals: the wild beast kills that he may eat and live, the savage Indian will not wantonly destroy game, but the sportsman will kill for the sheer love of slaughter and excitement. No wild beast of the forest will do this, but what is to be said of the gentler sex, the better-half of mankind, when a quarter of a million multiplied by four for those that are spoiled or wasted, say a million poor little Humming-birds are slaughtered every year to be worn as ornaments for the person. Adding the above figures together for value of bird's feathers and skins imported, we have £2,167,166 stg., a trade not to be lightly sacrificed, but it is not necessary that this trade should be entirely sacrificed. The ostrich producing the most valuable of all feathers is now domesticated, peafowl are domesticated, pheasants are domesticated, all the Heron tribe are easily domesticated and many other feather-producing birds may be domesticated profitably for their feathers. The Astecs of Mexico and the Incas of Peru kept their most beautiful birds in aviaries to obtain uninjured the feathers with which they produced their most exquisite feather work, but to return to figures as above, £2,167,166 is a large sum, but at what cost is it obtained; the destruction of birds has cost the world in grain and fruit-yielding plants more than this many hundred times over. Take the Genesie valley in the State of New York, long considered the garden of the Northern States, it produced the finest wheat and the largest yield per acre of all the wheat fields of America, where is the wheat now?—utterly ruined and gone; destroyed by insects because there were no birds to keep them within bounds, I have no statistics, but can put it this way. The Rochester flour mills, long said to be the largest and finest in the world, turning out the finest flour on the American continent, the capacity of one mill alone was, I believe, said to be 1,000 brls. (one thousand barrels) in the 24 hours or say 300,000 brls. per annum, value say $7 per brl—$2,100,000. I do not claim accu-

racy for these figures for the value of flour like every thing else, fluctuates and few or no mills are run to their full capacity night and day all the year round; still my figures are not far wrong and I would ask where is the profit in destroying our small birds? First the Hessian fly attacked the wheat, a small insect which deposited its eggs in the first joint of the straw above ground and just as the wheat began to ripen, the larvæ cut the joint and the crop was ruined and the remnant of grain left uninjured could hardly be cradled or cut owing to the straggling straws; then came the midge, a small fly which deposited its eggs in the ear of the grain, just after it had blossomed and the wheat was destroyed in the milk; and what to all appearance seemed a magnificient field of wheat on examination was found to contain not wheat, but millions of little red maggots. The cultivation of wheat has had to be abandoned in the Genesee valley, this is the result of destroying the equilibrium of Nature by felling all the forest and killing all the birds. The Hessian fly is said to have found its way to England, but fortunately England may still be called a "sylvan" country, and we are too fond of our feathered songsters to destroy them. The destruction of insectivorous birds is to Ceylon a very serious one; this season in Uva has been most favourable for paddy, yet the crop reaped has been very light, all caused by "poochies," but what I plead most for are my pet humming-birds, my swallows, my cocos and my sparrows. The humming-bird is found only in America, and in no other part of the world; there are a great many varieties and all are birds of passage; they are found from Terra del Fuego to Hudson's Bay, to the very utmost limit of flowering shrubs and from the Atlantic to the Pacific. Humbodt in his "Travels in South America," mentions having seen the humming-bird in some of the highest passes of the Chilian or Peruvian Andes: they flit with the flowers, and their favourite food is in the earliest Spring blossoms. I knew so soon as I saw the first blossom open on the Miserion, the Pinus Japonica, and the sweet scented currant, that my little birds were not far off. I do not think any lady would ever again wear a humming-bird in her hat or as ornament had she seen them, as I have done in Canada, after the long cold winter flitting from flower to flower, fearlessly entering the breakfast room, flashing about brilliant as emeralds and rubies set in burnished gold, sipping the honey from the hyacinth or Spring-flowers on the breakfast table; constantly returning to their tiny nest under the window to feed their two little fledgelings, for they lay but two eggs and if the present ruthless slaughter is to be continued it will not take long to exterminate them. It is a mistake to suppose that the humming-bird lives entirely on honey, they are also insectivorous, and as such most valuable in a flower garden, but the destruction of the swallows is worse than all the others. They are entirely insectivorous and do no harm to anything. Look at the swallow skimming a paddy-field or a wheat field, the swallow is the salvation of our crops. In America they have been nearly exterminated to supply the Paris market, the color of the common American swallow having been found to match admirably some new colour or "Mode." It used to be a sight worth seeing in American autumn when the swallows were preparing for their flight southwards, the old birds had probably had two broods of little ones, during the summer. Old and young in the autumn would collect on the ridges of houses and barns but their favourite place of resting was the telegraph wires, where they congregated in vast numbers, taking occasional flights to see if the young birds were strong enough on the wing to take their southern flight; in one day they disappeared how, when, or where, or if in the night no one knows. The Americans blame the introduction of the English sparrow for driving away the native birds and also say the sparrow destroys the blossom buds of the orchard in Spring and the fiat has gone forth that jack sparrow is to be exterminated, (if they can). Fools, it is their own insatiable greed and the law which is no law at all and protects nothing, but allows everyone to do as he pleases. You might as well tell one, it is the English sparrow has exterminated the Salmon from every river and the trout from nearly every stream and river in New England and New York. Mr. Downall should and must see to our Ceylon birds. A Sinhalese goya will plough all day in his muddy paddy-field and the coco is his companion like the rook following the plough picking up the grubs and slugs which would otherwise destroy his crops. The goya may be and often is hungry, but he will not kill his coco birds either to eat them or sell their feathers, and why should the stranger or others be allowed to do so for any purpose whatever, Here is an extract from the *Sunday Magazine* of June last: "In the State of Maine the sparrows were ordered to be destroyed; the order was carried into effect, next year the crops and even green trees were destroyed by caterpillars. At Auxeria a similar order was given with precisely the same effect; in the County of Oxford the farmers clubbed and destroyed all the sparrows and small birds on account of the grain they destroyed, the clergyman alone protected them in his garden and encouraged them; he had that season the only fruit crop in the parish and it was unusually large, caterpillars and other pests literally swarmed elsewhere." My friend, I ask, sparrow is an impudent bird and will steal from my breakfast table, but he is not particular; he will also eat cockroaches, in the early Spring; in cold countries he will feed on the buds of trees in the garden or the orchard, but he much prefers the buds on the trips of succulent shoots to the blossom buds on the dry fruit spurs of an apple tree. Our birds must be protected or we will suffer serious injury; that they destroy or live on grain and young plants is to a certain extent true, but they do infinitely more good than harm and I can plead for my feathered friends as Burns did for the field-mouse in his well known lines:

"A daiman icker in a thrave
'S a sma request
I'll get a blessin wi' the lave
And never miss't.

JAMES IRVINE.

Ventnor, Isle of Wight.—At Steephill Cattle, an *Araucaria imbricata*, about 40 feet high, has had nearly 40 cones, each twice the size of ordinary coconuts, this season. A *Chamærops Fortunii*, one of Robert Fortune's palms introduced from China, has been in full bloom throughout the season at East Dene, near Ventnor.—*Journal of Forestry.*

Future Cinchona Bark Supplies.—Mr. John Hamilton who is a very good authority on the cinchona market, writing to us from London, says:—"I quite agree with you that Ceylon people have more to fear from themselves than from any bark shipments that Java may send for the next four years. In view of the great fall in the value of bark, Ceylon men should decide only to send their good barks home, and keep their common kinds and twigs packed away on the estates for shipment nine months hence, or perhaps a year. It will all be wanted some day, but a combined effort is necessary to relieve the present tension." This again would seem to point to some such combination as is indicated in the Syndicate.

Jaffna Coconut Planting.—If coconut planting were not a success, and a decided success, we would really be unable to account for the fact of the Catholic Mission taking to it in right good earnest. We know of one coconut planter, the owner of almost half a dozen Pachchilapallai estates, whose views about coconut planting are not very encouraging and whose faith as to the productiveness of existing estates on an appreciably remunerative scale is rather shaky. But he is possibly mistaken. It is a conviction that coconut planting on an extensive scale is a safe and profitable investment and not one in which money is thrown away, that has induced the local head of the Catholic Mission to devote a large sum out of his private means, as we are told, to the purchase of a coconut estate and of 300 acres of Crown land, part of which has been already cleared and planted.—"Ceylon Patriot."

THE COLONIAL AND INDIAN EXHIBITION: TRINIDAD.

The cocoa or cacao of Trinidad has a greater name than its sugar. The value of the quantity exported was 421,974*l.* in 1885, as against 684,675*l.* for sugar. In 1829 the export was scarcely 3,000,000 lb.; in 1885 it was nearly 14,000,000; an increase of 433 per cent in less than fifty years. Coconuts are the only other native export of importance. The cocoa palm grows luxuriantly along the sandy shores of the southern and eastern coasts of the island, and, although the simplest, it is far from being the least profitable of the agricultural industries of the colony. The number of coconuts exported, which has risen from 4,450,846 in 1876 to 11,276,339 in 1884 proves that it is a paying and a progressive one, and it is stated to be well suited to capitalists who can afford to wait for a return. Beyond the purchase money of the land and the expense of putting in the plan but little expenditure is necessary, and when fully established, say at the end of eight years, it will give regularly a net income of from 80 cents to $1 (3s. 4d. to 4s. 2d.) per tree. In Trinidad the cocoa palm has been known to flower when only three years old, and generally bears at between five and six years; but it does not bear fully until eight years, old. To a limited extent there is a manufacture of coconut oil, and that industry has recently shown signs of revival. Hitherto about 45,000 gallons have been manufactured annually. Amongst the products which thrive well in the colony, though they have not been extensively cultivated so far, are coffee (for which a ready sale can always be found in the local market), tea, nutmegs, ground nuts, tobacco and lime tree.

Grenada.—The chief product of Grenada is cocoa (or cacao) for the production of which the soil and climate of the island appear to be peculiarly adapted. The consumption of chocolate has increased so largely in late years that considerable lands have been cleared and planted with cocoa trees with great advantage to the island. Last year about 5,500,000 lb. of the product was exported (this figure being below that of recent years), but the falling off was due to unfavourable weather during the bearing season, and the consequent lateness of the crop. Besides cocoa many other economic plants have been cultivated with success, such as nutmegs, cloves, vanilla, cardamoms, coconuts, &c. Attention is also being shown to Kola-nut—an African fruit said to contain a large proportion of caffeine, and some enterprising agriculturists are attempting to cultivate the tea plant in the island. Tropical fruits of the finest quality are always abundant, and the principal vegetable food resources include ground provisions (yams, sweet potatoes, tanias, Kushkush), pigeon peas, plantains, Indian corn, cassava, bread fruit, &c.—*Chamber of Commerce Journal.*

INDIA—(*Continued*).

Next to the native shops referred to in our last notice the seed and grain trophy is perhaps the most popular; standing, as it does, in the centre of the court, it cannot fail to be seen, if not actually admired by all. The seeds used in the decoration of the trophy are very varied, and they are here arranged more for effect than actual use, patterns being worked out according to colour. As this aspect of the trophy, however, is not within our province to criticise we will briefly notice some of the seeds used in carrying out the design, and this may be the more interesting, as the seeds are not named, and, indeed, from the nature of the design, it would be impossible to do so. The following are amongst the seeds used:—The Physic Nut (Jatropha curcas), the oil of which is a powerful purgative. The plant is a bush or shrub, native of tropical America, but introduced and now grown in most tropical countries. These seeds are about three-quarters of an inch long, and of a dirty black colour. Here are also the seed of the Gingelly, Benne, or Teel (Sesamum indicum the oil of which is very extensively used in Ind for culinary and a variety of other purposes. The oil is brought to this country in very large quantities, and used as a lamp oil, in soap making, and for mixing with Olive oil. Cold drawn Sesamum oil is used in France and Italy for salads, and the lamp-black used in China and Japan for making the best Chinese ink is procured by burning Sesamum oil. The seeds are small, somewhat flattened, and Pear-shaped, and vary considerably in colour, from a dingy white through various shades of brown to black. The combined violet and green tints of the Pistachio-nut (Pistacia vera) causes it to be distinct in appearance from its neighbours. In consequence of its pleasant taste the Pistachio-nut is eaten in large quantities, not only in India but on the shores of the Mediterranean. Sometimes they are cooked and eaten with salt and pepper. The oil has a very agreeable smell, and is occasionally used in perfumery, or for scenting soaps. Pistachio-nuts can be obtained in this country, but are not so well known as they deserve to be.

Another well-known oil-seed, which is in itself edible, is the Ground-nut or Monkey-nut, as it is sometimes called (Arachis hypogæa), an annual herb, probably of American origin, but now grown very largely in all warm climates, both as a food and for the sake of the oil contained in the seed, but more especially for the latter purpose. The oil is of a sweet limpid character, and is much used as a substitute for or mixing with Olive-oil, and also for making pomades, soaps, burning in lamps, and for various other uses. The Ground-nut is well known for its habit of pushing its young fruit under the surface of the soil and there ripening, from which habit its common name is derived.

In the genus Bassia the best known species are B. latifolia and B. longifolia; both of these have shiny brown seeds, with a broad rough scar on one side running the entire length of the seed, which averages from 1 to 1¼ inch. The former species is a large deciduous tree, common in the forests of Central India, and cultivated and self-sown throughout India generally. Gamble describes the oil obtained from this species as having a greenish-yellow colour, and, says it "is eaten by the Gonds and other Central Indian tribes, and is now used to adulterate glue, and in soap-making. It solidifies at a low temperature but melts at a temperature of 110°, and though it keeps well in a cold climate, in a hot one it soon becomes rancid, and seperates into two parts—a clear fluid oil above, and a thick brown substance below. One seer of oil is obtained from four seers of kernels." The tree is generally known as the Mahwa, and is celebrated for the fleshy flowers or corollas, which are eaten as food, or distilled for the spirit which is obtained from them.

Bassia longifolia is a large evergreen tree growing in South India and Ceylon, and known in each country respectively as Illupi and Mee. From the seeds an oil is expressed which is used for similar purposes to the last named, as are also the flowers. Amongst other oil seeds shown in the trophy are the Castor (Ricinus communis), the varieties of which are very numerous, some of the seeds being of a reddish or chocolate-brown colour, while others are nearly black. They also vary much in size, from a quarter to half an inch or even five-eighth inch long. The castor oil of commerce is obtained either by simple expression or by expression with a certain amount of heat; that obtained by the first process, known as cold-drawn castor oil, is the best. The Castor-oil plant is originally a native of India, but is now widely dispersed through tropical and warm countries, in the former of which it grows to a height of about 40 feet, becoming much smaller in warm climates while in colder climes it is known as an annual.

Sunflower (Helianthus annuus), and Linseed (Linum usitatissimum), both of the brown and white varieties, are here shown; besides many varieties of food seeds and grains, such as Lentils (Lens esculenta), Dolichos Lablab, green grain (Phaseolus mungo), ordinary grain (Cicer arieinum, Job's Tears (Coix lachryma), Maize (Zea Mays) &c.)

Of the very extensive collection of fibres, which has attracted a considerable amount of attention amongst specialists, it would be difficult to speak without a very extended notice; it will, therefore, suffice to draw attention to the Glenrock company's exhibits of China-grass (Boehmeria nivea), and fabrics made of the fibre, showing what can be done with this useful Nettle. The leaves of Puya fibre from Maoutia Puya, will also attract attention, indicating as it does what might prove to be an excellent paper material, if not a textile. In India it is used for making cloths and fishing-nets. Close to this are fine samples of Bhabar-grass (Pollinia eriopoda), a very strong grass, much used for ropes and cordage. Dr. Watt says it is "largely used in the tract between the Jumna and the Sarda, and is particularly abundant in the Garwhall Himalaya."

Amongst products interesting to the pharmacist, some fine samples of Cinchona bark will attract attention, especially one of Cinchona Ledgeriana, from a seven years' old plant, and some stems with moss-renewed bark.

Dye products, and the method of their manufacture or preparation, are well illustrated in the Indian Court. Amongst the products themselves the samples of Annatto (Bixa Orellana) will be noticed for the brightness of the colour, and the large size of the seeds. This product is well represented amongst the Ceylon and West Indian exhibits, and is referred to under those heads. Here are also large samples of Tissoo or Pulas flowers (Buttea frondosa), of a bright fresh yellow colour, used for dyeing yellow and orangered. The tree is one of those which yield a variety of products. The root-bark gives a good fibre used for coarse cordage, also for making slow matches, and for caulking the seams of boats. The gum or resin, under the name of Bengal Kino, is astringent, and is used in medicine, while the seeds are used as a purgative and vermifuge, and the leaves are employed as plates. Here are pods of Acacia concinna, which contain a quantity of saponaceous matter, and are used as soap, especially for washing the hair. The leaves of this species are eaten on account of the acid flavour they possess. Of indigo the exhibits are both good and numerous, and the model of an indigo factory will not fail to attract the attention of all visitors, so accurate is it in detail and so perfect in finish. The model shows the process of steeping the plants and pressing them in the vats or divisions, from which the water runs by a kind of pan into a large receptacle below, in which the workmen stand up to their middles in indigo, stirring it with long poles, and in a room behind is seen wire or wicker frames on which the cakes of indigo are placed to dry. The model gives a very good idea of the preparation of an important article of commerce about which but little is popularly known.

The other models illustrating Indian industries are oil pressing, Sugar-cane pressing, and the preparation of sugar from the Date Palm, in which the collector of the toddy is represented in the crown of leaves drawing the juice from the freshly cut spathe.

In the matter of direct forest produce, such as timbers and Bamboos, many excellent examples are shown. The timber trophy or screen at the entrance of the Economic Court is composed of small specimens of a great variety of useful timbers, the most striking specimens, however, are the large planks and blocks of Padonk (Pterocarpus indicus), of which also an enormous squared trunk lies outside in the adjoining promenade. The Padonk, or as it is sometimes called Andaman Red-wood, is a lofty tree of Burmah and the Andaman Islands. The wood is fairly hard, even grained, and easily worked, and is well known for its deep red colour, which darkens or becomes brown on exposure to the light. It is a very useful wood, and is much used for furniture as well as for cabinet work, carriage wheels, and similar purposes in India.

Another wood that will no doubt attract considerable attention amongst cabinet makers, is the Andaman marble wood (Diospyros Kurzii), an evergreen, the native of the Andaman Islands, as its common name indicates. The wood is very hard, irregularly blotched with black markings upon a greyish ground, usually arranged in alternate streaks of grey and black, but in the plank exhibited at Kensington, the figuring resembles as near as possible what might be effected by the casual upsetting of an ink-bottle, an appearance not to be found in any other wood. The smaller specimens of woods are too numerous and too well-known to claim any special notice, notwithstanding that many of them are of excellent quality, both on the score of durability and for their fine markings or figure, and ought to be better known amongst English hard wood dealers.

In the matter of Bamboos, the well-known bridge in the centre of the Court will be remembered as an excellent illustration of what these gigantic grasses can be applied to, besides which the numerous uses to which they are put in India are well shown in the couches, chairs, baskets, &c., which surround the bridge, some excellent photographs of Bamboo bridges spanning the Sutlej, are also shown in close proximity. A stem of species of Calamus, a slender of climbing Palm, often popularly confounded with the Bamboos, is shown under the roof of the court, and reaches almost its entire length. This, though a fine specimen, is not however, so long as one contained in the No. 2 Museum at Kew, which measures over 400 feet, or about the height of the dome of St. Paul's Cathedral. These stems are very pliable, and some of the more slender species are known as canes and are used when split for the bottoms of chairs. Another Palm product which will attract attention is a dug-out or canoe, such as is ordinarily used in India, consisting of the hollowed stem of a Palm from which one side has been cut away and the central, cellular portion removed. The bottom of the canoe has therefore no approach to a keel, but is simply rounded—the shape or from of the trunk.—JOHN R. JACKSON, Curator Museums, Royal Gardens, Kew.—*Gardeners' Chronicle*'

TEA ADULTERATION.—Mr. E. Collin contributes to the August number of the *Journ. de Pharmacie d' Anvers* a valuable paper on the means of detecting by the microscope the adulteration of tea and mate, and also points out the features by which coca leaves may be recognized under the microscope. The most frequent adulterations of tea leaves, according to Mr. Collin, are the leaves of *Epilobium angustifolium*, *Fraxinus excelsior*, *Sambucus nigra*, *Laurus nobilis*, *Prunus spinosa*, *Salix alba*, and *Populus nigra*, none of which, however, present the numerous sclereuchymatous phytocysts which are present in the tea leaf. The leaves of mate are said to be often adulterated with those of *Myrcia acris*, which are easily recognized by the presence of pellucid oil clots in the leaves.—*Pharmaceutical Journal*.

PROLONGED VITALITY OF SEED.—From the garden at Glen Grant we have received two joints of the pod of Entada scandens. The pods of this plant are very large and woody, each joint containing a single large seed. We have heard of these pods being made to serve the purpose of door knockers in the West Indies, and this use suggests another, viz., that they might be used as rattles to keep the birds off fruit trees. If we remember rightly, seeds of this plant have been washed up in a germinating condition on our western coast, but this is of minor importance as compared with the story told in the following letter:—"The enclosed are two Beans from the joint of a pod 2 feet in length, and containing ten Beans. This pod was brought home from India over forty years ago by the late Dr. TAYLOR, of Elgin. Two months ago I put several of the Beans in a pot in our stove, and to my surprise two of them have germinated and thrown up stalks which are now over a foot in height. The Beans have not been preserved in any special way, so that under these circumstances and after so long a lapse of time it is strange to see vitality so stronge in them. Perhaps you could tell me what is the name of the plant from which the enclosed has been taken off.—GLEN GRANT."—*Gardeners' Chronicle*.

THE USES OF COTTON-SEED.

From the Monograph on cotton cultivation in the Punjab, recently issued, it appears that 84 per cent of the whole yield of the province is locally consumed. Taking this as a basis for calculation we arrive at the conclusion that the quantity of cotton exported only averages 16 per cent of the total yield of the entire peninsula, including British Burmah. Assuming therefore that 84 per cent of the seed yielded is retained for local consumption, and taking the calculation given in the Monograph referred to above, that the proportion of seed to cotton is two-thirds, we have for disposal 506,604 tons of cotton-seed. The quantity of seed annually crushed in the United States averages about 420,000 tons, which yields a revenue of 8,000,000 dollars, or 3 per cent of the cotton crop. Therefore 506,604 tons of seed would represent 9,649,600 dollars, or reckoning at the rate of R2-8 to the dollar, we should have a revenue from cotton-seed alone of R24,123,800 which at present entirely lost to the country. In making these calculations, we have taken only 16 per cent of the yield of the country, taking the yield and consumption in the Punjab as a basis for the whole of India. It may, however, be stated, without fear of being contradicted, that this represents a very small proportion; as it is not to be supposed that 84 per cent of the seed is actually retained for local consumption and sowing. Our estimate may therefore be regarded as very low.

In no trade returns of India have we come across cotton-seed as forming an item of export or import, nor have we seen any allusion to it as an article of commerce. In the Punjab cotton Monograph referred to in this paper, it is stated that the labourer employed to separate the cotton from the seed, "is commonly paid by receiving the cotton-seed which he extracts:" and the only use to which the seed is put would appear to be the feeding of goats and buffaloes, and this, so far as we are aware, only to a limited extent. We have sometimes seen the seed used for illumination purposes. Earthen pans, 4 to 6 inches in diameter, are filled with the seed; a little common "sweet" oil is poured over it, and the whole ignited, burns with a fitful sort of blaze for a couple of hours or so.

That cotton-seed opens a wide field for the development of a profitable industry in India must be admitted. It is therefore to the owners of oil-presses and capitalists in particular that we address ourselves. We see no reason why it should not prove as profitable in India as it has in America. The Government of India have turned their attention to the development of various industries in this country—fibre, wheat, cotton, ensilage, &c. We hope they will add another to the list—the extended use of cotton-seed.—*Indian Agriculturist.*

RHEA (FIBRE).

By Samuel Jennings, f. l. s.,
Corresponding Member of the Agri-Horticultural Society of India.

The publication of Mr. Cogswell's useful Review of the History and Prospects of Rhea in a recent number of the *Journal* of the Agri-Horticultural Society of India, Vol. VII, Part II, may be considered to mark the period at which this valuable fibre ceased to be merely the admiration and the despair of experts, and definitely passed within the range of practical enterprise. Thirty years ago the excellent qualities of the fibre obtained from the stems of the Rhea plant, *Boehmeria nivea*, were recognised by the Society, and strenuous efforts were made from time to time to encourage the efforts of inventors, to provide some method of treatment under which the fibre could be produced at a cost that would bring it into general use, but no completely satisfactory results were obtained, and all that Mr. Cogswell could say was that he had hope that the problem would soon be solved. Agriculturists were naturally reluctant to risk their capital in a new cultivation, with but slender prospects of an adequate return, and consequently but little has been done to encourage the cultivation of Rhea except upon an experimental scale.

Since the middle of the year 1884, however, a considerable advance has been made in our knowledge of the best methods of preparing this fibre for the manufacturer, and it may now be definitely stated that all difficulties have been surmounted, and wherever Rhea can be grown, it can also be prepared for market in such a form that it will at once command a remunerative sale. It is well known that the fibre of Rhea is contained in that part of the stem of the plant which lies between the wood and the outer bark, to both of which it adheres tenaciously, embedded in a mass of glutinous, resinous matter, from which it is most difficult to free it. In China this is accomplished by hand-stripping and washing, an expensive process which involves a serious loss of good fibre. M. Favier has invented a process of decortication by steam, which so loosens the bark together with the whole of the fibre from the wood, that it can instantly be stripped off without damage to the fibre.

I have before me stalks of Indian grown Rhea which have been thus stripped, and similar stalks that have been decorticated by hand without the use of steam, the contrast is remarkable and quite conclusive. In the former case the wood is perfectly clean, and the stalks can be broken short like biscuit, but on the latter there still remains a considerable quantity of fibre adhering to the wood, which of course would be lost, and when it is considered that no more than five per cent of fibre is contained in the green stems, it is a matter of consequence that the whole be secured. This is accomplished by the steaming process, and the ribbons so obtained may be dried, packed and shipped to England for subsequent treatment.

I have also the ribbons which have been removed from the stalks to which I have referred, and comparison indicates a further superiority of those decorticated by steam, the inner surface being smooth and even, whilst in the case of those which have been stripped without the use of steam the fibre appears much lacerated, and this would involve a still further loss of fibre when the ungummed filasse is converted into slivers in the carding machine, or rather I should say the percentage of noils or short filaments will be considerably greater from the unsteamed ribbons than from those prepared by Favier's method, and the value to the manufacturer will be proportionately less. It will be the aim of producers to furnish a staple which will compete for use in the manufacture of the most expensive fibres, because such a staple will command the highest range of prices, and it cannot sufficiently be impressed upon cultivators that whether their produce will compete in the market with hemp, with flax, or with silk, depends almost entirely upon the method they adopt for the production of fibre in the first instance. Although the fibre of Rhea is exceedingly stroug, it is easily bruised and injured in the process of separating it from the stem, and the severe treatment to which it is subjected in the best machine yet introduced cannot fail to affect its ultimate value considerably.

I have recently sent some machine-prepared Rhea for conversion into filasse, and the result is deserving of note. When carded the proportion of Slivers—*i.e.*, long filaments—was considerably smaller than it should have been, this was attributed to the bruised condition of the fibre in the first instance. It must, however, be remembered that the Fremy process is specially adapted to de-gum steamed ribbons, and may not therefore have been the best chemical process for machined fibre. I do not mean to say that a machine may not yet be produced, which will be a great improvement upon anything at present before the public. A machine that will remove the fibre from the stem and clean it at a small cost, and yield a product that will command a ready sale for many purposes, I have, indeed, already seen a sample

produced by Mr. Death's recently invented machine, which appears to be vastly superior to any Rhea produced by mechanical means that had previously come under my observation. What this new machine may do yet remains to be seen, but until it is shown that any machine can produce the fibre without more or less bruising it, the trade will probably always give the preference to filasse from steamed ribbons. It is not alleged even on behalf of Mr. Death's new machine that it can entirely remove all the resinous matter from the fibre. The machine of Death and Ellwood recently exhibited in Calcutta leaves about 15 per cent of foreign matter still adhering to the fibre, possibly Mr. Death may have now succeeded in reducing that percentage, but some still remains which can only be removed by chemical treatment. So that after all, whether machined or not, the ultimate success of Rhea will depend on the completeness of the process by which it is rendered fit for the spinner.

This subject has long occupied the close attention of the distinguished French Chemist and Botanist, Professor Fremy, whose scientific works have obtained for him a European reputation. M. Fremy and his associate M. Urbain have now brought their system of de-gumming Rhea to great perfection. Within the past three or four months important discoveries have been made respecting the chemical properties of the glutinous matter of the Rhea plant, which have enabled them to simplify and cheapen their process very considerably. But as it is well known that laboratory experiments, however successful, are apt to disappoint when applied in practical operations on a large scale, M. Fremy and his associate have established a Factory at Louviere, near Rouen, where many tons of Rhea ribbons have been treated and the filasse worked up into yarn, in which form it is eagerly purchased by French manufacturers, who thoroughly appreciate its valuable qualities. A regular business has thus been created, which is only limited by the very small supplies obtainable of the raw material. In the meanwhile English manufacturers are by no means indifferent at the appearance of a staple that threatens to be a serious rival to silk and flax, and ultimately, perhaps, even to cotton, and before very long arrangements will doubtless be made to carry out the Fremy-Urbain process in this country. I recently visited the Factory at Souviers in company with several gentlemen interested in the subject, and for the first time the full details of the entire process were explained, and we were enabled to verify by personal observation every step in the treatment of the ribbons. The result of our visit was thoroughly satisfactory, we not only saw the filasse produced, but some of it was carded and manufactured into yarn in our presence, we were also shown yarn dyed in various colours which were remarkably brilliant, some that had been passed between hot steel rollers were as glossy as the richest silk, plainly indicating the high class of fabrics for which this fibre will be employed.

A manufacturer (English) who had worked Rhea into dress material, remarked to me recently that it had only one serious disadvantage, and that was, that it would never wear out. He had presented his wife with a dress of Rhea fabric, it had been washed several times without in the least impairing its beauty. "Good," he said, "for the husbands, but bad for the wives, who would get tired of their dresses before they could make them shabby." When in Paris I was shown some very handsome curtains having the appearance of heavy silk damask, delightfully soft, and rich and pleasing in colour. I was surprised to hear that they were made of Rhea. Excellent results have also been obtained with the same material in the manufacture of damask table cloths, napkins, bed linen, and such like fabrics indicating a wide range of uses to which this fibre may be applied, so that all fear of over-production may be dismissed for a long time to come. But apart from European demand, when it is remembered that thousands of tons of China grass are annually manufactured into fabrics in China, Hankow exporting 8,000 tons per annum for local consumption, it becomes a question whether the same result will not follow in India, if the cultivation of Rhea should be taken up on a large scale, what an immense gain this would be to the country in every way, and I do not know any reason why the Fremy-Urbain process of de-gumming the Favier ribbons should not be as successful, and managed as easily in Bengal as at Louviers. I saw nothing in the way of manipulation that Bengalee women and children could not do with these. A superintendent with some knowledge of chemistry, and a man to look after the boiler would be necessary. The chief requisite seems to be a plentiful supply of soft water, and the means of getting rid of it; when charged with colouring matter it becomes as black as bottled stout. This last is a difficulty where the water-supply is precious, and rivers may not be contaminated. In preparing ribbons for the Fremy-Urbain process, they may be greatly improved in value by removing as much as possible of the outer brown cuticle, this is effected by wiping th stems with some pressure with a rough cloth, while hot from the steaming chest.

In China this has been done with so much success that the ribbons thus prepared have yielded from 75 to 80 per cent of fine filasse. Ribbons not so treated yield from 45 to 55 per cent. of filasse. This means that freight has to be paid on at least 40 per cent of useless material which might be saved by the removal of the cuticle before decortication. It will also probably cheapen the chemical treatment by saving the expense of one boiling. Whether the extra cost of handling on the field will be less than the percentage saved in carriage and freight, will, of course, depend on circumstances of time and place. Cheap labour and high freight would be in favour of hand-cleaning. Dear labour and low freights might turn the scale the other way. Suppose 100 tons weight of Favier ribbons have been obtained, and the filasse contained therein amounts to 45 per cent, then—

	Tons.
The weight of filasse produced will be ...	45
And the weight of the waste will be ...	55
Total ...	100

But if these same ribbons had been thoroughly cleaned when removed from the steam chest, so that when converted into filasse, the yield would be 75 per cent instead of 45 per cent, the actual weight of fibre would not be increased, but the bulk of useless waste would be greatly reduced, thus—

	Tons.
Weight of filasse	45
Weight of waste	15
Total ...	60

Or a saving of 40 tons in every 100. It is obvious, however that the value of this deduction will depend on the percentage of fibre in the ribbons, which may be greater in China than in India, and may, in fact, vary in different parts of India. It having now been proved that Rhea can be converted into a highly remunerative staple for textile manufactures, there will soon be enquiry as to the best methods of cultivating the plant. Up to the present there has been a great deal of talk about the subject, but scarcely anything has been done. Garden experiments are almost as unreliable for planters as Laboratory experiments are to the practical manufacturer. I am not aware that any attempt has yet been made in India to grow Rhea upon an extensive scale elsewhere than on the estates of the Glenrock Company in the South-East Wynaad, where some 250 acres are now fully planted. Mrs. Montgomery has an estate at Kangra, where the cultivation of Rhea has been carried on for several years, but I do not know to what extent, the produce, I believe, is locally consumed. In Algiers the French have been growing the Rhea with considerable success, and also in Egypt, and the earliest information on the subject has been derived from these sources, but their statistics do not seem to apply in Southern India where the conditions are so different. There is not, therfore, a great deal

of experience available for the benefit of would-be Rhea planters, and what there is must be studied in view of the circumstances under which it has been obtained. Every planter will have to find out for himself what treatment is best adapted for his own climate, soil and other conditions.

The experiment at Glenrock has excited considerable local interest not only amongst the neighbouring planters, but also (*mirabile dictu* at this stage) amongst native cultivators as well; it is only the difficulty of obtaining plant that has hindered them from already beginning on their own account. I am quite satisfied that before another year has passed, the cultivation of Rhea will be vigorously taken up by the natives, especially in the Coimbatore District. Plants and seed have been promised already to several of the headman of the villages, who have asked to be supplied.

I am indebted to Mr. J. W. Minchin, the able Manager of the Glenrock Estates, for a vast amount of useful information, the result of his own careful observation and experience during the past 18 months. Mr. Minchin was sent out to India early in 1884 for the special purpose of introducing the cultivation of Rhea. On his voyage out he obtained la small supply of plants from Algiers, these were dug up and roughly packed in boxes, and after a long and trying voyage at the hottest season of the year, were delivered at Glenrock in the month of May. The roots were at once planted, and from them about 2,500 plants were obtained to start with. In the following November 200,000 plants had been obtained from the original stock by cuttings, layers, and root divisions. These were again, taken up and divided, and in June last the number of plants had been increased to above two millions. A remarkable example of arithmetical progression applied to agriculture deserves to be recorded. From one root planted in January seven stems were cut, each divided into five cuttings, three eyes to each cutting, most began to grow in a week; from the roots bulbous tubers formed nearly filling up all the space between the roots at 18 inches apart. From this one plant 57 strong root cuttings were taken, making in all 83 plants, from one root not five months in the ground, and that under unfavourable circumstances, poor soil, and no water or shade. Again, a single root left undisturbed for a year had so increased in size that 42 stems were counted in various stages of growth.

The plants require to be left a whole year before they should be cut for fibre. During the second year only half a crop should be expected, the yield of the third year will be greater, and from the fourth year full crops be cut. This is Algerian experience, but it remains to be seen if the rule holds good in India. In Algiers they reckon the average weight of each stem when ready to cut to be 1½ oz., and they obtain ribbons to the weight of 10 per cent of the green stems. Mr. Minchin states that the average weight of Glenrock green stems when mature is 3 ounces, but he has not hitherto obtained more than 7½ per cent of ribbons. There can be no doubt that the growth is far more robust in India than in Algiers, and the plants too carry far more moisture, and this may account for the smaller percentage of ribbons to the green stuff cut. The season of cutting may also make a considerable difference. Then again all the French calculations are based on the results obtained from *Urtica tenacissima*, *Roxb.*, whilst Mr. Minchin's refer to *Urtica Nivea*. He has both species in cultivation at Glenrock, and remarks on the great difference between them. The latter being far more robust in habit and quicker in growth, though it may be that experience will prove that the former will yield as good a crop when thoroughly established, and the smaller weight of stem may yield a higher percentage of ribbons. During the wet seasons the stems will certainly contain a far greater waste of moisture than at other times, and this is the case with *Urtica Nivea*, with stems 7 to 8 feet long, and weighing over 6 ounces each. It does not, however, follow that the actual weight of fibre will be less, neither can it be said that the same results would follow in different parts of India under different conditions of soil, temperature, rainfall, &c. These are points that each planter must find out from his own experience, and doubtless we shall all be very much wiser a few years hence. A gentleman told me a few days ago that he had seen *Urtica Nivea* growing in Italy with stems from 10 to 12 feet high, but he could not tell me what percentage of fibre it yielded, which after all is the important point. I should recommend planters to try any species they can get, for they all yield excellent fibre in remunerative quantity.

Urtica candicans is also grown at Glenrock, but I have no information about it. *Urtica Nivea* may be known by its leaves, the undersurface of which is silvery-white. In *Urtica tenacissima* the undersurface of the leaf is green.

I have already referred to the extraordinary rapidity with which the varieties of Urtica can be propagated by cuttings and root division, plants raised in this manner make new growth very quickly. In one month new shoots appear, in three months the shoots will be four feet high, and in six months there will be five or six strong stems. Separations of the tubers are, however, much slower in growth than cuttings, and in hot dry weather the best mode of propagation is by layering without complete separation. Mr. Minchin sowed 2 lb. weight of seed on the 27th March occupying an area of 1,400 square feet, germination took place on the 3rd April. Much trouble was at first experienced with ants, but a little kerosine oil mixed with the water successfully kept off the depredators. In four months the seedlings were 18 inches high and strongly rooted, both cuttings and seedlings require partial shade till they well established. I am inclined to think that for most districts in India seedlings will ultimately prove to be the most satistactory, because the roots of plants raised from cuttings seem to have a tendency to spread laterally, and do not strike deeply into the ground, these will be sure to suffer more or less in long continued drought. On the other hand, the tap root of seedling penetrates vertically, and seek moisture at a considerable depth. The French recommend their own system of planting out at 18 inches apart, so that each acre will contain 16,000 plants. This, no doubt, applies to the less vigorous species *Urtica tenacissima*, and in a climateless forcing than that of India. At Glenrock Mr. Minchin has put in his plants in six-feet beds, separated by a one-foot drain, two rows in each bed 3 feet apart, and 18 inches between the plants on the row, so that in Glenrock 7,000 plants occupy an acre. He finds that the space between the plants quickly fill up with new growth, and the ground soon becomes quite covered. Irrigation is a matter of considerable importance, as it will probably make a difference of one crop in the year. A portion of the Glenrock plantings was left without any artificial watering, in order to observe the result. It was found that although root growth was not materially checked, there was scarcely any movement above ground between the months of February and May. On the irrigated fields the dry heat did not seem to affect the development of the shoots in the least, in eleven days stems were observed to have grown 15 inches. Growth is more vigorous on the hollows than on ridges, or on level ground. At Glenrock the altitude above the sea is about 2,000 feet, and the rainfall is exceedingly heavy during the monsoon. Rhea is also being grown in the Bhowani Valley at the foot of the Neilgherrie Hills, in the Coimbatore district. Here, where the soil is rich and the climate very forcing, the development of the plant appears to be much more rapid and the growth more uniform and vigorous than at the greater altitude of the Wynaad. Close planting is strongly advocated in order to induce tall, straight growth and check the formation of side branches, it is also said to be a great protection from the ravages of caterpillars and other insect pests which devour the leaves, and so cause side growth. As regards shading, the practice varies considerably in

different countries. In the Indian Archipelago Rhea is planted under the shade of forest trees. In Algeria and in Egypt it is grown in the open field entirely exposed to the sun. Mr. Minchin advocates partial shade, and in clearing his forest land he has left some of the larger trees for this purpose. Manure can scarcely be despensed with, but the plant gratefully responds to every attention paid to it.

No crop for the purpose of fibre extraction should be expected until after the plants have been left undisturbed in the ground for at least 12 months, during which time the fields must be kept free from weeds, an expense that will not recur when the Rhea has thoroughly established itself. The cost of upkeep after the first year will, therefore, be light in comparison with most other crops. When in full vigour, Rhea should afford in India from four to five crops in each year according to locality. The stems are said to be in their best condition for cutting when they begin to ripen, which may be known by their commencing to turn brown at the butt. An interesting account has recently appeared in one of the Manchester papers of a visit to the Rhea plantation near Zagazig, on the Suez Railway, where there are over 300 acres of Rhea under cultivation, the property of the Ramie Company of Egypt. Here it is said that no shade is necessary, and the fields are irrigated in the customary Egyptian manner. The treatment of the crop differs very materially from that recommended under the Favier system, and I am unable to say whether the introduction of decortication by steam would enable them to obtain better results than they have yet realised. It appears to be the practice in Egypt to cut the stems while still young and pale green in color, and they do this because they find that when the stem once begins to change colour, the bark hardens, and the resinous matter becomes stronger and decortication almost impossible. Of course this is so, and as the flowering stage approaches, the entire structure of the plant will be undergoing considerable changes, which, in all probability, will, to some extent, affect the character of the fibre, as well as the bark and the wood.

The steaming process enables the bark to be removed with all the fibre attached, at a much later period when the plant has reached its most perfect vigour, and when it is reasonable to assume that all its component parts are in their best possible condition. In Egypt the stems would then be 8 or 9 feet in length, but they cut them when from 4 to 5 feet long, and the delicate film of bark can then be easily stripped off the stalk by hand, and an hour's exposure to the sun is sufficient to dry it ready for packing. When removed from the half-matured stem, the bark is described as "a thin pellucid ribbon as translucent as green Persian silk when in a moist state." No doubt, in this condition the gum will be much less tenacious than at a later period, and therefore more easily treated, but on the other hand the weight of fibre lost by premature cutting must be very considerable, and the decision as to which of these two systems is the most advantageous will turn upon the relative qualities of the filasse so produced. If there is but trifling difference in the value of the fibres, the balance of advantage must rest with the system that affords the heaviest crop.

On this point I am not in a position to afford a decisive opinion, never having seen any of these delicate Egyptian ribbons, but of the fibre produced from the mature stems by Favier's steaming process, some of the leading flax spinners have spoken in the highest terms, describing the yarns made from it as possessing "quality and strength superior to other China grass yarns from other sources," and again "very superior to that which is obtained by the application of mechanical methods." The testimony is sufficiently conclusive as to the commercial value of the filasse from steamed ribbons, and is satisfactory evidence that the fibre is in no way injured either by the action of steam or by the subsequent chemical treatment by the Fremy-Urbain process. Some notion of the probable crop may be arrived at from an interesting observation of Mr. Minchin's, who selected three one-year old plants, and on the 6th March cut them down close to the ground. On the 6th May following he cut from these three plants 62 stems, weighing in the aggregate 8½lb., and on the 1st July he again cut from the same plants 83 stems weighing 11¼lb.

In April, stems 6 feet long when decorticated, yielded 7½ per cent of their weight in ribbons, but in the rains the green stuff contained more water, and the percentage of ribbons was somewhat less. In Algiers, where the ripe stems only averaged about an ounce and a half in weight, it is stated that an average yield of 10 per cent of ribbons is obtained, whereas in India, owing to the greater vigour of Indian grown Rhea, the stems of which averaged three ounces in weight, the percentage of ribbons to the weight of the bulk may very well be much less, whilst the actual yield of fibre per acre may be as much as, or even more than, in Algeria.

It will be seen that an enormous quantity of green stuff must be cut and handled for every ton of fibre that is produced. One hundred pounds weight of green stems, after the leaves have been removed, will not yield more than 3lb. of fibre, treated by the machine, the average will probably not exceed 2½lb. The same weight of stems, when decorticated by steam, will furnish 7½lb. of dry ribbons. The process of decortication can be carried out on the field by the use of light easily portable steam generators, and this will render the carriage of but seven and a half per cent of the gross weight necessary. Now the machines, I am speaking of Death and Ellwood's patent, require a strong pressure of water, and can only be used where there is an abundant supply of water, and either steam or water-power for driving. They must, therefore, be located where these requisites are available, and the entire weight of green stuff must be carried to the mills. Fancy carrying 35 to 40 tons of stems for any distance to produce a single ton of machined fibre. It is in this direction that the planter must exercise all his ingenuity and close supervision to effect economy in labour and carriage to prevent his profits from being eaten up at the very first stage of treatment.

With these figures before them will be possible for planters to draw up approximate estimates of cost of treatment according to the scales of charges current in their several localities. I will now proceed to furnish some idea of the probable crop to be expected. To obtain a ton of ribbons per acre, assuming the percentage obtained from the bulk to be 7 per cent, it will be necessary to cut 12,000 lb. weight of green stems, and assuming them to average eight stems to the pound, that will be 256,000 stems, so that if five crops are obtained in the year, it will be necessary to get 51,200 stems at each cutting from the acre, or per square yard (4,840 square yards=1 acre), say 10½ stems. To get two tons of ribbons per acre 21 stems must be cut from each square yard. At Glenrock, in many places, over 30 mature stems have been counted to the measured square yard. Two tons of ribbons per acre is not, therefore, an unreasonable estimate of the probable yield of established cultivation in favourable localities. I have already stated that the dry ribbons produced by the Favier system of steam decortication will yield at least 45 per cent of fine filasse when treated by the Fremy-Urbain process. If the yield per acre be two tons of ribbons, the produce in filasse will be 2,016 lb., the present market value of which is stated to be from seven pence to nine pence per lb. according to quality, the gross proceeds of the produce of one acre would therefore be £67-4, from which must be deducted the cost of cultivation, handling, treatment, carriage, drying, packing, freight, chemical treatment, commissions, &c., to ascertain nett results. I cannot, however, as yet say that there is a large present demand for the filasse of Rhea in England, for the simple reason that no considerable quantity has yet been offered in the market, and manufacturers naturally hesitate going to the expense of altering

their machinery to suit the new staple until they are relieved of uncertainty as to supply. The French manufacturers on the other hand will take as much as they can get at about the price I have quoted, and English and Irish manufacturers are ready to follow their example as soon as a definite and regular supply can be depended on. I have been personally assured by some that they are prepared to enter into contracts on a large scale, directly the supply can be guaranteed.

I do not, in the least, fear that Rhea coming to this market a couple of years hence will fail to find ready purchasers, because arrangements have already been made to obtain supplies from China and elsewhere, that will encourage the trade to expect regular shipments, and the present uncertainty will at once disappear, and as every one freely admits the valuable properties of the new staple, it will not be long before Rhea will take an important position amongst textile fabrics of British manufacture.

NOTE ON RAISING RHEA FROM SEED.

By Mr. J. W. Minchin, of Glenrock.

We have been fairly successful with Rhea Seed Nurseries, and have germinated and planted out seedlings from seed received from Paris and London and also two varieties of seed from plants on our own plantations. Generally speaking, the seed and seedlings must be treated in the same way as Cinchona Ledgeriana seed. The great difficulty is to protect the seed, which is exceedingly small, from ants. We tried soaking the seed and watering the seed in phenyle and in kerosine oil water, but found the best course was to sow the seed in boxes or raised beds supported on legs kept constantly tarred. We made long basket beds of bamboo lattice-work, raised about one foot from the ground on forked supports 5 feet apart, with 6 inch sides to hold in the earth; the earth was sifted as is usually done for Ledger nurseries; fresh jungle soil is sufficient: each basket bed was 3 feet wide, and over each bed was erected an ordinary sloping screen thatched sufficiently to keep out rain.

The beds should be made so that the slope of the screen should face south and west, which keeps out the sun for the greater part of the day and evening: before sowing the seed the earth in the basket beds should be well damped through a fine rose watering pot, the seed should be mixed with about 5 times its bulk of ashes, or fine sand, so that it may be sown more evenly; it can be sown rather thickly as the seedlings can be pricked out when about an inch high; after the seed is sown the beds should be gently pressed with a flat board, no earth is required to be sprinkled over them; they should be lightly watered with a fine rose every evening. Care should be taken to keep the supports fresh tarred, and that no grasses or straws hang to the ground by which ants, &c., could reach the seed beds. The seed will begin to germinate in from 6 to 10 days. In from two to three months some of the seedlings will be large enough to prick out, they will be about an inch high above ground, and will have radish-like roots, two to three inches long, they can then be carefully taken up with small bamboo, chop sticks, the seedlings being handled as little as possible, and can be planted out into ordinary nursery beds about 4 inches apart, and should be protected from the sun by bracken fern, stuck into the ground about them; in another three months they will be large enough to plant into the field, and I have found that in 12 months from the time the seed is sown, the plants will produce stems large enough for treatment. The seed should be sown between October and March; during the monsoon the seedlings are very liable to damp from some fungus growth, as in Ledger seedlings, although I have no doubt, with care, they can be grown at any season of the year; but I have not yet succeeded with young seedlings subjected to the early monsoon mists.

SUGAR AND "THE NEW SWEETNESS."

In these dull and prosaic times the following amusing article from the *Weekly Scotsman* will, we are sure, be read with some interest by Colonial sugar planters:—Persons who are so fond of sweet things that they have not the courage to practise the self-denial of the Banting system have good things in store for them. They have found a friend in Orthobenzoyl-sulphonimide, the new discovery of Dr. Constantine Fahlberg. Whether the makers of cane and beet sugars will have as much reason to be glad may be questioned, for in the near future they will probably find their occupation gone. What will become of the West Indies is, of course, a serious matter. The ruin they have suffered by the emancipation of slaves, and the ruin again suffered by the abolition of the "differential duties" about which Tom Dupuy waxes so savage in Mr. Grant Allen's current story, "In All Shades," will both be as child's play to the fate now in store for the cane-sugar growers. Their only consolation will be that the beet-sugar makers will share to some extent, in the same fate: and, of course, if there is one thing that sweetens one's own loss, it is the knowledge that one's rival is being overwhelmed in the same calamity. Dr. Fahlberg's great discovery has recently been brought before our scientific men in detail in Mr. Levenstein's paper before one of the learned societies, and by Sir Henry Roscoe before the Royal Institution, while incidentally it was mentioned by Professor Meldola in describing the progress of the coal-tar colour industry before the Society of Arts three months ago. For it is amongst the busy German workers amongst coal tar products that the great modern discovery is made, so that the country which has flooded us and ruined our native sugar industries with cheap sugar is to be hoist with its own petard, by making a discovery which is not only to spell ruin to Greenock and Bristol, but to render the cultivation of beet as unnecessary and unprofitable as the sugar cane seems likely soon to become.

The story of the progress of the investigation of coal-tar products is the scientific romance of our day. Since the sickly and somewhat fugitive colour, mauve, was discovered by Perkins thirty years ago, investigation has been carried on with indefatigable industry, till at the present moment the most brilliant dyes—scarlets, blues, greens, and yellows—can be drawn from the waste of our gasworks. And now a further stage of discovery has been made in the production of saccharine from the same source. In sweetening power the new product is stated to be 220 to 1 as compared with the best cane sugar. We give the Philistine or popular name to the new product rather than the appalling chemical title already quoted. For it is wise in those learned people to invent a simple as well as a scientific name for their products. It would be rather hard if our helpmeets at home had to ask, "Do you take cream and Orthobenzoyl-sulphonimide in your tea?" This, it is true, is not so formidable as some of the names in the new industry. Thus, Professor Meldola assured his hearers that "it appears flavenol is hydroxyphenyl-lepide," and that when pure orthoamidoacetophenone is treated in a certain way flavaniline is produced in small quantities, and that flavaniline is amicophenyl-lepidine. Truly, small quantities of such articles should only be made when their pronunciation is so difficult, and we may be glad that as sensible a word as "Saccharin" has been adopted for Dr. Fahlberg's popular invention. To an American interviewer the successful chemist has laid bare the entire process of extracting this new sugar, and given illustrations of how it may be used to drive other sugars out of use. It is not actually a sugar

but contains carbon hydrogen, sulphur, oxygen, and nitrogen in certain atomic relations. There are it appears, seven distinct steps in the course of obtaining it from the toluene of coal-tar, and the process is described by Sir Henry Roscoe as a triumph of synthetical chemistry, and perhaps the most remarkable of all the marvellous products of coal tar. Saccharin is not a nutriment or a poison. Where sugar is used as food the new invention cannot take its place ; but for all sweetening or flavouring purposes its use is certain to be great. It is so sweet, we are told, that a tea-spoonful will convert a barrel of water into syrup, while a small portion will convert the bitterest quinine solution into "a regular molasses." It is already being used by makers of biscuits and "wafers" in Germany. It will neither decay, mould, nor ferment, nor will it be attacked by bacteria. In sweetening power it is, as already mentioned, 220 times more powerful than cane sugar, and it is said that for food purposes a small fraction added to beet sugar makes that article equal to cane sugar in strength, as it is already superior in digestibility and wholesomeness. Another blow to the West Indies !

Dr. Fahlberg's story of how he made the discovery is hardly less sensational than the invention itself. The German chemists are constantly experimenting with the coal-tar products. It was stated by Professor Meldola that while in this country an experimental chemist can neither find encouragement nor employment—so much so that a young chemist here who wishes an opportunity goes over to Germany—one German colour work alone has fifty-four chemists at work. Labour of this kind goes on with complete indifference as to immediate "practical" results, and most of the concoctions go down the sink ; but one successful hit may enable the discoverer to throw a new and valuable dye upon the market, and so more than repay all the misses that may be made. Dr. Fahlberg was in his laboratory one evening, so much interested in some experiments that he forgot all about supper, till very late he rushed to his meal, without, as usual, washing his hands. Breaking a piece of bread and putting it to his lips, it tasted "inexpressibly sweet." Rinsing his mouth with water and drying it, the napkin with which he wiped his lips tasted sweeter still. Raising the glass of water to his lips, his mouth came where his fingers had previously touched it, and the water seemed like syrup. Then the truth began to dawn. He applied his thumb to his tongue, only to find it exceeding in sweetness any confectionery he had ever tasted ! The secret was out—he had discovered some coal-tar product which "out-sugared sugar." A rush back to the laboratory, a taste of every dish he had been working with, and some weeks of careful study and experiment with the stuff he found in one vessel, sufficed to trace out and fix the elements of this remarkable invention. Dr. Fahlberg says that when he first announced his discovery people treated it as a scientific jest, and he was laughed at in the press at home and abroad. But now the laugh is on the other side, and large works to produce Saccharine are already started in Germany. The price at present is from 40s to 48s per lb., but Dr. Fahlberg hopes to reduce this considerably soon. But even that is not dear for 220 lb. weight of sugar. And then the delight of having everything as sweet as you like, without the danger of growing fat !—*European Mail.*

[The discovery, we need hardly say, is not new. Dr. Fahlberg found it out in 1879, and it has been frequently referred to in these columns. Even the *Weekly Scotsman* admits that when sugar is used as food the new invention cannot take its place, and it is very questionable, owing to its enormous cost, whether "Saccharin" will ever be largely used for sweetening or flavouring purposes, even though its sweetening power may be 220 times that of cane sugar. As yet it is not certain whether its consumption would prove injurious or not, because although it and many other hydrocarbons do not act as poison, a long course of true hydrocarbons have an effect, more especially upon the liver. Experiments are still being made with this product from coal-tar, but even its discoverer, Dr. Fahlberg, hesitates to recommend its use at present.—Ed. *E. M.*]

CEYLON MINERAL EXHIBITS AT THE LONDON EXHIBITION.

The mineral resources of Ceylon comprise gold in small quantities, platinum, silver, tin, mercury, iron, and lead, graphite in large quantities, but no coal. The minerals exhibited are graphite, ironstone, talc, and building stones, with a very fine display of Gems, for which Ceylon has always been famous. The precious stones exhibited are, omitting the diamond from consideration, the finest display of the kind in the Exhibition.

The graphite of Ceylon is too well known to need any commendation. It is chiefly met with in the north-western and western provinces, and is an important article of export, the total quantity which left the island in 1883 amounting to 279,057 cwt. "The yearly value of the graphite exports now varies from one and a-half to two and a-half millions of rupees. . . . the finest bright silvery lumps ranging between 100 and 135 rupees per ton, and the lowest quality, in the form of dust, commanding a price of from 30 to 45 rupees per ton." Both the mining and trade are in the hands of the Sinhalese, and the mines vary in depth from 100 to 450 ft. The graphite exhibited appears to come from the Dematagolla mines at Kurunegala, the most important in Ceylon. Mr. de Mel's mine at this locality and from which samples are exhibited, has been carried to a depth of 450 ft., and yielding, according to Mr. A. M. Ferguson, at the rate of 800 tons per annum for 11 years. The graphite exists here generally in horizontal veins, "associated with beautiful snow-white transparent crystaline to semi-opaque quartz, the latter occasionally showing specks of garnet and bands of soapstone." A number of these small quartz crystals are exhibited by Mr. de Mel in illustration of this. Graphite is said generally to occur in Ceylon in "quartz gneiss'," embedded or diffused, but usually in long thin horizontal veins, the quality of the mineral always improving with depth. The term mine is hardly applicable to these openings, as they are in reality mere excavations or deep holes.

Some fine blocks of graphite of great purity are on view, the only associated minerals being little iron pyrites, and the before mentioned quartz. One block, forwarded by Mr. A. T. Fernando, weighs 3 cwt., 3 qr. 24 lb., another by Mr. W. A. Fernando, 3½ cwt., and a still larger of 4 cwt. by Mr. W. Gunasekara. Mr. Ferguson states that a block of Mr. de Mel's was exhibited in the Philadelphia Exhibitions only 14 lb. short of 6 cwt. probably the "largest mass of plumbago ever shown." Some of these masses present a coarsely laminar structure, the portions between the laminae having a prismatic appearance. There are also on a view number of trade samples, known as "ordinary." "chips," and "dust," but from a mineralogical point of view the silvery graphite in flakes, shown by Fernando & Co., is most interesting, each flake being in fact an hexagonal plate. A fibrous variety is also exhibited by the same exhibitor having much the appearance of radiating stibnite crystals. About one-third of the Ceylon graphite is used in the manufacture of crucibles, and the process is illustrated by Messrs. Morgan Brothers, of Battersea, who exhibit specimens showing the various stages in the manufacture. Several works of art demonstrating the adaptability of this mineral for ornamental carving and

turning are also on view—a carved elephant, an elephant hunting scene in a jungle by Morgan Brothers—a cashew tree with crows, a crab and lobster, by Mr. A. T. Fernando, a Buddhist Dagoba, by W. A. Fernando, and other articles including models of the sifter and tools employed in preparing the graphite after extraction. Nearly one-half the entire quantity produced in Ceylon is exported to the United States, the other moiety is distributed between this country, the Continent, and India.

The ironstone found largely in the southern provinces is of excellent quality. A true bog iron ore is exhibited from Kumilamzunai, in the Mullaitivoe district, by the Government of Ceylon. It is found as large boulders and gravel, and was formerly smelted by the Sinhalese and used for tools, weapons, and other articles. Although of a rude character, these have been found to possess a fine temper, and to be not inferior to those made of the finest Swedish metal. Talc has been found in the province of Uva, and specimen are on view. A few building stones are exhibited by the Government, including pedestals of a massive gneiss, both polished and unpolished from Mahara, Western Province, showing but little evidence of foliation. Gneiss appears to be the chief geological feature of the island, and is overlaid by a dolomitic limestone, hand specimens of which are also on view. A pedestal of a highly crystaline limestone from the Dolosbage district, and a coarse, gritty sandstone from the sea coast, in the neighbourhood of Colombo, are prominent stones in this collection. And this very interesting sandstone is also to be seen slashed with dark curving lines of foreign minerals, which seem to be small octohedral magnetite, and garnets in small grains. We again meet with laterite, or, as it is called in Ceylon, cabook, in masses of suitable size for building purposes. Some interesting blocks of coral-rock are also exhibited from the Peninsula of Jaffna, Northern Province, where it forms the principal rock of the country. Finally, Mr. A. M. Ferguson has a good red granite from Veyangoda, Western Province.

Ceylon produces almost every variety of gem commercially valuable, with the exception of the diamond; but the principal are rubies, the sapphire, cat's-eye, and the moonstone. The gems are chiefly obtained from the alluvial plains at the foot of the Saffragam Hills not, however, in the recent alluvium, but in an older and similar stratum, known as *nellan* usually at a depth of 10 ft. to 20 ft. from the surface. It is separated from the overlying recent alluvium by a hard crust called *Radua*, a few inches in thickness. The gem drift is composed of waterworn pebbles and blocks of granite embedded in clay. In 1884, 500 of these gem diggings existed. The chief producing district of sapphires and rubies is within a small radius around the town of Ratnapura (City of Gems), in the Western Province, and near Rakwana.

The Ceylon Government have been much assisted in their exhibit of the gems of the island, by the loan of some exceedingly fine examples and suites of stones by the following gentlemen, Messrs. C. H. de Soysa, J. P.; R. C. Nockold, E. W. Streeter, Hunt and Roskell; W. J. Tripp; O. L. M. Macan Marikar; A. L. Meera Ismail Lebbe; A. L. M. Mohamadu; Captain F. Bayley; and A. de Beer. The Sapphires of Ceylon are very variable in colour, which is by no means confined to shades of blue as is very generally supposed, but embraces all colours and their shades, until they approach that of the rose-red, when they are included under the ruby. The blue stones range from a pale azure blue, through deepening tints to inky black, when it is useless as a gem-stone, the most valuable of those tints being the velvety blue found in the district of Rakwana. Some very fine examples of these are shewn, also a very large suite illustrating their range of other colours besides blue. These form a large part of the contents of two cases lent by R. C. Nockold, each of which contains 221 facetted stones of high quality and beauty. Noteworthy also are the sapphire and ruby star stones, the characteristic feature of which however, is only well seen under direct instead of diffused light, as daylight. Like the other varieties of corundum, the star stone or "Asteria" varies much in colour, but is usually of shades of sapphire blue or of ruby red. These stones are almost most peculiar to Ceylon.

The Ceylon Ruby is usually of a rich rose, varying in intensity, and differs in this respect from the Burmah ruby, which is mostly of a pigeon-blood colour; it also differs in its brilliancy, and "has considerably more light and life." A peculiar kind of chatoyance or as some may express it, a "silkiness" is characteristic of most of the rubies of Ceylon. Of this stone a remarkably fine example is shown by Mr. de Soysa, valued at £450. With this may be coupled a fine exhibit of 49 unusually fine examples of this rare gem which are designated as "specimen rubies."

Some really magnificent examples of the true "cat's eye" which is a stone also peculiar to Ceylon are exhibited. One of those belongs to a "Moorman," and is valued by him at £3,000. This mineral is a chatoyant variety of the species chrysoberyl. The finest are found in the gem pits of Morowa Korle. Like the star stone these chatoyant stones require the aid of direct, instead of diffused light, to develope the characteristic band to which they owe their name.

Another variety of chrysoberyl is the "Alexandrite," which was first found in the emerald mines of Ekaterinburg, Government of Perm, Russia, where it occurred frequently in large twined crystals of the same type as those of the chrysoberyl of Brazil and Ceylon, but, rarely of sufficient transparency to admit being facetted as a gem. Its colour in daylight varies from that of a dark emerald-green to a smoky or sometimes bottle-green, but it possesses the peculiarity of exhibiting a raspberry to a columbine-red colour when exposed to artificial light. A stone weighing about 23 carats is one of (if not the most) beautiful example of this peculiar mineral we have yet had the pleasure of examining. Quite new to us is a single example of a chatoyant variety of this stone, designated as an "Alexandrite Cat's-Eye."

The moonstone, hitherto in our opinion a much neglected stone, is, we learn, meeting with a greater amount of favour. Numerous examples illustrating its adaptability for ornaments of personal decoration in the way of brooches, necklaces, scarfpins, &c., are shown. This variety of felspar is found in considerable quantities of varying quality in a pegmatite rock. The other gems shown are the varieties of zircon, (the jargoon and hyacinth or jacynth), the lustre of which approaches nearer to that of the diamond than any other known mineral; cinnamon stone, a variety of garnet often sold as jacynth, which, however, is an exceedingly rare mineral. Most of the above minerals are also represented in their natural state as found, both those fit and unfit for facetting purposes. Finally, a large crystal of quartz is shown enclosing numerous cavities (some of considerable dimensions), each of which contains a fluid and a moveable bubble, which recalls to mind the equally interesting example from Brazil preserved in the National Collection of Minerals in the Natural History Museum.—*Mining Journal.*

At the British Pharmaceutical Conference an interesting paper on the Correlation of Study in Botany and Materia Medica was admirably read by the author, Professor Hillhouse, of the Mason College. The arguments set forth were based in a great measure on the requirements of the medical student, but Professor Hillhouse struck a chord of sympathy with a section of his audience in declaring that pharmacy is a part of the medical profession. The paper was intended as the basis of an arrangement for future consideration, and the subjects advanced were (1) a thorough training in pharmacognosy, pharmacogenesis, pharmacy, posology, and therapeutics; and (2) a comprehensive course of histological work. The author regretted the abolition of botanical studies by some medical qualifying bodies, and this was taken as the key-note by some of the speakers who followed. Dr. Trimen—the well-known botanist—could not agree

with Mr. Hillhouse regarding medical botanical studies, and gave a forcible illustration of the inefficient manner in which botany was taught in London twenty years ago. It was pointed out in the course of the discussion that bad results hitherto were due to the want of systematic and practical teaching, pharmacy apparently being as bad in this respect as medicine. From what the chairman said, however, it appears that we shall by-and-by get all that is required in the research laboratory of the Pharmaceutical Society. —*Chemist and Druggist.*

The Falkland Isles.—There is certainly a remarkable contrast between this place and Seychelles in the way of vegetation. There the most redundant tropical growth, here all as bare as your hand. It is about this very bareness that I am going to trouble you. I am very anxious to try and grow some hardy bushes and shrubs here; and in sheltered spots they will grow I know, to a certain height, though I doubt if one could expect anything about 12 or 15 feet at most. Still this would be something better than "diddle dee" and Balsam Bog. Could you advice me what to try, and perhaps send me a few seeds or roots, with directions as to the best way of managing them. I have a good gardener here who was at Paul's Nursery Gardens, and will take pains with plants. The soil, as of course you know, is chiefly peat, and the winds are high and cold. The latter, I suppose, would always prevent trees of any size growing. But it is wonderful what can be done here in sheltered spots, and the flowers do capitally. I have never seen such Pansies, Pinks, Picotees, &c. as are grown here. Fruit seems to degenerate—Strawberries, Raspberries, and Currants, all get small by degrees and beautifully less, year by year. So far as I have yet seen, the climate has been too much abused, chiefly by people who, like Sir Wyville Thompson, happened to come here during bad weather. It is now over three months since my arrival, and I find from my journal that more than half the days have been fine and calm, and when it is fine it is lovely—like spring weather at home. To be sure it does blow "whiles," and snow, too; and, unluckily, visitors generlly arrive when it is doing one or the other, or both, and at its best it looks a little bare and dreary, but would be vastly improved if a few nice evergreen bushes and shrubs could be induced to grow here and there in sheltered places. About the town I do not see why Laurels, Hollies, &c., should not do, but I should be very glad of your advice and assistance to think of me.—Extract from letter from Hon. A. C. Barkley, late Commissioner at the Seychelles, now Acting Governor of the Falkland Islands, to Mr. W. T. Thiselton Dyer, F.R.S., C.M.G., Director, Royal Gardens, Kew.—*Gardeners' Chronicle.*

Effects of White Ants on Soil.—The opinion has been held and expressed that the white ants use the best particles of the soil in forming their pyramidal nests. A writer on a sál forest in the *Indian Forester* is of a very different opinion, thus expressed:—But if, in the Bhinga forest, fires have devoured the mould desiccated by exposure, and the free inlet of sun and air has made further accumulations of it impossible, if the hitherto highly impregnated soil has been bereft of all its remaining riches in the ordinary course of vegetable life, a most formidable agency of ruin and destruction remains to be described. I refer to the ever-busy colonies of white-ants, whose numerous hillocks—sometimes as many as fifteen to the acre—constitute one of the most conspicuous features of the Bhinga forest. Neglecting the almost certain fact that the termites consume a considerable quantity of the forming vegetable mould, these only too industrious insects are mischievous in quite another direction, and on a much more serious scale. Each one of these tiny Neuroptea is but a living pump, and by the united force of their myriad numbers, an immense quantity of unkindly subsoil is annually brought to the surface, to be there spread out, wherever the protection of the neighbouring trees is deficient, into even sheets of a plastic and impenetrable cement—a soil so inhospitable that, until much diffused in the progress of years, even the lowliest herbs cannot grow upon it. An observing visitor to the Bhinga forest will not fail to notice the many blanks, from a few hundred square feet to acres in extent, which characterize it. These void spaces bear many points of close resemblance to one another in the generally barren nature of the soil, its white coloration, and the numerous evidences of extinct and living ant-life—evidences that range from the not wholly demolished hillock to the white circular deposit of unusually cement-like earth. Before walking very far inside the Bhinga reserve, the observing stranger will descry this process of soil deterioration going on in all its different stages, from the truncated cone just attacked by the advancing monsoons to the three or four mounds littering with their detritus half an acre of ground. Wherever we proceed, we notice, at short intervals, either towering ant-hills, or the evidences of their past existence, and it is impossible for us to neglect the immense importance of the part played by termites in forest economy."

The Value of Fruit as a diet has often been insisted upon; but there seems to be a sort of prejudice to the use of fruit on a large scale, which may doubtless be traced to an ignorance of the laws of hygiene. The following remarks, which we extract from the *Journal of Health* will, we think, be read with interest. In a hot, enervating climate like that of India, fruit should form a very large proportion of our daily food:—

Of all the fruits with which we are blessed, the peach is the most delicious and digestible. There is nothing more palatable, wholesome, and medicinal than good ripe peaches. It is a mistaken idea that no fruit should be eaten at breakfast. It would be far better if our people would eat less bacon and grease at breakfast, and more fruits. In the morning there is an acrid state of the secretions, and nothing is so well calculated to correct this as cooling, sub-acid fruit, such as peaches, apples, etc. The apple is one of the best of fruits. Baked or stewed apples will generally agree with the most delicate stomach, and are an excellent medicine in many cases. Green or half-ripe apples stewed and sweetened are pleasant to the taste, cooling, nourishing, laxative, far superior, in many cases, to the abominable doses of salts and oil usually given in fever and other diseases. Raw apples stewed are better for constipation than some pills. Oranges are very acceptable to most stomachs, having all the advantages of the acid alluded to, but the orange juice alone should be taken, rejecting the pulp. The same may be said of lemons, pomegranates and all that class. Lemonade is the best drink in fevers, and when thickened with sugar it is better than syrup of squills and nauseants in many cases of cough. Tomatoes act on the liver and bowels, and are much more pleasant and safe than blue mass. The juice should be used alone, rejecting the skins. The small seeded fruits, such as black-berries, figs, currants and strawberries, may be classed among the best foods and medicines. The sugar in them is nutritious, the acid is cooling and purifying and the seeds are laxative. We would be much the gainers if we would look more to our orchards and gardens for our medicines and less to drug stores. To cure fever or act on the kidneys, no febrifuge or diuretic is superior to water-melon, which may, with very few exceptions, be taken in sickness and in health in almost unlimited quantities, with positive benefit. But in using them, juice should be taken, excluding the pulp, and then the melon should be fresh and ripe. It is true that we cannot procure apples in sufficient quantities, or at rates low enough to suit the pockets of the masses, but peaches, water-melons, oranges and figs are common enough, should be largely used. We have other fruits, such as plantains, mangoes, plums, papyas and pine-apples, custard apples, &c., which are are all good wholesome fruit, which ought to figure conspicuously on our tables. The tomato can be had nearly all the year round, and limes or lemons are plentiful in all seasons.—*Indian Agriculturist.*

MR. LESTER ARNOLD'S BOOK ON COFFEE-PLANTING.

Review of Coffee: its Cultivation and Profit, by E. Lester Arnold.*

Only twenty years ago, and coffee-planting was the best investment in Ceylon, the one grand product of the island; beside which, all its other exports were separately insignificant trifles; but the destroying demon came and marched in triumph through the land, leaving his mark everywhere, gradually feeding on the life blood of the plant, and extinguishing the hopes of the planter. The invisible germs of the destroyer floated in the air and attached themselves to every object, and were thus borne to other lands; it spread to the coffee regions of India, to Java, to the Straits Settlements, carrying ruin in its train, and it seems to be a work of time merely, for the same fungus to extinguish this industry, all over the world. We have no authentic information that this enemy has yet reached the coffee regions of the West, but we have clear proof now that coffee is nowhere a permanent industry. Within living memory, coffee was profitably grown on the sea shore in Brazil; it has now receded far into the interior, and still marches westward, leaving (so far as coffee is concerned) a barren exhausted soil behind. We were told long ago, that the Brazil system was unsound and must collapse; but since that theory was first broached, Brazil has doubled its exports and goes on increasing them, till the markets of the world are swamped and the profits of that industry, reduced to the vanishing point wherever it is grown, independent of the ravages of *Hemileia Vastatrix*. How long it may take Brazil to exhaust her resources, we have no means of estimating, but they are not inexhaustible and her onward career, may be checked by social or financial collapse, long before she has got to the end of her vast forests; in the meantime, we cannot credit with very deep wisdom the man, who goes into coffee planting in any part of the world, with perhaps one exception; the Blue Mountain coffee of Jamaica has never been affected by the fluctuations of the market, and probably never will, unless its production is increased beyond the wants of its own special market.

It is at such a time, and under such circumstances, that Mr. E. L. Arnold, an Indian planter, has given himself the tronble of writing a book on coffee. If the object of this work was to instruct those already engaged in administering diminishing crops in a falling market, he will probably be told to instruct a venerable ancestress, in the art of extracting food by means of suction. If on the other hand, the object is to draw fresh capital into the enterprise, there may be some chance of success. There are always plenty of English people ready to open their purses, for the support of any scheme that is plausibly invested with the promise of profit, but writing a book of technical instructions, is not the best way of reaching them.

Planters first and last, have learned very little from books: the new 'chum' who comes among them has only to open his eyes and his ears when he meets his neighbours, they talk little else than 'shop' and he sees around him daily the outcome of the accumulated experience of a long series of years; so that he has little need to turn to books on coffee for professional knowledge. There is only one possible case in which such books are useful, that is when new hands begin to plant in new countries, but such a case is not likely to occur in this century. The early Ceylon planters owed much to the old French refugee, Laborie, and all the books that have been since written, add little to the information, given by him.

As to the merits of Mr. Arnold's book, there is little to say. It gives a fair view of the life and work of a planter. His estimates are rather slovenly in details; and larger in the gross, than the Ceylon rate for the same works. One great slip is cutting pegs, lining, making holes two feet by eighteen inches, and filling them up with fresh surface soil for R25·80 per acre, and then charging R27 for removing the plants from the nursery to the field, setting them in the spots prepared for them and filling in any vacancies that may occur during the season.

A maiden crop of 4 cwt. per acre is more than the average Ceylon yield in our best days, and 70s is certainly above the average of present prices and no allowance is made for curing, packing, shipping, insurance, freight, and London charges; if the difference between ten rupees and twenty shillings was meant to cover those charges, it might have been so stated. With no guide but Mr. Arnold's figures, the investing capitalist can arrive at no other result than an excess of receipts over expenditure at the end of the fifth year of not less than R30,000 and the promise of R30,000 per annum for a long series of years. If something like this is the general experience of Indian coffee planters, nothing more can be said, but the capitalist who has learned what the coffee fungus has done in Ceylon and that it has a hold in India, will shake his head and button up his pocket.

* Published by Whittingham & Co., London.

CEYLON UPCOUNTRY PLANTING REPORT.

Dumbara with enough rain—Fine crops of cacao in prospect—Mangoes and cardamoms—Tea-sifter and tea-roller—Mother Seigel's syrup.

11th Oct. 1886.

This fine planting season still continues, and the south-west seems to be as boisterous as if it were but beginning to blow. That we have had more than enough of rain was manifested by the remark of a Dumbara man the other day, who said that they really were not wanting any more there! Fancy Dumbara in a state of saturation and the inhabitants thereof, calling out 'enough'! What fine crops of cacao may not be expected; in all likelihood, the best they ever have had if the present promise holds. But what suits one product does not suit another, and the tobacco enterprise of that rich valley has, I understand, not been quite such a mine, as it might otherwise have been had the usual weather obtained. Another season, let us hope may make up for this.

I suppose it is one effect of the abnormal weather that our mango trees are full of blossom which may mean another crop, whereas we usually have only one. In the old days a fine mango blossom was a pretty sure token that there was going to be a good coffee one: but then the mango flowered in the early months of the year, and to see it in bloom in October was not looked for. In a quiet way, there is going on at present a good deal of Cardamom planting, and those who are doing this are hopeful of reaping the reward of their faith in having a firm market to send to with good prices, when the time of harvest

comes. Most of the cardamoms now in fruit will be past by the time the bulbs now being put out are matured, and as there are not very many extending the cultivation of this product, there would seem to be ahead a good time for the knowing ones.

Messrs. Baillie and Thomson's patent Tea Sifter has been improved lately. The old style of wood in frame has given place to a wrought iron tubular end, which makes the machine look much smarter. With this improvement, the price has also advanced somewhat, whereas tea machinery in Ceylon might well afford to have a turn the other way.

Messrs. Law & Davidson's "Simplex Tea Roller" is quietly making a name for itself, and is said to do very good work. It takes 100 lb. of leaf at a fill and finishes this off in 30 or 40 minutes with six coolies.

One who has had practical experience of almost every hand-roller in the field, has now no hesitation in giving the palm to the "Simplex." He maintains that it is strongly and solidly built, is the lowest priced, has a better twisted leaf, gives a larger proportion of fine tea, than can be turned out by any other hand-machine. He further asserts that every leaf is thoroughly rolled. That is high praise, and if the "Simplex" comes up to it, it will be another example of the capability of Ceylon men to invent and manufacture their own machines. Certainly such a testimonial should fully satisfy the inventors, although in these days it is sometimes difficult to do this. Of course, in regard to the merits of tea-rollers, there will always be a variety of opinions, and as almost every other man you meet now is an authority on tea, there will be for every machine that does any kind of fair work, a number willing enough to supply the manufacturer with a sample of this literary composition, so treated or otherwise. Coffee, what at least of it is left, is beginning to ripen up, but the picking is a farce after all; you don't know very well how to do it, so as to secure the miserable harvest, at anything like a modest cost. If you try four coolies in the line, the tale at the close of the day is so poor as to make you regret the more: whereas by the picking, you may secure half or two-thirds of what is really there, and the rest drops. And then to read of the excitement and speculation in the American coffee market, and the brilliant prospects which lie before the cultivation of that fragrant bean, and to feel that we are all out of it or nearly so! It is rather tantalizing that this turn comes just as we are unable to avail ourselves of it. Had it been earlier, it would have suited Ceylon much better. I suppose it is because that we are now recognized all over the world as a sorely tried and suffering people that the proprietor of "Mother Siegel's Syrup" has of late inundated the island with an almanack, altogether given over to the extolation of this quack medicine. It is difficult, however, to understand why the Post Office officials should be mixed up with it—for the copy of the almanack which lies before me is from one of the outstation offices, and the name of the postmaster is printed thereon. It has a gay cover, and the outside is the best of it. One who was disappointed in love, and took to the "Syrup," says that its effects were wonderful. He at once recovered his spirits, was able to sleep, and ceased grinding his teeth. He hints that the official connection with the "Syrup" includes many in high places, that the Acting Postmaster-General is always at his worst when his supply is exhausted: that Mr. MacBride goes in for heroic doses, whenever Mr. Campbell writes a letter about the state of the roads; and that even His Excellency has of late been rather an extensive buyer, and as he has not been known to offer it to any one, it is conjectured that he uses it all himself. But in Ceylon, it is very hard to know what to believe, and this "gup" from the disappointed lover may be, after all, not a whit more reliable than much which we have formerly rejected.

PEPPERCORN.

HOOPER AND HOWARD ON CINCHONA BARK.

We copy from the *Pharmaceutical Journal* abstracts of papers read before the Pharmaceutical Congress. As regards Mr. David Howard's opinion regarding hybridization in Ceylon, it seems a pity he did not explain how hybridization can be prevented where different species are cultivated within reach of winds and insects:—

"Mr. David Hooper communicated some of the results obtained in the course of his quinological work in the Madras cinchona plantations. Shaving cinchona trees as a method of harvesting bark is now very general, but the question as to the limit to the constant and successful shaving of the tree is not yet fully understood. It has been found that when operating on trees of six years old the increase in the amount of quinine during the first and second renewal at intervals of twelve months was most satisfactory, but the increase was not so marked in the third year renewal, although the conclusion arrived at is that renewal by shaving might be permitted for at least four years. The beneficial effect of renewal by shaving was very marked in the case of a six-year old succirubra, which yielded twice as much quinine sulphate as from a natural succirubra of twice that age; but the operation was not satisfactory in its results when applied to trees of sixteen to twenty-one years, as such old trees will not bear the shaving treatment. The application of cattle manure to cinchonas seems, from the results of three sets of experiments on succirubra and magnifolia trees, to have the effect of increasing the amount of total alkaloids, and in two instances the amount of quinine, by 52 per cent. and 20 per cent. respectively; but the usefulness of the application of manure was not so marked in old trees, and it is believed that the effect of manuring would be more apparent in Crown and Ledger barks. It is also stated that the maximum yield of quinine in Ledger and succirubra barks seems to be attained when the trees are between the age of five and six years, as after that time there is no sensible increase in the amount of quinine. Another point ascertained was that bark which had been kept for ten months in a damp room, and had become mouldy in consequence, had not deteriorated as regards the amount and quality of the alkaloids."

Cinchona Cultivation in South America was the title of a paper by Mr. David Howard, who believes that it is to other countries than Ceylon, which occupies at present the most prominent position of all the countries where cinchonas have been cultivated, that we must look for the solution of the scientific points involved in the cultivation of cinchonas, owing to the little care that has been taken in Ceylon to avoid the danger of hybridization. Unfortunately, very little scientific information can be obtained from South America, the natural home of the cinchonas except what little can be derived from the study of the cultivated bark which reaches us from that country. Among the cinchonas under cultivation in South America are two new species, *C. Thomsoniana*, named after Mr. Thompson, who discovered it in the Central Cordilleras, the home of the well-known *C. lancifolia*, and another discovered by Señor Pombo in Ecuador. *C. Thomsoniana* gave on ana-

lysis of the bark of a two-year old tree 3·3 per cent quinine sulphate, trace of cinchonidine, and 0·55 per cent cinchonine. The bark from the other species of the same age gave 5·7 per cent quinine sulphate, 0·43 per cent cinchonidine, with no cinchonine or quinidine. The improvement brought about by the successful cultivation of the cinchonas is further shown by the results obtained from the same plantations in 1872 and 1881 of several kinds of cinchonas grown in Jamaica, and these results were even more favourable in the cultivation in Columbia of descendants from the Jamaica plantations. In the case of a succirubra cultivation in Columbia from a Jamaica plant the bark yielded as much as 7·0 per cent quinine sulphate, with only 1·9 per cent cinchonidine, and 0·67 per cent cinchonine and Mr. Howard remarks that this succirubra is one of the finest he has tested. In Mr. Howard's opinion it cannot be too clearly borne in mind that the prospect of future profits in the cultivation of cinchonas depends entirely on the cultivation of high testing bark, for in the face of the importation of such highly valuable cultivated bark from Bolivia, as well as from Java, the profitable growing of inferior bark is impossible.

THE KALUTARA TEA DISTRICT.

(From a Resident Planter.)

THE RUSH INTO AND COLLAPSE OF LIBERIAN COFFEE —THE SUCCESS OF TEA, YIELDING UP TO 1,000LB. PER ACRE—CHEAP SINHALESE LABOUR FOR TEA-PLUCKING—THE TEA DISTRICT PROPER NEARLY ROADLESS—THE TRAFFIC LOST BY THE RAILWAY—THE NEED FOR A VISIT FROM THE GOVERNOR.

A very few years ago it was doubted if tea would grow in this District, at all; and experiments on—— were tried, partly alone, and partly intermixed with coffee. I only know what crops two fields of this have given, but it all looks very fine indeed. The field you saw on——is giving 800 lb. per acre *this* season; and during the last 9 months the field you saw on—— has given 924 lb. of made tea per acre, with 3 months to run yet, during which time it will be pruned. I estimated some time ago that at least R800,000 had been invested in the District, mostly spent in Liberian Coffee cultivation, which has turned out a snare and a delusion, and of which there are only a few acres left now.

Perhaps never in the history of the Island, has so much capital been put into an industry, which, practically *before it gave any returns*, collapsed; and the perseverance of the planters under the heart-breaking circumstances, is beyond all praise. As much as R70 per acre was paid for some of the land, and most of it was planted with plants costing from 50 cents to 12½ cents each! so you can easily imagine what some of the capital accounts must have stood at, to start with. Then came the fact that it took 4 bushels of cherry to make 1 bushel of parchment, and when it became known that instead of being worth 50 per cent more than ordinary coffee in New York, it was worth much less the last straw was piled on "that broke the camel's back," or rather that decided the fate of Liberian coffee, and in the last 3 years a wonderful change has taken place in the District, as practically all the coffee has been replaced by tea, which is coming on remarkably well.

With Liberian coffee, everything was an experiment and the calculations of profits were built upon fables wafted over the sea, and pamphlets published by the sellers of seed; while the few trees in Ceylon at the time only served to confirm the exaggerated reports of its bearing capabilities, as they bore enormous crops simply, I suppose, through over-manuring. I know of one instance where eight experimental trees gave at least at the rate of 50 cwt. per acre; *one individual tree giving 2 bushels parchment in one year!* while the adjoining field never gave over 5 cwt. per acre, and this was very good for Liberian coffee. With tea, on the contrary the planting generally was gone about in a far more systematic manner,' and with previous experience before them in the fields first planted, and in estates in other districts, there have ensued the happiest results and I venture to assert that there has not been a single (or married either for that part) visitor to this district, who has not been surprised at the state of the tea industry and the wonderful growth of the plant in the district.

Tea planted in abandoned citronella land and in its 8th year giving over 1000 lb. per acre augurs well for the future of the district. The price that tea can be produced for in this district is another point, with scarcity of Tamil labour and reduced prices both looming ahead of us, this is an important factor, and we have cheap work in the shape of indigenous population, who will work more cheaply and quite as well as Tamils.

"I pick leaf regularly at 2½ cents per lb.,' said a superintendent to me lately, "I have a gang of 60 women (Sinhalese) always employed." If prices fall, and as the women get better up to the work, I have no doubt that leaf will be plucked all over the district at 2 cents per lb.; and even supposing half the plucking only is done in 1888 by Sinhalese, it will mean an income of about R50,000 (fifty thousand rupees) for this work *alone* to the local Sinhalese population.

It is clearly in the interest of Government to encourage planting in Kalutara as much as they can, for the very reason that it is employing a large population of hitherto idle people (in many cases idle, because except at seed time and harvest time, there was no work) and there is still an ample number of labourers of this description in this population of 270,000, many of them being on the verge of starvation before the approach of harvest.

The question of the value of low-grown tea at first caused some anxiety to the owners of tea gardens in the district, but the fallacy of the theory that low-grown tea means poor prices has long ago been proved; and in the last week's Sale List five Kalutara estates had tea sold; three of them realizing between 1/3 and 1/3½ sterling and two between 1/1 and 1/2d sterling, averages that will compare favorably with those of any district in the island.

The next question to be faced is how to get the crops despatched and food imported for the labourers. By their present policy Government are driving the traffic from the railway to the river and canal to Colombo.

Fancy what would be the action of a private Company if it owned 30,000 acres of available tea land, within 16 miles of a railway, and wheer useful cart roads could be cut for R3,000 per mile. Certainly not to refuse to cut absolutely necessary feeding roads, to its own direct loss.

In the year 1888 there will be made in Kalutara, tea	800,000 lb.
Say packages, tea-lead and up and down	300,000 ,,
Rice, (say 1 bushel per month per acre)	2,600,000 ,,
Sundries	780,000 ,,
	4,480,000 lb.

or 2,000 tons of traffic, and not a road through the district to take it to the railway, although this could be made for R30,000 at the outside.

Tea is an article which should be possible to dispatch direct to its destination without the delays

and damping it gets in river transport, and the only principal road to Kalutara now is flooded repeatedly during the year, and stops short seven miles from the railway. At this point a large cart bridge was put up some years ago at considerable expense (*and the road not continued a foot beyond it* ! !), so that carts come to the bridge and turn without crossing it, there being no road.

PLANTING IN NETHERLANDS INDIA.

(*From the Straits Times.*)

We understand that Mr. Teves, one of our townsmen, along with an experienced Deli planter, and on account of an enterprising tobacco grower in Mid Java, will proceed to British North Borneo to ascertain how matters stand there, and how far that article can be successfully cultivated there for the European market by the methods pursued on the East Coast of Sumatra. It is deplorable that enterprising Hollanders must look to British colonies for advancement in the cultivation line, notwithstanding the circumstance of Holland having magnificent colonial possessions. The British seem to have the knack of better knowing how to encourage private enterprise and backing it up than our Government. We look forwards with interest to further particulars of this undertaking owing to so little being known as yet of British North Borneo. *Samarang Locomotief.*

At Buleling in Bali so says a Surabaya newspaper, the tobacco hitherto grown was used only for native consumption. The quality, however, has proved so excellent and the leaf so choice that the article has some chance of being grown at a profit also for the European market. Bali may hence at some time become a rival to Deli. Experiments in this direction have not yet been made but no doubt will soon be, judging from appearances.

Dr. Bonavia, in a letter to the *Gardeners' Chronicle* (July 31, p. 147), gives a glowing account of the beauty of the *Cassia fistula* tree, or "amiltas," as he calls it. When in bloom he considers it to be one of the sights of the Indian flora. An avenue of the trees in bloom would, he says, be worth a trip from any part of the world to see. When in full flower it is a perfect cascade of canary-yellow spray. He remarks that there are two varieties, one with bright green leaves throughout, which has flowers of a pale yellow, and the other with fine maroon-bronze leaves when young, but turning green later on, and bright canary-yellow flowers.—*Pharmaceutical Journal.*

Experimental Tobacco Culture.—On some ground rented by Messrs. Carter & Co., at Plaistow in Kent, a number of varities of the Tobacco plant are now undergoing a course of trial, so as to ascertain the varities best sulted to our climate. The ground is so far suited to the growth of the plant it being well sheltered, but although its area does not exceed three-quarters of an acre, there appears to be considerable diversity in its fertility, as is shown by the varying heights and strength of the plants; and the lowest part of the ground is liable to be flooded by water from a neighbouring ditch. These drawbacks could be avoided by deep digging after an even distribution of homogeneous well-rotted manure, and by other obvious changes. The sorts grown are Havana, Spanish Seed-Leaf, Florida, Yellow Pryor, Hester Virginia, Pennsylvania, One Sucker, Kentucky, Virginian, Big Frederick, Maryland Broadleaf, Island Broadleaf, White Burley, White Stem, Yellow Oronoco, Connecticut, and Gasner. The most promising Tobaccos are those which are long jointed and broad-leaved. These carry their foliage clear of the soil, and are in consequence not disfigured by dirt or injured by worms and slugs; the air gets better amongst them than is the case with the short compact-habited sorts whose leaves, as in the case of Cann's Seed-Leaf, lie on the ground or nearly so. Glasner, Connecticut, Pennsylvania, and White Burley are each more or less, so far as could be seen now, of this close dwarf habit. The other kinds differ from these in being, as we have said, of an ascending habit, with long intervals between the leaves. Some have slender foliage, pendulous at the tips; other support the leaf horizontally, or nearly so; and in scarcely any of them are the various hues of green alike. The plants are now growing fast, and if the weather continues warm, without rain, great progress will be made before we get frost in that part of the country. The method of cultivation adopted is that generally advocated by men of experience in the United States of America. the plants being set out on light hillocks standing 3 feet apart in the row, and 4 feet between the rows, the greater space affording means of getting amongst the plants with the cultivator in the early stages, and with the hoe later. Topping the plants as they show the flower-buds and have developed nine leaves, without reckoning the bottom pair, and constantly removing laterals, requires the constant attention of the man in charge of the crop. If it should be found to answer, and our Government fix an Excise tax on each plant, as is done in Belgium, it would prove a source of revenue to our small farmers and cottagers, as the profits per acre are considerably higher than those from corn, &c.—*Gardeners' Chronicle.*

Tea Prospects in India.—From the Calcutta "Commercial Letter" in the latest *Pioneer* we take the following:—

The following are the figures published by the Calcutta Tea Association, giving correct estimates of the crop. The previous estimates of the Indian tea crop given in their Circular, dated 8th May last were:—

	Estimated crop of 1886. lb.
Assam	35,133,494
Cachar and Sylhet	22,908,180
Darjeeling, Terai, and Dooars.. ..	13,302,800
Chittagong and Chota Nagpore ..	1,346,800
Dehra Dun, Kumaon, and Kangra ..	3,250,000
Total ..	75,941,274

From figures since obtained, a revised estimate has been prepared based upon actual results up to 31st August, showing the following figures:—

Manufactured up to 31st August	1885. lb.	1886. lb.
Assam	16,520,520	18,910,054
Cachar and Sylhet ..	11,749,129	13,004,412
Darjeeling, Terai and Dooars	7,076,594	8,769,820
Chittagong and Chota Nagpore	589,154	651,057
Total ..	35,935,397	41,335,343

Revised estimate of crop, 1886:—

	lb.
Assam	32,584,466
Cachar and Sylhet	22,074,022
Darjeeling, Terai and Dooars.. ..	14,014,485
Chittagong and Chota Nagpore ..	1,316,596
Dehra Dun, Kumaon and Kangra ..	3,500,000
Private and Native Gardens (estimated)	2,000,000
Total ..	74,489,579

The consumption of Indian tea in India and the requirements of Government being estimated at 14 million lb., and the exports to the Australian Colonies and other places being calculated at 2 million lb., there should remain about 71 million lb. for shipment to Great Britain against 65¼ million lb. shipped during the season of 1885-86.

Adding 13 million lb. out of a total of 14 million exported from Ceylon, we get 84 million lb. of Indian and Ceylon tea for the United Kingdom in 1886-87. But the Indian and Ceylon seasons do not quite correspond.

MANURING TEA WITH COTTON-SEED.

Our readers will recollect that we quoted into the *Tropical Agriculturist* the results of experiments in the manuring of tea by Mr. F. McL. Carter of Chandpore Garden, Chittagong, with castor cake solely, and the same substance mixed with superphosphate. Mr. Carter has now published in the *Indian Tea Gazette*, the results of manuring with Cotton-seeds. Three pounds to a bush raised the yield to 831 lb. per acre as compared with 554 lb. on an unmanured plot and the profits in first and second years were good in proportion, though not quite equal to those resulting from the use of castor cake. There is no evidence that in this case the quality of the leaf was improved.

MEMORANDUM OF EXPERIMENTAL MANURING WITH COTTON-SEED ON CHANDPORE GARDEN, CHITTAGONG, IN SEASONS 1882 AND 1883.

Elevation of plateau 75 to 80 feet above the paddy lands; and soil, a sandy loam near surface, with a ferruginous clay and sand for subsoil. The bushes are of a fair Assam Hybrid variety, transplanted from nurseries in 1867, to 4'×4'=2722 per acre, and were pruned down to 18 inches on 5th, 6th and 7th January 1882.

SEASON 1882.

The experimental plots A, B. and C comprised ¼ acre, 680 bushes each manured with Cotton-seed, &c. and a similar area contiguous to each with no manure; all properly fenced in, and plucked by selected women throughout the season, the leaf being carefully weighed by beam scales. The style of plucking 2¾ leaves (the bud counted as one).

Plot A manured with Cotton-seed, @ 2 lb. per bush } equal 68 maunds per acre }
„ B Do. do @ 3 lb. per bush } equal 102 maunds per acre }
„ C Do. 1 lb. of Cotton-seed, mixed with 5 lb. of *gobar* per bush } equal to a combination of 204 maunds per acre. }

The manures were applied between the 7th and 10th March 1882.

RESULTS IN YIELD.

Plot A.

	lb.	oz.		lb.	
Manured ¼ acre	694	8	green leaf	=694	tea per acre.
Non-manured do.	564	5	„	=564	„
In favor of former by	130	3	„	=130	„

or an increase of 23 per cent.

Plot B.

	lb.	oz.		lb.	
Manured ¼ acre	831	11	green leaf	=831	tea per acre.
Non-manured do.	554	2	„	=554	„
In favor of former by	277	9	„	=277	„

or an increase of 50 per cent.

Plot C.

	lb.	oz.		lb.	
Manured ¼ acre	729	10	green leaf	=730	tea per acre.
Non-manured do.	632	10	„	=633	„
In favor of former by	97	0	„	= 97	„

or an increase of 15·3 per cent.

From the foregoing areas there were 27 flushes in the season, which commenced on 15th March, and terminated on 31st December.

The rainfall in 1882 was 102 inches and 21 cents, and number of days in which rain fell was 137.

The average rainfall for this garden in 15 years was 97 inches 70 cents.

The height of bushes at end of season was on plot A

Manured plot	...	...	36"
Non do.	...	...	30"
Do.	do.		Plot B
Manured	...	...	36"
Non do.	...	...	30"
Do.	do.		Plot C
Manured	...	...	36"
Non do.	...	...	30"

The mean average of Brokers' *three* valutations in 1st season was R0-8-5 per lb. from the manured areas, *viz.* 8th June, 5th August, and 17th November, and also R0-8-5 on non-manured area, no difference in fact, but plot B was the highest, being R0-8-7 per lb., the lowest being R0-8-2 per lb. on plot C.

The results are estimated as follows:—

Plot A.

		per acre
Manured plot lb. 694 tea *to* say		R0-8-0=R347-0
Non-manured do. „ 564	„	R0-8-0=R282-0
In favour of former by 130	„	=R65-0
Less the actual cost of the manure, including Freight, transport, and application &c., was on this plot R47-7-4 per acre		=R47-8
Amount in favour of manured plot	...	=R17-8

Therefore, the profits were 36¾ per cent per acre.

Results from Plot B.

			per acre.
Manured plot ...	lb. 831 say @	R0-8	=R415-8
Non do.	lb. 554 @	R0-8	=R277-0
In favour of former by	lb. 277	„	=R138-8
Less the actual cost of manuring, &c., this plot was	R71-3 per acre		=R71- 3
Amount in favour of manured plot			=R67 -5

Therefore, the profits were 94·3 per cent per acre.

Results from Plot C.

			per acre.
Manured plot ...	lb. 730 @	R0-8	=R365-0
Non do. ...	lb. 633 @	R0-8	=R316-8
In favour of former by	lb. 97	„	=R48 8
Less actual cost of manures on this plot	@ R 39-11-8 per acre		=R39-12
Amount in favour of manured plots	...		=R 8-12

Therefore, the profits equal 22 per cent per acre.

From the above it will be seen that plot B. manured with lb. 3 per bush=102 maunds, or about 3½ tons per acre, give the best returns.

This can be demonstrated in another way: for instance, the *cost* of manuring plot A is R 47-8, and plot B, R71-3 per acre, which is exactly 50 per cent more; whilst the profits on former were 36¾ per cent and on *latter* 94·3 *per cent per acre*, or "57·55" per cent greater, whereas in "theory" the profits ought not to have been in excess of 50 *per cent per acre above plot* A.

I should have stated that these areas were twice deep dug, and five times light hoed or weeded in the season, which is twice more than is the usual practice on this garden.

The foregoing experiments were carried on in 1883 also, being the second season, but no more cotton seed or other manure was applied to the plots, and the outturn from them is as follows:—

A

			per acre.
Manured area ...	lb. 470¾ green leaf	=lb. 471	tea
Non do. do. ...	lb. 457 „	=lb. 457	„
In favour of former by	lb. 13¾ „	=lb. 14	„
The increase therefore was	...= 3 per cent per acre.		
Add do 1st year	..=23 „	„	
Total increased yield in 2 seasons	=26 „	„	

The profits therefore will be

Manured plot ...	lb. 471 tea per acre @	R0 8	=R235 8
Non do. do. ...	lb. 457 „	R0 8	=R228 8
In favour of former by	lb. 14 „	R0 8	=R 7 0
Less cost of manure	„	nil.	
Therefore, net profits	... per acre		...R 7 0
Add profits 1st year	... „		...R 17 8
Total profits in two years	„		...R 24 8

or 51½ per cent.

			per acre.
Manured area ...	lb. 571 green leaf	=lb. 571	tea
Non do. do. ...	lb. 426¾ „	=lb. 427	„
In favour of former by	lb. 144¼ „	=lb. 144	„ .

		per acre.
The increased yield therefore was	=33¾	per cent ,,
Add do. 1st year	=50	per cent ,,
Total increased yield in two seasons	=83¾	per cent ,,

The profits consequently will be

Manured plot	...lb. 571 of tea per acre @ R0-8	= R285-8
Non do	...lb. 427 ,, @ R0-8	=R213-8
In favour of former by lb. 144	...	= R72-0
Less cost of manure	...	= nil
Therefore, net profit per acre ...	...	= R72-0
Add profits 1st year ... ,, ...	...	= R67-5
Total profits in two years ,, ...	...	=R139-5
		195-4 per cent.

C

Manured area	... lb. 500 green leaf	=lb. 500 tea per acre.
Non do. do.	... lb. 438 ,,	=lb. 438 ,,
In favour of former by lb. 62	,,	lb. 62 ,,
The increased yield therefore was	=14	per cent per acre.
Add do. do. 1st year	=15·3	,, ,,
Total increased yield in two seasons	=29·3	,, ,,

The profits therefore will be

Manured plot	... lb. 500 tea per acre @	R0-8=250-0
Non do. do.	...=lb. 438 ,,	R0-8=219-0
In favour of former by=lb. 62	,,	R31-0
Less cost of manure	,,	nil.
Therefore, net profit ... per acre		= R31-0
Add profits 1st year ... ,,		= R8-12
Total profits in two years ,,		=R39-12
		=100 per cent per acre.

In the second season the increased yield of C over plot A must be attributed to the *gobur* not having been in a soluble condition, and therefore not fit for assimilation by the rootlets of bushes until second year after application.

The plucking of 2¾ leaves (bud as one) commenced in 1883 on 16th March, and terminated on 29th December—and there were 25 flushes in the season—the rainfall being 112 inches 21 cents. The garden was deep dug once, and light hoed or weeded 2¼ times—total 3¼ times only this year, which is much less than usual. The bushes were pruned down to 18" on 11th and 12th January—and on plot B (the others were not recorded) the average height at end of season on manured area was 37 inches, and on non-manured area 33 inches. On a reference to my Castor Cake experiments published in *Tea Gazette* of 6th October 1885, it will be seen that better results are obtained on plot No. 3 where castor poonac alone was applied @ lb 1 per bush=24 cwts. per acre, although the cost in 1884 was R70 per acre, than on plot B manured with lb 3 per bush of cotton seed, and which cost R71-3: the profits in the *two* seasons of former being 245¾ per cent and from latter 195-4 per cent per acre.

The trials with cotton seed were not registered after the second season. but it was very noticeable that the bushes were benefited by the single application in the third year also.

I should have stated previously that the seed was purchased at Naraingunge near Dacca perfectly fresh at 6 as. per maund, and had to be transported from there about 170 miles to the Factory, *all the way by water* except the last 2 miles, on a level road, from the khal to garden. The seeds had then to be *heaped* in 50 or 100 maunds, the latter quantity the most desirable, moistened with cold water (hot water would have answered the purpose quicker) and then covered over with clods of earth to induce fermentation with the object of destroying its vitality; otherwise the seed when put into the soil would have germinated and produced plants.

I found this took from 5 to 8 days, which could be judged by the disagreeable sour odour emitted, and also the proper stage could be ascertained by the temperature of the heap, as the outside was very warm when felt by the hand. The entire charges for transport, fermentation, and application to the soil, cost R0-5-2 per maund, and including the purchase money of 6 As. per maund, the total cost per maund was R0-11-2. The former charges therefore nearly equalled the orginal cost.

I have been frequently asked if such and such a manure would pay if the transport charges were *higher* than yet cost to *this garden*; and to enable any one to ascertain the limit of expense under this head, beyond which there would be a loss, it will be necessary to make the following calculation. The average price the Tea *realizes per lb.*, is a principal factor in the estimation; another of considerable importance, also, will be the average yield per acre on a garden *in ordinary* seasons prior to any application of manures. If, as in the former case, the produce sells *below* a certain price per lb., taken in connection with the cost of manure there will be a loss; and in the later case loss will ensue likewise if the *yield per acre* is *below* a stated quantity; and on the other hand the converse will happen if the tea realizes high prices, &c. In this event the increased price will enable the planter to pay more for the cost of manure and transport, and still secure a good profit per acre. Most managers can tell fairly well what the ordinary yield per acre is on the different areas of a garden in full bearing, unless the season should turn out exceptional, and therefore there will be no difficulty, when the cost of manure and results obtained from it per acre is known, in ascertaining whether it will pay to apply a certain quantity or not on any particular area. As a general rule, poor lands that are incapable of producing more than about 2 maunds of tea per acre when in full bearing should be abandoned, as it would never pay to apply the large quantity of manure requisite per acre in order to ensure a remunerative yield of crop, unless of course the manure could be put late the soil for very much less than is possible at the present time.

Table I, is based on the supposition that the results obtained from plot B will be accepted as more satisfactory than either of the other experimental pieces. The plot C also shows well in second year, and probably would be preferable where *gobur* can be had in *large quantities*, and when cotton seed is expensive. I will assume that a garden's teas realize any of the prices from 8 As. to 10 As. per lb. inclusive as in column 2. Column 1 gives the increased yield of tea per acre due to manuring; col. 3, the gross receipts per acre; col. 4 the increased yield in 2nd season; col. 5 the total gross receipts per acre in 2nd season, *cost of manuring.*

TABLE I.

Plot B.

1 Increased yield per acre lb.	2 Price realized per lb.	3 1st season gross receipts per acre.	4 Increased yield tea per acre lb.	5 2nd season gross receipts per acre.	6 Total increased yield tea per acre in 2 years lb.	7 Total receipt per acre in 2 years.
277	0 8 0	138 8 0	144	72 0 0	421	210 8 0
..	0 8 3	142 13 3	...	74 1 0	...	217 1 3
...	0 8 6	147 2 6	...	76 8 0	...	223 10 6
...	0 8 9	151 7 9	...	78 12 0	...	230 3 9
...	0 9 0	155 13 0	...	81 0 0	...	236 13 0
...	0 9 3	160 2 3	...	83 4 0	...	243 6 3
...	0 9 6	164 7 6	...	85 8 0	...	249 15 6
...	0 9 9	168 12 9	...	87 12 0	...	256 8 9
...	0 10 0	173 2 0	..	90 0 0	...	263 2 0

Table II shows the *net profits* and loss per acre in *both* seasons after deducting the expenditure for manuring as on plot B, and for a progressive increase in the cost of applying cotton seed from R0-11-2 up to R2 per maund inclusive.

Realizations of tea per lb. (plot B)	R. A. P. 0 8 0	R. A. P. 0 8 3	R. A. P. 0 8 6	R. A. P. 0 8 9	R. A. P. 0 9 0	R. A. P. 0 9 3	R. A. P. 0 9 6	R. A. P. 0 9 9	R. A. P. 0 10 0
Gross receipts per acre, 1st year	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, at R 0-11-2 per maund ...	71 3 0	71 3 0	71 3 0	71 3 0	71 3 0	71 3 0	91 3 0	71 3 0	71 3 0
Profits per acre, 1st year	67 5 0	71 10 3	75 15 6	80 4 9	84 10 0	88 15 3	93 4 6	97 9 9	101 15 0
Ditto 2nd year	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits per acre, in 2 years	139 5 0	145 14 3	152 7 6	159 0 9	165 10 0	172 3 3	178 12 6	185 5 9	191 15 0
Or, Percentages	195 per cent.	204 per cent.	214 per cent.	223 per cent.	232 per cent.	241 per cent.	250 per cent.	260 per cent.	269 per cent.
Gross receipts per acre, 1st year, ...	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, at R 0-12-0 per maund ...	76 8 0	76 8 0	76 8 0	76 8 0	76 8 0	76 8 0	76 8 0	76 8 0	76 8 0
Profits per acre, 1st year, ...	62 0 0	66 5 3	70 10 6	74 15 9	79 5 0	83 10 3	87 15 6	92 4 9	96 10 0
Ditto 2nd year, ...	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits in 2 years.	134 0 0	140 9 3	147 2 6	153 11 9	160 5 0	166 14 3	173 7 6	180 0 9	186 10 0
Percentages, ...	175 per cent.	183 per cent.	192 per cent.	201 per cent.	209 per cent.	218 per cent.	226 per cent.	235 per cent.	244 per cent.
Gross receipts per acre, 1st year, ...	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, at R 1-0-0 per maund, ...	102 0 0	102 0 0	102 0 0	102 0 0	102 0 0	102 0 0	102 0 0	102 0 0	102 0 0
Profits per acre, 1st year	36 8 0	40 13 3	45 2 6	49 7 9	53 13 0	58 2 3	62 7 6	66 12 9	71 2 0
Ditto 2nd year	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits in 2 years, per acre	108 8 0	115 1 3	121 10 6	128 3 9	134 13 0	141 6 3	147 15 6	154 8 9	161 2 0
Percentages, ...	106 per cent.	112 per cent.	119 per cent.	125 per cent.	132 per cent.	138 per cent.	145 per cent.	151 per cent	158 per cent.
Gross receipts per acre, 1st year	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, @ R 1-4-0 per maund ...	127 8 0	127 8 0	127 8 0	127 8 0	127 8 0	127 8 0	127 8 0	127 8 0	127 8 0
Profits per acre, 1st year	11 0 0	15 5 3	19 10 6	23 15 9	28 5 0	32 10 3	36 15 6	41 4 9	45 10 0
Ditto 2nd year, ...	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits per acre, in 2 years, ...	83 0 0	89 9 3	96 2 6	102 11 9	109 5 0	115 14 3	122 7 6	129 0 9	135 10 0
Percentages, ...	65 per cent.	70 per cent.	75 per cent.	80 per cent.	86 per cent.	91 per cent.	96 per cent.	101 per cent.	106 per cent.
Gross receipts per acre, 1st year, ...	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, at R 1-8-0 per maund ...	153 0 0	153 0 0	153 0 0	153 0 0	153 0 0	153 0 0	153 0 3	153 0 0	153 0 0
Profits and *Loss* per acre. in 1st year.*	**14 8 0**	**10 2 9**	**5 13 6**	**1 8 3**	2 13 0	7 2 3	11 7 6	15 12 9	20 2 0
Profits per acre, in 2 years, ...	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits per acre, in 2 years, ...	57 8 0	64 1 3	70 10 6	77 3 9	83 13 0	90 6 3	96 15 6	183 8 9	110 2 0
Percentages, ...	37 per cent.	42 per cent.	46 per cent.	50 per cent.	55 per cent.	59 per cent.	63 per cent.	67 per cent.	72 per cent.
Gros receipts per acre, 1st year	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cost of manure per acre, at R 1-12-0 per maund ...	178 8 0	178 8 0	178 8 0	178 8 0	178 8 0	178 8 0	178 8 0	178 8 0	178 8 0
Loss per acre, 1st year,*	**40 0 0**	**35 10 9**	**31 5 6**	**27 0 3**	**22 11 0**	**18 5 9**	**14 0 6**	**9 11 3**	**5 6 0**
Profits per acre, 2nd year, ...	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits per acre in 2 years.	32 0 0	38 9 3	45 2 6	51 11 9	58 5 0	64 14 3	71 7 6	78 0 9	84 10 0
Percentages, ...	18 per cent.	22 per cent.	25 per cent.	29 per cent.	32 per cent.	36 per cent.	40 per cent.	43 per cent.	47 per cent.
Gross receipts per acre, 1st year	138 8 0	142 13 3	147 2 6	151 7 9	155 13 0	160 2 3	164 7 6	168 12 9	173 2 0
Cos of manure per acre, at R 2-0-0 per maund ...	204 0 0	204 0 0	204 0 0	204 0 0	204 0 0	204 0 0	204 0 0	204 0 0	204 0 0
Loss per acre, 1st year,*	**65 8 0**	**61 2 9**	**56 13 6**	**52 8 3**	**48 3 0**	**43 13 9**	**39 8 6**	**35 3 3**	**30 14 0**
Profits per acre, 2nd year, ...	72 0 0	74 4 0	76 8 0	78 12 0	81 0 0	83 4 0	85 8 0	87 12 0	90 0 0
Total profits per acre, in 2 years	6 8 0	13 1 3	19 10 6	26 3 9	32 13 0	39 6 3	45 15 6	52 8 9	59 2 0
Percentages, ...	3 per cent.	6 per cent.	9 per cent.	13 per cent.	16 per cent.	19 per cent.	22 per cent.	25 per cent.	29 per cent.

*The *loss* per acre is written in black figures.

From the foregoing table any one can estimate whether there is gain or loss, and how much, in applying 102 maunds of cotton seed per acre to his tea cultivation, the profits being dependent upon the cost per maund to put it into the ground and the price obtained per lb. for tea. As to what amount may be considered *fair profit* per acre must be left to the decision of each planter who uses this manure, as circumstances differ so greatly that what would be deemed satisfactory by one person or garden might not turn out a profitable investment for others.

In the foregoing table the cost of cotton seed per maund includes *all* charges, *viz.*, the purchase money and the expense of transporting and application per acre. Finally, it must be remembered that the above quantity per acre extends its beneficial influence upon the cultivation during a portion of the *third* season, also, after application; and although there seems apparently to be no improvement in the strength and quality of the tea, judging from the few samples reported on by the Brokers, yet there is no doubt whatever that *suitable* manures when applied in *adequate quantity* per acre, must enhance the value of the produce in addition to increasing the outturn.—F. McL. Carter, *Manager.*

Chandpore Garden, Chittagong, 4th August, 1886.

P. S.—I have omitted to state that if the cotton seed could have been procured *fresh*, with the oil expressed, it would have been equally as valuable for manurial purposes, and the cost in consequence would have been less.

NOTE ON PAPER PLANT,

By J. S. Gamble, Conservator of Forests, Northern Circle, Madras.

The "paper mulberry" is very easy to grow when once one has a few plants to start from, for cuttings strike most freely. Before I left Bengal I planted a few acres (I forget how much) in the Terai. They were doing well when I left, but I have heard nothing of them since. The tree is indigenous in Tenasserim and wants a moist climate. It would not grow in the Ceded districts, but would do well enough, I think, in Goomsur, in Madras, and in, perhaps, the coast rice country, and, of course, in Malabar, &c. To be of any use as a fibre it should be grown near the port of shipment, for we have unfortunately no paper mills yet in this Presidency. I have no idea of what its value is. Plantain fibre (see also for this Dr. King's remarks) is purchased by the Bally Mills from Bengal ryots at R1 per maund of 80 lb. Babuli grass (Pollinia Euopoda) is worth R2 per maund, and is nearly equal to Esparto. Cleaned Broussonetia *might* be worth R4, so that it would not stand much railway freight to pay its expenses. Grown at Madras or near other coast ports it might be a good speculation if the land were not heavily assessed, and it were done on a large scale. But unless paper mills are started it is not worth growing inland. The Chingleput District Forest officer might try it on the old farm lands at Saidápet. If seed is wanted, it should be procured from Colonel Seaton, Conservator of Forests, Tenasserim Circle, British Burma. We have any number of indigenous fibre plants in the moist climates of the Presidency, and paper mulberry could be very easily grown if the paper stock would pay its expenses. In such climates, I have no more doubt of its success than of any of the common urticaceous plants which grow so easily from seed or cuttings. What we *want* are plants that will do to reafforest dry and poor soils and give sufficient wood or fibre or bark or something to pay expenses.

THE NORTHERN AUSTRALIAN TERRITORY YAM.

(To the Editor of the "Australasian.")

Sir—My attention has been drawn by the various accounts given in your paper of the prolific nature of what is now generally known as the Northern Territory yam, its extraordinary value as a fodder plant for all kinds of stock throughout the year, as well as its value to man as a substitute for potatoes. If all that is written about it be true, it will flourish under any climate and in any soil. Under these circumstances it ought to become when once located a great boon to both stockowners and farmers in the arid North, especially during the summer months and times of drought, when everything else is parched up, yet its usefulness, I think, can be still further extended. Might it not be planted with advantage through our scrub lands? I believe in a very few years it would be the means of enabling us to stock many square miles of useless scrub which will carry little or no stock at the present time. My idea is that it should be distributed among the leaseholders of these lands, with the request that it should be planted through the scrub. The same should be done on all unleased Crown lands by the Government. If successful and once firmly rooted the vines would soon spread over the ground, and would choke and destroy a great deal of the undergrowth and bushes which man or beast do not eat, and which prevents anything like grass growing. It would also spread and climb over the trees and entwine itself among the leaves and branches. The stock would help to destroy a great deal of scrub by constantly trampling and breaking it down in getting at the vine, whereas now they only make tracks or pads. I firmly believe its presence in these said scrubs would make them capable of carrying a certain amount of stock, and by so doing would place a value on the land which it has not now. Let it grow ever so thickly, a plant that will give food to both man and beast can never become a nuisance. There are scores of places where it might be tried with advantage that are now only refuges for bunny; for instace, through the Murray Scrub, and that long stretch of country between the Gawler Ranges and the West Coast—the *bete noir* of the Colton farmers. Provided bunny did not destroy the vine it might in time become bunny's greatest enemy, by drawing a population into the isolated portions of the country, and help in a measure to break up these great breeding-places. I should like to see it tried on this now despised Kangaroo Island. I believe its advent here would help more in its advancement than anything I know; there would be little or no trouble or expense in the experiment. The telegraph line runs through the centre from one end to the other. A parcel of tubers should be sent to each of the telegraph officers, and given by them to the line men, who could easily plant them on either side of the line about a mile apart on their travels up and down. The lighthouse-keepers ought to have some tubers sent to them, and be asked to plant them round about. I feel certain if the settlers and farmers were found in seed they would only be too glad to plant them about, as most of them leave home for a month or two every year and pretty well spread themselves all over the Island. It would be no trouble for each of them to take a few in their pockets, and plant them here and there as they go about. I myself could plant any quantity if I had the tubers over a large extent of country from West Bay down. Like the wallaby-hunters we could take some in our pockets and plant them when out mustering. By these means the whole of the Island might be thickly planted in one season, and the sooner the better. It will be to every islander's advantage to help in the cultivation of the yam here, for well he knows what a very great boon it would be even if it did nothing more than provide food for his horses when travelling. The want of grass has been the one great bar to all travelling here, and the principal cause of so little being known about this island. Kangaroo Island has been in the background long enough. It only wants a little energy and enterprise to bring it to the front. I am one of the few who believe that it is coming on slowly. I live in hopes of yet seeing the smoke of a thriving township curling over the waters of Vivonne Bay. Wool, timber, fruit, and minerals chief exports, not forgetting the wallabies—skins, tails, carcasses, and all.—I am, Sir, &c., Another Industry that will Yet be Added.

PLANTING PROSPECTS IN UDAPUSSELLAWA, CEYLON

COFFEE BEARING IN ITS OLD STYLE—CINCHONA KEEPING UP—TEA VERY FINE—ROADS.

Udapussellawa, 12th Oct. 1886.

The blossoming season is now well over and we are in a position to gauge our prospects for the coming year. Mid and Upper Udapussellawa will do very well, the eastern end of the district not so well, but even there crops will be better than some alarmists prognosticated some months ago. The truth is that the nerves of our planters have been in such a state of tension, that ill rumours are far too readily accepted and they err in good company, for the press and the Colombo agents too eagerly swallow any evil reports regarding our old staple. The season has not been a favorable one as regards weather and our good crops arise from the inherent strength and vigour of the *coffee*. Manured coffee is bearing in is old style, leaving nothing to be desired. We had our sharp attack of leaf-disease which did some damage, but it soon passed off, and we believe as the area under coffee contracts, this pest will diminish in virulence and strength.

Cinchona.—There is still a good area under cinchona, and this crop will not be reduced for several years. Some planters are rooting out when the trees arrive at four years old, that being the age, when the question arises which to sacrifice, the cinchona or the good coffee. Time has justified the warnings thrown out by many, years ago, that bark was only a drug and would be overproduced. Had we all looked upon it as simply an auxiliary, and planted it only along roadsides and in odd corners, we might have kept our export down to six million pounds and preserved paying prices. As it is, the cultivation will never be abandoned. It grows as well as ever with careful cultivation, and I do not believe that the output will fall below the six million lb., in a decade of years to come.

Tea is beginning to shew up and I feel sure that finer fields of tea, than are to be seen on Eskdale and Glendevon do not exist in the island. Most of the coffee estates are getting in an appreciable average of this product, as a secondary cultivation most useful in the assistance of our finances. The leaf will as a rule be sold to the tea estates, whose managers are rapidly providing themselves with the necessary machinery.

Roads.—Our road is beginning to cut up and wants immediate attention. I have not lost faith in the MacBride system as it was defined in the official instructions. Unfortunately, these instructions have never been carried out to the letter save for a short time in the face of district agitation. If Mr. MacBride would tell-off two men to each mile of road, to watch the first symptoms of breaking up and there and then to fill in and blind and pound, his system would yet commend itself to the public for the upkeep of grant-in-aid roads. As it is, all the work is done during three months of the year, the men then disappear from mortal ken, and the road is left to itself. For my part, I consider that the upkeep of all grant-in-aid district roads should be handed over to the care of a District Road Trust, consisting of the district engineer and two resident planters. The upkeep of roads, is no longer a branch of the engineering profession as in the days of Telford or MacAdam. All that is wanted is organization and persistent supervision. The work at present is done in a spasmodic fashion; under a Trust every mile would be in charge of a couple of men, whose work, under a properly organized system, would be seen every day, for every planter through whose estate the road passes, would have a personal interest in the continuity of the repairs. The old adage (a stitch in time) goes to the foundation of what is wanted for road upkeep.

Labour.—Many enquiries are being made for coolies and a good number have left the district, having received advances from other districts. Anyone can foresee further trouble on this head. I myself sent a European in 1862 to India to recruit for coolies. I got a mixture of engine-drivers, sepoys, sailors and riff-raff of the jails, at great expense and had to fall back on the old system of trusting the coolie and the kangani, and cannot say that I have been victimised; on the contrary, the honesty of Ramasamy as regards advances, has always seemed to be very remarkable.

I enclose rainfall statement—for the first nine months of the year from 1880-86.

G. A. D.

RAINFALL.

	1880		1881		1882		1883		1884		1885		1886	
	inches	days	inches	days	inches	days	inches	days	inches	days	inches	days	inches	days
January.....	9·00	14	17·17	15	16·66	18	14·73	25	11·69	22	16·56	22	20·30	22
February ...	9·08	14	5·21	13	9·00	15	8·61	10	0·98	10	4·05	8	4·71	10
March	15·97	17	4·13	7	4·74	5	1·84	9	5·55	9	6·31	13	4·44	10
April	7·55	12	4·14	15	3·23	10	9·01	19	3·26	9	3·92	7	7·43	15
May	2·20	9	5·71	10	6·27	13	10·95	11	4·24	4	7·80	14	4·24	15
June	0·42	2	1·25	7	3·13	14	2·81	12	0·68	6	3·82	18	4·10	9
July	0·77	7	1·21	4	5·73	19	5·13	13	0·83	4	1·08	11	3·07	10
August	1·86	6	4·19	12	9·64	21	7·00	19	1·57	10	3·28	13	3·32	11
September .	0·81	8	3·19	9	0·05	2	3·09	9	2·93	15	5·48	13	6·93	11
Total...	47·66	89	46·23	92	58·46	17	62·97	127	31·73	89	52·30	119	58·54	113

INDIA AND CHINA TEAS.

The North China *Herald* in discussing this question says:—

People now in the tea trade must look back with regretful envy to the time when tea was synonymous with China and China with tea. Every year brings new competitors with what was always regarded as the birth-place of the tea-plant, and there are far-seeing tea-merchants in China now who believe than in three or at most five years more the tea-tasting profession will be extinct in China. The first blow was struck at China's pre-eminence in the production of tea when the tea-shrub was found to be indigenous in Assam: and there are not wanting botanists in India to declare that the tea-shrub was introduced into China from the slopes of the Himalayas. The second deadly blow was struck when American consumers found the Japan leaf

more to their taste than the China green teas. It is an old cry now how the competition of India with China grows stronger every year; the Chinaman, with the prestige of centuries of experience in the production and preparation of the tea leaf, cannot hold his own with any success against English energy and intelligence. Following in the steps of India come Ceylon and Java as competitors with China; and the first mutterings of the storm are beginning to be heard even in the Straits Settlements, and South Africa. The fact is that the tea-shrub is so hardy, and requires so little attention when it once takes kindly to the soil, that every continent must have districts suitable to its growth, and we shall by and by wonder not that successful competitors with China have arisen, but that China maintained the first place so long. There is evidently little hope, without vast reforms which we cannot expect to see realized, that she will keep it much longer.—It is not to be supposed however that tea will cease to be exported from China; a commodity of which the production is practically unlimited, and the first cost no more than the rent of the ground which the plants occupy, is not likely to be snuffed out altogether. It is the fine distinctions, the discovery and maintenance of which have been the occupation of chasees for decades, that will be swept away. Here and there no doubt a special market will still call for a special kind, and it is apparent that the Russians will still for some years prefer the fine teas of China; but the bulk of the China product will be lumped together, or divided into two or three broad classes, and used at home as the foundation of the grocer's shilling, or eighteen-penny or two-shilling canister, as they are called, the required flavour being given by the more carefully prepared growths of India and Ceylon. Foreigners in China have not to blame themselves for this degeneration in the Chinese leaf; they have preached to the Chinese year after year, that the trade must suffer unless more care were taken to make good tea, and not to hurry it to market before it was properly cured. Individual foreigners have tried in vain to get the midlemen—unfortunately they do not come in contact with the growers—to see the desirability of having foreign supervision over the manipulation and preparation of the tea. The Chinese have preferred to stand on their ancient ways, and the result will be the early extinction of the tea-trade in China in its present form, and the relegation of China tea, as an article of commerce, to a level with what has hitherto been contemptuously designated as "truck."

INDUSTRIAL ENTERPRISE IN SIAK.

The Native State of Siak on the east coast of Sumatra made over to the Netherlands along with Acheen by Mr. Gladstone's Sumatra treaty of 1871, is now attracting some attention in Java and Holland as a promising field for enterprise in the cultivation line. Several capitalists at Amsterdam have secured land there for opening out a tobacco plantation, and have actually set about operations by last advices. As will have been seen in our recent article on the productive resources of Siak, the waste land available is admirably adopted for tillage so that with common prudence, there is every prospect of success of rewarding the exertions of both planters and financiers. Among the productions which abound in the forests of Siak and have proved a spur to commercial enterprise are the trees yielding the prime trade articles styled Balan and Suntei. Under the name of Siak vegetable tallow, they are exported from Singapore, and have gained a high repute in the European market. Balam and Suntei trees are said to be found in any quantity in forest tracts, not only on the main land but also on the islands off the cost. The information available points to the likelihood of their being mostly met with in primary jungle on moist land near the coast The Balam tree is from 60 to 80 feet high. It also yields gutta of inferior quality used for adulterating superior kinds. The timber turnedout therefrom is white and not of a lasting nature. The Suntei tree is less big its measurement being 50 to 60 feet. The timber is reddish brown and in great demand. Seeds of both these kinds of trees have of late years been regularly collected and forwarded for the most part to Singapore, where, from their lobes, tallow is manufactured which is used for sundry purposes, and is in great demand throughout Europe. The collection of the fruit is an important item in the domestic finances of the people. From November 1884 to March 1885, no less than 200 coyans of tallow-yielding material were collected and disposed of at high but fluctuating prices. The usual price per coyans is from 60 to 100 dollars, rising sometimes to $120. The pulp is taken off by hand very easily. The seeds after being dried in the sun are then shipped off to Singapore. A few Chinese at Bengkalis have taken to the preparation of the tallow but in a very rough style indeed. The Balam tallow is yellowish in colour, rather bitter in taste, and as plastic as wax. It is used in sugar refining, in making artificial flowers, in preparing tapioca, and for other purposes. It is smeared on the pans heated to a high temperature upon which tapioca is dried. The larger portion of this kind of tallow prepared at Singapore is forwarded to Europe. The Suntei tallow is pure white in colour, has a sweetish taste, and is used by the natives for cooking purposes. In its extraction by the native method there is a good deal of waste. Prepared at Singapore the percentage of tallow is higher. The market price of both sorts varies from 7 to 15 dollars per picul. These rates are readily paid on shipments for Europe. It is evident that, gradually, this branch of industry will so increase in importance and extent, that research will lead to trees of the coveted kind being found in other localities throughout Siak. The trees do not need to be destroyed to secure the product so that they do not run the risk of dying out. Considering the important place taken by Siak vegetable tallow in the list of articles making up Straits Produce, the advantages attending the experimental cultivation of the trees yielding the article by our garden authorities are too obvious to need more than drawing attention to the subject. At present it is hard to tell whether growing them will prove profitable if taken in hand by private enterprise. The average yearly yield of dried seeds from a full grown tree is as yet an unascertained point. Any estimate so far of the pecuniary value of each tree in bearing is hence impracticable. Other trees of the same species take 20 to 25 years to attain full growth. Few private individuals would be at all inclined to take this branch of cultivation in hand at the risk of the capital sunk in the enterprise remaining unproductive for so many years. Planting it may however prove advisable for afforestation purposes. The importance of these trees to the people of Siak may be judged of from the fact that, though this branch of industry is still in its infancy, 600 coyans of seeds are, on an average, exported yearly, valued at 100,000 guilders. Several specimens of both these tallow yielding trees have reached the Government Botanical Gardens at Buitenzorg and more are expected shortly, besides consignments of seeds. We trust that the economic section of the Gardens here will soon be the richer by including samples of these valuable trees among its treasures.—*Straits Times, September 25.*

SPECULATIONS ON THE PHYSIOLOGY OF TEA

are indulged in by the London correspondent of the *Indian Tea Gazette* thus:—

Tea in Johore is still confined to two or three small experimental gardens, the largest not much exceeding, I believe, 35 acres of tea in full bearing. This Garden was started by the Maharajah (now sultan) of Johore as an experiment, and has since become private property. It is rumoured that a gentleman interested in the tea-trade of Formosa, is negotiating for a share in this property with a view to extending on a fairly large scales. The climate is a forcing one, rain falling regularly every afternoon, expections to this rule being considered quite of the nature of events. This

regular rainfall modifies the excessive temperature, and renders the climate not disagreeable (for the tropics). Chinese labour is chiefly relied upon. Hitherto the resemblance to Ceylon experience, of a temporary extraordinary yield in the cases of coffee, cinchona and spices, more particularly of the latter, only to be followed by disease and disaster, has marked the history of cultivation in the Straits, Malay Peninsular. It remains to be seen whether tea, as prophesied on a *quasi* scientific hypothesis, will follow the same course. For my own part there is a noteworthy difference between tea on the one hand and spices and coffee on the other, if we exclude cinnamon and roots. Thus tea is a *leaf* crop, the others for the sake of argument are *fruit* crops. Now, it is an accepted axiom that fruit is an effort of nature exerts herself in proportion to the danger which may be incurred by the species. For this reason we expose the roots of vines, peaches, &c., and produce temporary debility, so to speak, and this excites nature to put forth her utmost efforts to insure reproduction, which efforts once excited we feed and nourish with rich and suitable manures. In the case of the wonderful yield of coffee obtained in Ceylon in the palmy days, we may have had the best index that either the soil or the climate was not suited for the permanent endurance of the plant, inasmuch as nature made such extraordinary efforts towards reproduction, thereby under the above axiom telling us that the healthy appearance of the bushes was misleading, and that their vitality was low, just as a powerful man to all external appearance may have the seeds of death maturing within him. Now, the yield of tea in Ceylon bears on this line of reasoning no analogy to the past experience, *re* coffee and spices. Where, however, we may look for an index, if this mode of reasoning has anything in it, is in the yield of tea-seed per acre in Ceylon. It is not alone a matter of curiosity, but of great importance—as establishing a precedent for future guidance in respect of other crops—that planters in Ceylon should at this early stage compile statistics of the yield of tea-seed per acre in various localities, which statistics should be carefully filed by some record-office in Ceylon. These statistics should in the first instance be compared with the average yields of similar—*jat*—plants in Assam, and cases of excessive yield carefully noted and tabulated. Should a large excess be noted perennially, then, under above axiom, that excess should indicate the approach of disease, blight, &c., and efforts should be made to stave off the evil day by applying the particular manure which chemists should be able to recommend after comparative analyses of tea-soils and Ceylon soils. The vast difference in the seed yield of different *jats* in Assam is so remarkable as to make the insistence of special care in comparing the statistics of the greatest importance. The above axiom is borne out by these very differences of seed-yield in Assam. *Pure* indigenous bushes *under cultivation* and sickly old China bushes give the largest yield. Healthy hybrids give the lowest seed yield. The pure indigenous have not become habituated by "heredity" to exposure and to pruning and plucking and in fact to artificial living, and, "feeling," upset so to speak, in fear of death, seek to reproduce the species. The low, old Chinas found on some of the oldest gardens, come from a worn out stock deteriorated by centuries of artificial existence in China, and being old plants too in themselves, without a strain of the indigenous to reinvigorate their *effete* race, also, spend their strength in efforts after reproduction. The healthy hybrids, being the result of new life infused into stock already accustomed to abuse and unnatural usage, embrace many of the characteristics of mules; and being vigorous and hardy, under the conditions for which by descent on both sides they have been produced, they make but little effort to reproduce the species. This reasoning might be followed up in a search after the best crosses, as I by no means wish it to be supposed that I am here advocating a cross direct between a pure indigenous and a pure China. On the contrary, we want the smallest possible amount of the deteriorated China race which will suffice to infuse the asinine quality of long suffering under abuse and unnatural treatment into the more desirable qualities of the thorough-bred. Crosses are now so woefully mixed in Assam, that few gardens are suited for using as true tests, but there are many which would serve for all practical purposes. Were Ceylon planters to send a commission to those gardens from whence the seed used in Ceylon had been sent, to report upon each, with a view to comparing the *jat* conditions, and surrounding *jats* of the parent gardens with the progeny as visible in Ceylon, it might save vast sums being wasted in the future. The whole scope of the enquiry and comparison is too vast to enter into here, but if a botanist, who had made a special study of the laws of reproduction were to accompany the commission, its usefulness would be increased. Take one instance. An estate planted on shallow strong soil in Ceylon might have a dangerously high record in seed yield, yet the parent garden planted on deep, rich, forest soil in Assam might be all that could be wished. Its seed, however, would be totally unsuited for that particular Ceylon plantation. The way in which people have gone in blind-fold and purchased their seed merely because it was the "best"—for its own conditions—irrespective of all the teachings of science as to "heredity" and the laws of reproduction is staggering. They would not attempt to breed their racers by sending their Arab to a donkey to obtain produce qualified for weight carrying, why should they be less particular in a matter of vital consequence to the success of their plantations?—*Indian Planters' Gazette.*

ARNOLD'S COFFEE MANUAL.

As much literature has lately grown up about the cultivation of tea, we are glad to welcome a book.* that is likely to recall public attention to the advantages of the cultivation of coffee. Many excellent works on this subject already exist, but they are, in many cases, of a nature little calculated to attract the notice of any one contemplating opening a coffee estate in India, or to give him much useful information as to what he may expect during his first few years in this country. Some of these books are antiquated; some, and, perhaps, the best refer exclusively to Ceylon, where the conditions of life are somewhat different to what they are in India; while others diverge into questions interesting enough in themselves, but which have little to do with the matter in hand. Now Mr. Arnold's book gives a very fair idea of the work that has to be done in opening and managing an estate, and of the planter's life and surroundings. It does not make the mistake of representing the life in too enticing colours, but neither does it fail to show that the pursuit has many attractions for those who are suited for it. Readers of the author's former work will remember that his experience was principally gained as one of the first Europeans in the Neillampathy Hills, where the life was then about the roughest, and the difficulties of all kinds the greatest, that coffee planters have had to contend with in these latter days. His account of a beginner's troubles and of some items of expenditure must therefore be taken with a certain amount of qualification; but his book will be found eminently readable. It contains a great deal of useful information, and though some of his opinions are open to controversy, they are never put forward with the aggravating air of superiority found in some writers on kindred subjects.

Mr. Arnold commences with the inevitable historical retrospect, and briefly traces the history of the plant from its original home in Abyssinia, whence it appears to have been first introduced to Arabia in the 14th century. An enterprising Bishop attempted to grow it in England about 1796, and the Dutch have a tradition that all their Eastern plantations are from seed grown in Holland. The first planting in India

* *Coffee: Its Cultivation and Profit* By E. L. Arnold on don, Whittingham & Co., 1886.

was made in Wynaad, as an experiment, in 1822 by Major Bevan, and somewhat later Mr. Cannon opened his celebrated estates in Mysore. The various species of the plant are next enumerated, and a glowing account is quoted of that atrocious and unpronounceable fraud the "Maragogipe" coffee. Indeed, we are inclined to quarrel with Mr. Arnold for devoting two pages to an extract on this subject—which first appeared, if we are not mistaken, in a circular—and for apparently accepting the wild statements therein made about that variety of coffee as undoubted facts; if he had examined any of the beans he would have found them rather smaller than ordinary coffee instead of being "much larger," and any planter who had experimented with it, could have informed him of its worthlessness, in this country at least. We next have an account of the climate and soil most suitable for coffee, and may raise a casual objection to the statement that "the best zone of latitude for coffee is 15° on each side of the equator." As to soil, the recommendations on this point are, we think, good as far as they go, but the author himself remarks that it must be remembered by the intending planter, that "an estate may have everything to recommend it to the external view, and fulfil to a nicety all the conditions he has been taught to seek for, and yet disappoint when the crucial test of crop time comes." In fact, excellence of soil is one of the most deceptive of all tests on which to rely; negatively it may be a good guide, as there are classes of soil which no one with any experience would care to put coffee in; but affirmatively it is likely to be neutralised by many other considerations. The next chapter is devoted to an account of the means employed to get together a gang of coolies, and of the various races the beginner is likely to come in contact with. Some useful hints are given as to the best way of treating them, so as to gain their confidence, and induce them to remain on an estate; and the author then proceeds to give details of the various works that have to be undertaken in connection with opening. It is this part of the work that will probably be found most useful to the beginner. The question of cost is an important one, and Mr. Arnold thinks that nobody should attempt to open on his own account with a smaller capital than £5,000. We shall have occasion hereafter to analyse his "estimate for bringing 200 acres of forest land into bearing," but even if we adopt the somewhat lavish scale therein advocated, we find the planter who starts with £5,000, at the end of three years with his estate of 200 acres in bearing, all his buildings, except cattle sheds, complete, and about £2,600 in hand. Now this is a state of felicity which most men, and all coffee planters, would be glad to work a good deal longe for, and, as a matter of fact, comparatively few of those who have succeeded in coffee commenced with as much as this fortunate youth's balance.

The account of the numerous countries in which coffee can be grown is interesting. Burmah appears as likely to come to the front in this respect as any other place, for the authorities are anxious to establish the industry there, and have offered considerable advantages to planters. The first accounts received from the Tavoy district were rather encouraging, but we have not had much opportunity lately of judging how things are going on. So much depends upon the course of events in Brazil that we should have liked our author to have given more space to an account of the present state of the cultivation and prospects of coffee in that country. The information is to be found in Mr. Van Laerne's book, but this is not even referred to. There can be no doubt that the cultivation of coffee in Brazil is gradually declining; but it is dying very hard, and it would be difficult to say with certainty that the influence of Brazil coffee on the markets of the world is appreciably less than it was five years ago. The abolition of slavery, and the consequent inability of proprietors to work their estates as economically as they now do, are powerfully destructive agents, but absolute prediction on this matter is nearly useless. Of the other countries noticed as likely to compete with India and Java, little need be said here. Ceylon need not have been omitted by Mr. Arnold from his list, for the export is still large, though terribly decreased; in Natal, the attempt to grow coffee has been an utter failure and there does not appear to be much likelihood of estalishing it in Queensland. New Guinea appears to be adapted for ths purpose, but immigration to that great island is not yet encouraged. The West Indies, especially Jamaica, produce a limited quantity of very fine coffee, but on the whole "middling plantation" appears likely to decrease in quantity, and rise in value in the near future.—*Madras Mail*

Scientific Tea Manufacture.—"Another Old Planter," writing to the *Indian Daily News*, takes up this subject, and abuses all who differ from him in the necessity for a "scientific" knowledge of Tea-making in India. He states that he does not believe there is a man in India with the requisite scientific knowledge. As long as there are men with a *Practical* knowledge of Tea making, and who can succeed in making good Tea to fetch good prices, we should prefer them to any number of chemical experts. You may overdo even chemical analysis. We should have thought that if the cognomen "Old Planter" is a correct one, he might have told us something about the "science in Tea-making" of which he says all are ignorant; but although he claims to have age and experience, and presumedly therefore "scientific knowledge," he seems indisposed to part with any of the results of the latter for the benefit of his neighbours.—*Indian Tea Gazette.*

A Plague of Earwigs.—Earwigs are a perfect plague here; the place is swarming with them. They eat the hearts out of lettuces, injure fruit trees, and otherwise do harm in the garden. Is there any ready way of getting rid of them?—Hazelwood (King's Langley, Herts). [These destructive insects cannot be destroyed upon the plants they are devouring, but they can be trapped in several ways. The dahlia grower places small pots, partly filled with dry moss, upon the tops of the stakes, into which they gather for shelter and security through the day. These he examines every morning, and casts the occupants into hot water. The fruit grower places pieces of beanstalk 8in. or 9in. in length about his trees, and once at least every day blows the earwigs into a bottle of hot water. Earwig traps, too, can be obtained from dealers in horticultural requisites, but their superiority over the gardener's primitive contrivances is doubtful. The insects being so very numerous in your garden, get small pots 3in. diameter, by the score or the hundred, put a small piece of dry moss into each pot, place them on their sides in your lettuce beds, anywhere and everywhere about the garden, where they will be partially or entirely covered by the foliage or other shelter from rain. Equipped with a can of hot water, send a boy round every morning—the earlier the better after they have retired from their night's feed—and he will soon make a perceptible reduction in their number. Some put a piece of raw potato into each pot, but this is superfluous, as the earwigs go out to feed by night, and only require a dry shelter from rain and cold. This system of catching and killing is the best for the time being; but, to prevent a recurrence of the plague another year, dress your lettuce and other beds with gas lime as soon as the crop is off, and let it lie until the time arrives for winter digging. Scrape the surface soil away from nut bushes and other fruit trees, and let it be burned, but do not place the gas lime near the stems, as it is powerful and dangerous to the roots. Collect all the soapsuds from the laundry into tubs or tanks, and, so soon as the leaves have fallen from the trees, commence washing every twig and stem, also the old walls and trellises, with the garden engine or an old syringe. Repeat the washings throughout the winter as often as the supply of soapsuds will admit, and the earwigs will not again trouble you. The benefit will not, however, end here, as moss, lichen, and the larvæ of other insects will disappear.—*Field.*

CARDAMOMS IN SOUTHERN INDIA.

COORG, 28th Sept. 1886.

DEAR SIR,—I think if your correspondent "Aberdonensis" could give the nett price per lb. realized for the whole crop (refuse included) of the M.M.M. & C.C.C. estates, it would be a better comparison with Ceylon & other S. I. marks. I believe the above estates send only the *very finest* of their cardamoms to the London Market.

Though not up to all the "tricks of the trade" I managed to nett R1·6 per lb. for my crop this season, the whole of it being sold in the country. The fancy bleaching, which our Mysore friends think so profound a secret, is very generally known now. One of the firms on the Coast make cardamom, pepper and ginger curing a special branch of their business, and I hear a partner of the same firm is going in extensively for cardamoms in the Wynaad. It would be interesting to know if the Ceylon planters are still planting them to any extent; and if the estimated 250,000 lb. for this season is likely to be exceeded in the ensuing season.

The lease of cardamom jungles in Coorg having expired this year, the Commissioner invited tenders for their lease for any period not exceeding 21 years, subject to rather stringent rules. I enclose for your readers, benefit, a copy of the form of agreement the fortunate tenderer must enter into. Strange to say, notwithstanding the new rules and the heavy decline in the cardamom market, the rents in most cases have gone up considerably, clearly shewing that the natives at least consider it a paying spec.

The cardamom crop will be a mediume one. The rain in January forced the racemes out too early and not being followed by showers in March, the b ossom got burnt up. The monsoon has been light and enjoyable, the heaviest rain being in July. The weather for planting could not have been better,

Showers and sunshine. YELAKEE.

FORM OF AGREEMENT IN RESPECT OF LAND LET FOR THE CULTIVATION OF CARDAMOMS.

I son of of village Nad Taluk, being the successful tenderer for the lease, for the space of years from the 1886, of the Malle situated in the village of in nad of the Taluk, the estimated area of which is acres, and which is bounded as follows:—

North
South
East
West

do hereby agree and contract to abide by the following conditions:—

1. The sum of Rupees shall for the first 7 years be paid by me annually into the Government Treasury on account of the rent of the said malle on or before the 20th January of each year, commencing from January 1887. In the case of this lease being for 14 years or under, the amount of the aforesaid rent shall be subject to revision by the Deputy Conservator of Forests at the end of the 7th year from the date of the lease, according as circumstances and the ruling prices of Cardamoms may justify. In the case of this lease being for 12 years or under, the amount of rent as prescribed on revision at the end of the 7th year as aforesaid shall be similarly subject to revision at the end of the 14th year from the date of the lease. If the Commissioner require a fixed deposit on account of rent from me, I will comply with such requisition. For the due payment of rent as above provided for I name and as my securities.

2. If I fail to pay rent as above provided for on the appointed date the Commissioner shall be at liberty to cancel this lease and to grant it to some other person or persons or to dispose of it otherwise as may seem to him fit. Any loss accruing to Government from such cancelment and release shall be recoverable from me, together with interest and process charges, under the rules or existing practice for the recovery of land revenue. The Cardamom crop raised from the said malle will be held by me liable for the Government demand for rent as a first charge.

3. I will not cut any trees in the said malle except such as it is indispensable to cut for the purpose of making plots for the cultivation of cardamoms, or for erecting cooly lines or other buildings incidental to such cultivation. I will replace immediately every tree felled by two suitable saplings. If any tree be cut for other than the purposes above described I hold myself liable to pay the value of the trees as determined by the Deputy Conservator of Forests together with such penalty not exceeding R50, as may be fixed by the Commissioner, on each tree so cut down. No timber or produce, except cardamoms, pepper arekanut and resin on which assessment is paid as specified in the schedule hereto attached shall be taken from the jungle without the special permission of the Deputy Conservator of Forests.

4. (1) I will cultivate the malle according to the plot method; (2) no plot shall exceed in area more than one-sixth of an acre; (3) and I will leave a belt of Forest of at least 30 feet, round each plot.

5. Should I make any plot larger than one sixth of an acre, or by any means bring a plot into such a bad condition as to prevent its regrowth into forest, and to render it unfit for cardamom cultivation, I agree to pay in respect of every such plot a penalty of R100.

6. I engage to keep the boundary marks of the said malle clear and to show the boundaries of the said malle to the Deputy Conservator of Forests or to any Official whom he may depute to inspect the malle.

7. I will not cultivate cardamoms or fell trees or otherwise interfere with the forest or soil beyond the boundaries of the said malle.

8. If any above mentioned conditions be contravened, or if after being warned, I neglect to encourage the growth of young trees in the plots of the aforesaid malle the Commissioner shall be at liberty to cancel this lease, and to prosecute me under any Forest Rules for the time being in force.

Signature of lessee

Signature of
1st Witness
2nd Witness

Countersignature of Deputy Conservator of Forests.

THE ENGLISH TOBACCO CROP.

In reference to the British harvest, one has now to include a greater and a lesser novelty—namely, maize and tobacco. In April last, when Lord Harris found the Royal Agricultural Society considered the date too advanced to attempt the experiment of growing tobacco, he said, with some confidence, "But the Royal Horticultural Society will try a quarter of an acre at Chiswick." Whereon the writer of this article remarked, "But the public will not be satisfied with Royal societies or gardeners' experiments—*farmers must grow it themselves*, and by the acre." At this juncture the president and hon. secretary of the Ensilage Society, believing the attempt might yet be made in 1886, applied to and obtained from the Inland Revenue Department very prompt permission for several agriculturists to grow "the Indian weed." As a result, there are now at this date, growing and maturing, several acres of English tobacco. I visited two lots last week, and I have to record the first impression of seeing the crop—this was, that the dangers and difficulties said to be lying in wait for the British agriculturist in the cultivation of tobacco are ending, as difficulties often will end when they are met, in smoke. A farmer who is making the experiment, upon my asking him whether, if the crop would pay, he would hesitate to grow it, replied, he should willingly grow fifty acres next season, just as he might fifty acres of any other plant.

But, speaking with all reserve of what is only a beginning, and as referring only to two fields, I may mention that I have received from the Revenue Department a list which includes a score of growers,

who farm in Kent, Essex, Worcestershire, Devonshire, Suffolk, Norfolk. Lincolnshire, Lancashire, Scotland and Ireland.

Now, in July, at the Norwich Show, at the Ensilage Society's stand, were exhibited a few good and forward tobacco plants which had been grown in a garden (some chemists have supposed the silo may be seviceable in preserving the tobacco leaf, hence the special interest taken in the subject by the society); but it was quite a month later before field plants were of the same size as those exhibited at Norwich. Let me, then, speak of the first English field of tobacco visited on Tuesday Sept. 7, being grown at Holloway's Farm, at the foot of Bromley Hill, in Kent, for Messrs. Carter, of Holborn. When I was there, one of the friends we have always with us was also present —the supervisor from Gravesend, in whose excise district the ground was situated. He had watched the crop from the beginning, and expressed his surprise at the thriving state of the plants; they seemed acclimatised, and had nothing exotic or sickly-looking about them. I give this as a second opinion in support of my own. The soil of the field was a good but variable sandy loam, with a little slope to the north. The tobacco plants, of several varieties, were sheltered by hedgerows on two sides, a yard-high partition of matting from other crops on the third side, and open to the sun on the south side. The space covered was three-quarters of an acre, each plant being from the next a yard apart, and being earthed up on a hill. There was decidedly a noticeable difference in the sorts, some being better than others, whilst across the field itself the soil ran in belts—good, better, best the last being almost a black loam. For these reasons —difference of variety and difference of soil—the general surface of the plants was rather uneven. Many of the leaves measured 2ft. 6in. across, and as for the previous three weeks the plants had been pinched or topped, taking away the centre seed-bearing stem, the height was fairly regular. Each plant had seven to ten leaves left. The seed had been originally sown in a bed; next, on the 14th of May, pricked out in boxes; and finally planted out in the field on the 16th of June. The weather that followed for about a month was often ungenial. The varieties called Pennsylvania, Island Broad Leaf, Connecticut, Glassner, Hester, Virginia, Maryland Broad Leaf, appeared most thriving; the Havannah and Kentucky were least so. All the plants were of a good "stocky" character, and their pyramidal growth reduces to a minimum the effect of wind, which was considered as likely to be a great drawback to the cultivation. It is expected the crop will be cut in about a week. Visitors to the farm manifest by their attendance general public interest in the expriment. Insect pests were conspicuous by their absence. No coverings, glass or otherwise, had been used at any time. The leaves have that gummy stickiness which rightly pertains to the leaf. The ground had received farmyard manure in the proportion of twenty loads and 7cwt. of artificial dressing to the acre. In going to the nearest railway station, Plaistow, I observed a small field of inferior maize.

On Thursday, the 9th, I saw more maize and more tobacco many miles from Kent—at the home from, Merton, Norfolk, where Lord Walsingham is making his tobacco experiment, and continuing the already successful cultivation of maize. Here I do not want any second opinion to support my own when I record that the fifteen acres of maize which I there saw is one of the grandest crops I have ever seen. I have seen maize growing in parts of France, Germany, and Spain, but have never seen a similar crop for bulk and beauty as that now standing seven feet high, in plants a foot apart in rows and about four inches in the drill line, each weighing some four pounds. Let the students of Cirencester and Downton reckon up the present weight per acre, and remember for about two weeks more the plant should grow one to two feet higher. Truly this was an English jungle, and I can only compare it to the seven foot high hemp crops I have seen growing on the best lands of th Loire valley. Of course the store for this harve e was the big excavated silo, of which a model was seen at the Royal Show. The maize was drilled 8th to 10th June, and followed an oat crop. Fifteen loads of farm muck and 5 cwt. rape cake per acre was the manure applied a few days before planting. This exuberant vegetation was not in tassel, and, as frosts injure it, the crop will be secured this month. Grass frosts often come in September, but seldom occur at seven feet from the ground.

I have purposely dwelt on the above particulars, because I think they indirectly infer that the last six weeks have favoured broad-leaved plants, and, therefore, tobacco. White turnips, mangolds, and swedes, especially, are looking remarkably well, and possibly, therefore, this first season has lately suited tobacco cultivation. Assuredly the plot of a rood on the Merton farm was in a most thriving condition, and more even, decidedly, than that seen on Tuesday. One reason for this would be in the fewer varieties grown. They are the Pennsylvanian, the Connecticut, the Big Frederick, and some Virginian. They form seven rows across a large field of about 20 acres. These rows are but 30 in. apart, and the plants are at the same distance from each other. The rows run east and west. The soil is a mixed, fairly good sandy loam, with clay subsoil, and had twenty loads of farm muck to the acre. The crop follows swedes. It is to be remarked that the plants took well, and only about a score of misses had to be made good. The plants, I believe, were from Messrs Carter's stock, and were set out on June 16, then being 3 in. to 5 in. high, with four leaves. They were constantly hand hoed, and now the surface soil is quite free from weeds. Since they started in growth they have gone on without check. The colour has always kept good. They are now about 4 ft. high, and some leaves 3 ft. by 16 in., with an average of nine leaves each. Here and there, where the seed stem has been allowed to flower, the leaves of the plant are much smaller than in the plants which have been carefully "topped." The stem circumference is 5½ in. They are entirely free from insect attacks, and to the eye form a beautiful crop in the evenness of colour and thriving appearance. It is expected to cut them in about a fortnight, and take them to dry in a sheep house admirably suited for the purpose, as moveable shutters extend along the sides, and allow the circulation of air in a direct current.

The morning of Friday, the 10th inst., was very unsettled in Norfolk, and much rain fell after midday. Leaving Thetford for Brightlingsea, Essex, to view Mr. John Bateman's experiment, I may note that weather could hardly be more adverse—a circumstance that confirmed my day's arrangements to see his tobacco growing, although under equally wind and flooding rain. Although I had but one object for this journey, to inspect the tobacco crops, there is no good reason I should not record, by the way, that a farmer at Thetford showed me how he utilised some of the headlands of his fields—by planting them with prickly comfrey, a plant much like tobacco; also where there was a long wall to one field, close to which usually nettles and other weeds abound, he had planted rhubarb, which, well manured, smothered all undergrowth, and produced a crop which, for several weeks in spring, brought a return of 12s. per week—a single row more than paying for the rent of the acre of land, which it only bounded on one side. The walk in the rain from Brightlingsea station to the "Hall" farm showed me Mr. Bateman's neighbours were following him in growing maize, and the crops looked generally well, being in tassell and about seven feet high. There are some 35 acres of maize on Mr. Bateman's farm, of whih 30 acres follow the crop of maize I saw last year on Oct. 1, when it was being cut and carried to the silo. This season's crop is heavier, probably 30 tons to the acre, and was manured with sprats 5d. per bushel and some 80 bushels per acre.

Although planted at the same date as that of Lord Walsingham, early in June, the Essex maize was quite ten days in advance of the Norfolk crop. My visit being without notice, it was by chance, that I found a party of a dozen gentleman already "prospecting" the tobacco crop! Amongst them were scientists and

manufacturers of cigars; also a gentleman now living in England, but formerly a tobacco planter and buyer in Virginia. The plot selected by Mr. Bateman for his experiment was a swampy piece of ground draining into a small lake, and with a moist, black soil which had been enriched with ashpit manure. Here were a dozen varieties of tobacco growing, and the plant stood up thick and well against the wind and rain. The seed had been planted in a cucumber frame and raised to the height of three to four inches by June 12, when they were successfully transplanted. They are now fairly ripe, and have remained free from insect pests. The English experiments are too new to have lured over the American worm, which, however, said the Virginian planter, would be sure to find out the tobacco plant, wherever it might be raised. The whole crop at Brightlingsea was in flower on the 10th, not having been budded or topped; so whilst it is tall and thriving the leaves are not equal in size to those I had seen in Kent and Norfolk. Our tobacco planter, philosopher, and friend from Virginia expressed his opinion that this Essex crop was as good as he had usually seen in the United States and Mexico, and he could confidently say the plants properly cured should make excellent cigars or smoking tobacco. He recommended the cutting should take place this week, and that the curing might be undertaken in a silo compartment, which would form temporarily a tobacco shed. The plants having a slit made in the base of their stem, will be speared throughout by oak laths, or threaded by cords, and then be suspended across the silo at some elevation from the basement. On the floor dry wood fires (beechwood preferred, as emitting but little odour) will be kept going for some eighty to ninety hours, to produce the necessary heat and dryness. Next the leaves should be stripped from the stems, and be allowed an amount of fermentation that only an expert could determine. The manufacture into cigars Mr. Phillips, of Colchester, would undertake.

The above remarks infer that English tobacco growing successfully is so far accepted as a general probability, failure not being apprehended; reckoning of course, always, that the drying and curing process of good product can be accomplished by Englishmen in the English climate.

On Thursday last I had expected to see the tobacco crop at Lynsted, in Kent, grown by Mr. Faunce de Lanne, but a letter from that gentleman defers my visit until next Monday, because on that day "he will be taking out one cured lot of tobacco, and be putting in a fresh lot of tobacco. Of the two kinds cured, one lot has come out in the finest yellow leaf, which has been inspected by one of the chief tobacco manufacturers in the country, who pronounces it to be of the best quality. Besides, on Monday I shall be filling my silos with buckwheat and hopbine." This extract carries the experiments a step further—the growing has been successful, and the drying also successful.

Whilst deferring further remarks until more visits have been made, it is desirable to state, as several growers are now wishing to cut their tobacco plants, that, whilst tobacco grown in hot climates is usually saved in the gross, by cutting the plant and drying it off, each separate plant suspended complete, in rows with others, yet in slower and more irregular climates, such as the British islands, it is best to select and pick off the leaves as they mature, and these may be threaded together on string, and be dried in succession.

First, should any grower be pleased with any special variety, and desire to save the selected seed, care must be taken that no frost has touched it, and impaired its vitality. When the seed pods blacken, the seed is ripe, and the heads are cut off below the forks of the plant, and are hung to dry. The seed is rubbed out by hand and winnowed, and if it crackles when thrown on to a hot stove, it is good. An ounce contains about 100,000 seeds; but as the percentage of vitality is low, half an ounce is usually saved to produce the plant required for an acre.

But probably most growers will seek to save only the leaves, and these are ripe when they assume a marbled and yellowish green colour—they increase in gumminess, and the tips bend downwards. The leaves should only be harvested after the dew is off the plant, and not upon a rainy day. When the leaves are gathered singly, the bottom leaves are the first taken. They should be taken to shelter—even a tree will serve the purpose; but commonly the grower will have some suitable shed, where the whole plant, or the strung leaves, may be suspended to dry. They must not be hung so close as to press each other. Usually a dry day is sufficient to "wilt" the plants, so as to allow them to be handled without breaking or tearing the leaves. They may then be dried, and below is given an illustration how tobacco plants are suspended for drying:

The drying shed should be ventilated so as to allow of regulation of the currents of air. Everyday the leaves must be carefully examined, as they dry unequally. Experts recommend that artificial heat should be supplied, and this should be conducted into the drying shed without the fire or the products of combustion being admitted; but, as stated above, many Americans light wood fires on the floor, and cure tobacco much as bacon is cured by smoke. Confirmation of this mode—referred to at Mr. Bateman's meeting—has been given to me by a former large grower of tobacco in America, who has had 100 acres in cultivation. One coloured workman was reckoned sufficient to look after four acres of tobacco. The arrangement of a tobacco-drying shed is much like that of a fish curer, the object in both being to keep the plants or fish close and yet apart. When the tobacco plants or leaves have become dried, and yet are pliable, the process of stripping commences, which is done in a moist atmosphere, and then the selected leaves are graded and made into hands, *i.e.*, ten to twenty leaves are tied together, and each day these "hands" of tobacco are "bulked" together in heaps 4 ft. to 8 ft. square (of course this refers to cultivation on a large scale, and experimenters can only reasonably follow the methods), with all the stalks outside, in order to ferment. The amount of fermentation can be controlled, as in the making of ensilage, and the process lasts an irregular time. The bulk is often pulled to pieces and rearranged through days and weeks. Some tobacco is fit for smoking a few weeks after drying, whilst it is usually some months before it becomes an article of commerce.

The above details, simplified and reduced as much as possible, may appear to claim great skill and trouble, but actual practice makes them easy and quite within the scope of ordinary farmers who may grow tobacco.—Invicta.—*Field*.

A Present of Coffee Leaf Disease from Cashmere.—We have just received a packet from Cashmere containing four or five coffee leaves more covered with leaf disease than any we have ever observed. The leaves are enclosed in a piece of paper, on which the following is written:—"Coals to Newcastle, or leaf disease (of sorts) from Cashmere." The present serves to show us that we are not the only ones troubled with *Hemeleia vastatrix*, though the number in this colony who now take much thought concerning this fell pest is getting fewer every day.—Local "Times."

At the British Pharmaceutical Conference were read two papers on quinological subjects. Mr. Hooper's paper dealt with experiments in Madras. He showed that renewal by shaving greatly increased the quinine value of the bark, and that manuring has a somewhat similar effect in a less degree. The paper also contained details of analyses of barks at different ages, and concluded with a reference to the effect of mould on bark, which is almost nil. Mr. Howard's paper was one of considerable interest, and contained the results of many analyses of various cinchona barks, all of which, contrasted with a review of what was being done in cultivation of the bark, led him to predict that profitable cultivation can only result from the propagation of the highest quinine-yielding trees.—*Chemist and Druggist*.

TEA MAKERS.—A writer in the *Indian Daily News* signing himself "Old Planter" declaims against the custom of employing native superintendents of Tea factories. He would have a "good, active, intelligent European" placed in charge of the Tea-house, who should be required to remain in the Tea-house from the commencement of manufacture till its finish, and on no consideration to leave the building—all his meals being brought there to him. "The Old Planter" must, we fancy, have had very limited experience, or he would know that on all large factories the Assistant in charge of the Tea-making is a European, and that he *does* remain in the factory during manufacture; sometimes half through the night.—*Indian Tea Gazette.*

JAPAN CLOVER (LESPEDEZA STRIATA, H. A.)—My attention, says Dr. Schomburgk, was directed to this valuable fodder plant by Mr. F. E. Schlegel, of Beachport, by his sending me a cutting from a Californian paper (the *Rural Californian*), which gives a glowing account of this remarkable plant. The extract runs as follows:—The perennial Clover, Lespedeza striata, is now covering thousands of acres where in 1886 it only covered 10 feet square. It grows in the plains, and at an altitude of 4000 feet, and stands well through the midsummer droughts, flowering and blooming until the frost comes, and living after most herbage is dead. It grows on every kind of soil—rich or poor, clay or sandy, dry or wet—and is deep-rooted and improving the soil. It never runs out, and can be fed off without injury. It is wonderfully fattening, and contains—

Nitrogen matter ...	16.60	Potash	0.88
Fat	1.10	Soda	0·51
Ash	5.92	Phosphoric acid ...	0.39
Lime	0.99	Sulphric acid ...	0.20
Magnesia	0.56		

—*Gardener's Chronicle.*

DEPENDENCE OF THE GROWTH OF WOOD UPON METEOROLOGICAL FACTORS.—A. Spamer communicates the following conclusions as to the dependence of the growth of wood upon meteorological factors:—1. Temperature and precipitation are the meteorological phenomena that affect the process of the formation of wood. 2. Of these two variable quantities during the principal period of growth, the rainfall diminishes the formation of wood while the heat increases it. 3. The principal period of wood growth is from July to October, at least for the plants which are very sensitive to frost. 4. The rainfall seems to influence growth more than the temperature. [Excess of rain diminishes growth more than excess of temperature increases it.] 5. The growth of different plants is not affected in the same degree by the rain; some are affected more by rain and others by the temperature. 6. In many periods only one of these factors appears to exert any influence, the other being inactive. 7. Possibly this anomaly may be explained by observations of the duration of insolation. 8. The increase of carbonaceous compounds goes parallel with the increase in the inorganic constituents of the wood. 9 The aqueous component of the wood dimnishes when the carbonaceous increases. 10. The so-called ripe wood [the heartwood] differs from that which is less ripe by a greater amount of ashes and carbon.—*Smithsonian Institute Report.*

CULTIVATING THE MAMMOTH SEQUOIA OF CALIFORNIA.—To the editor of this magazine one of the most interesting lessons learned in California was one which only one experienced in the culture of trees could learn; namely, that the Sequoia gigantea is by nature a swampy tree. The places where they grow now are comparatively dry; but two or three thousand years ago they followed the track of descending glaciers, and they received the melting snows from the tops of mountains that have no summer snows now. The ground on which these mammoth trees stand, once very wet, or even swampy, has become drier through the long ages. Horticulturists know that swamp trees generally grow very well in ground that is comparatively dry, but seeds of such trees will not sprout in anything but the moist oozy moss on the top of a swamp or damp ground. Hence the only young trees we find in the mammoth tree locations are where a chance seed happens to fall on a moist rock, or other damp situation. Young trees are common only in one location, where clouds condense against a mountain-side, and the whole situation abounds with springs and oozy spots. Here in the east hundreds of trees have been planted during the past quarter of a century, but rarely has one lived more than a few years. They do not mind the winters. We have known them stand 20° below zero uninjured, but some fungus, favoured by a dry atmosphere, carries them off gradually during the summer season. Profiting by these facts, the writer brought three strong plants from California and set them in a swamp. Usually when we set swamp trees in a swamp they will not grow unless they are suffered to grow into the swamp themselves. We make a mound and plant them in the mound, from whence they root down as suits themselves. These three plants have had two winters and one summer the past winter being a terribly severe one. Today they look perfectly sound and flourishing, and the editor believes that he has at last discovered how to make the great tree of California thrive in eastern gardens.—*Gardeners' Monthly.*

CINNAMON CULTIVATION IN CEYLON.—Cinnamon peeling is at a stand-still owing to a heavy bud being on, and will possibly not be resumed till this month is well nigh over. In the meantime the favourable weather is causing the bushes to grow apace. I have to congratulate you on a new departure, or rather on the resumption of an old practice, the making public the results of the Cinnamon sales. As the form in which you give it is open to improvement, I trust you will favourably entertain my suggestion to give the price each quality fetches, the same as is done with Tea. This will afford more information than simply giving the range of prices and the average. The average price any produce of more than one quality fetches, is a very misleading test to apply as to its excellence. The average price is lowered or raised according as lower or higher qualities predominate. The brand that heads the list, occupies that exalted position owing to its two first qualities only having been sold. The older Estates, where the soil is sandy and the growth not very vigorous, can as a matter of course make a larger percentage of the finer qualities of Cinnamon. The same with the Estates, that, in direct violation of the Resolution passed by the Agricultural Association, and by which they were bound, never gave up the short-sigted and pernicious practice of scraping Chips. Estates were, owing to the richness of the soil, the growth of the Cinnamon is vigorous, will have the bulk of the Cinnamon consist of the lower qualities, unless very tender Cinnamon is cut. One noticeable feature in the shipments from Mr. De Soysa's numerous Estates, is the absence of the 4th quality Cinnamon. Has he gone a step beyond the Resolution of the Association, or does he convert his 4th quality Cinnamon also into Chips for the still? The Lairds of Wester-Seaton asserts that if all Cinnamon Planters had followed his example, and scraped Chips only for the still, the price of Cinnamon was bound to rise. I go further than he, and say that if all Cinnamon Planter's had followed my, I believe, solitary example, and did not scrape Chips at all, the price of quilled Cinnamon was sure to have risen. Cinnamon oil is but a concentrated form of Cinnamon, and for some purpose can with advantage be substituted for it, under these circumstances it must be regarded as much a rival of quilled Cinnamon as Chips. But the respected Laird of Wester-Seaton so little believes this, that he consistently refuses to sell Chips except for the still, even though he receives a higher offer for them, and asserts that he will sooner bury their Chips, than sell them for export. Paddy-crops are being harvested everywhere, and the air resounds with the cheering strains of harvest songs. Except in a few favoured fields, crops are not above the average. —Local "Examiner."

THE PROSPECTS OF CEYLON CINCHONA BARK.

We call attention to the letter of Mr. John Hamilton on page 332, and feel sure it will be read with interest both by tea and cinchona planters. It is with reference to the latter portion of his remarks that we would wish once more to consider the position of the holders in this island of cinchona bark whether on the trees or in the stores. Mr. Hamilton, like so many other authorities, quotes with approval our remark that Ceylon cinchona planters have for several years to come, more to fear from themselves in the way of competition, than from any other quarter. The more information we receive and the more we study the subject, the clearer this becomes, at least so far as the course of supplies for the next four years is concerned. We do not see that the exports from Java, India or Bolivia can, up to 1890, seriously affect the position attained by Ceylon; although after that the case may be different.

But the question is, suppose Ceylon to go on for the next four years exporting 12 or 15, or even 10 millions lb. of bark per annum, in what position would our plantation clearings or bark supply be at the end of that period. This is a most important question to have answered, and we are glad to see that the Dimbula Planters' Association has taken steps to have the requisite information collected after a careful and authentic fashion, and we trust the example so set will be followed by other Associations in the cinchona growing districts. At the Dimbula meeting we learn Mr. James Sinclair called attention to the subject, disputing the accuracy of the statistics supplied or worked out for our Directory, and although the remarks he made could not be embodied in the Secretary's report we have received a copy to which we readily give a place:—

"Cinchona bark has fallen to such a low figure, that it has really become a question whether much of it is worth the expense of placing on the market. There is too, an idea prevalent, which speaking for myself, has assumed something more definite, and that is, that before long (but too late for most of us) a re-action is bound to set in; I mean, when the bulk of the article has been shipped from the island, and this date at the ratio of shipments for the past three years cannot be far off. Fairly accurate information on this point, gentlemen, is within our reach, if we will but set about it. I beg, therefore, to propose that this Association do communicate with the several District Associations interested, with a view to obtaining for each body the following information:—

I. The estimated acreage under cinchona.

II. The quantity to be harvested for the years ending Oct. 1887 and 1888.

If we can induce the other Associations to aid us, as I say, fairly accurate figures are possible, and we shall then know the *best* and *worst* of our position. If, unfortunately, it should be the latter, it might yet be one which some such regulating Syndicate as I propounded lately in the newspapers, (which some of you may have seen) would enable us to some extent at least to participate in the rise of value, which we all know *must* take place after our fields have become denuded. In the *Observer* of Friday and "Times" of Saturday much interesting information is given, also the opinion of the greatest living authority on bark (Mr. Howard), viz., "that the price of cinchona entirely depends on the exports from Ceylon." This coming from one, who has probably the greatest facilities of any one individual for acquiring information from cinchona-producing countries, may be accepted as true. Another no mean authority, Mr. John H. Hamilton, tells us that we have more to fear from our own exports than from those of any other country. With such testimoney to that effect before us, can we not go hand in hand in obtaining accurate figures of the total acreage now in the island? The following figures and conclusions being given only to illustrate our possible position regarding the product, I need not now take up your time by stating how I have arrived at them, but I may mention, in passing, that such an enquiry as I propose will probably prove them fairly correct. Let us take the whole area in Ceylon under cinchona at 20,000 acres with 1,200 trees per acre, which when all matured, say at 30th September 1888, would yield one pound of dry bark per tree, or twenty-four million pounds. Suppose we once more ship 15,000,000 lb. of which quite ⅔ds would be stem, branch and root bark, or say ten million pounds we have but fourteen million trees on which we can operate during 1888, by shaving or any other process. If therefore, gentlemen, my figures are nearly accurate, consider the re-action that would take place in the value; why, I believe we should see the unit at 1s again, and all our bark gone; surely this would be too tantalizing on the back of all we have had to bear these last eight years. I hope therefore, you will support this resolution; and when information is asked by our Secretary, that every care will be taken in framing estimates. I am aware there are many who do not belong to any Association and who may decline to furnish information, but there must be few who would wantonly throw obstacles in the way of such an enquiry, and if there are, their neighbours can generally give a rough estimate to make the return as accurate as possible."

We are as keenly anxious as any planter can be to give only fair and accurate returns of cinchona under cultivation as of all other products and we shall be much pleased to get the result of the Dimbula enquiry. We think it likely enough that our returns will be found above the mark, only it is possible that Mr. Sinclair forgot they were compiled before much of the past season's very heavy export was harvested. At the same time Mr. Sinclair's own figures must be decidedly below the mark: to say that Ceylon has only 20,000 acres with an average of 1,200 trees per acre, yielding about 24 million lb. in all by 1888 must be far below accuracy. Mr. Sinclair can have but a poor idea of the cinchona clearings and interspersed plantings in the several divisions of Uva. From the best authority in Udapussellawa we have a very interesting and able report in which Mr. Dick expresses the opinion that cinchona may be regarded as a permanent cultivation, and further that in a decade of years he does not believe our exports will fall below six million lb. From another reliable authority—a gentleman who we believe has been taking stock of the different districts,—we have estimates which we consider much nearer the mark than those of Mr. Sinclair. In estimating for next season's exports the correspondent we refer to, while venturing on 11 million lb. as a possible total of exports for 1886-7, adds that he thinks "40 million lb. of cinchona bark still remain in the country." This seems to us as a much more probable approximate estimate than 24 million lb. in 1888; but although the former may appear large, in reality—remembering to what a limited extent comparatively, cinchona is being planted in this tea era,—40 million lb. is by no means a formidable stock to place before the world. On the contrary if it could be shewn that were Ceylon to ship say 10 million lb. for four consecutive seasons, the export would then of necessity drop down to five to six millions, the effect would inevitably be to strengthen the position of our bark in the European market very considerably. It is the uncertainty that Ceylon may not go on pour-

ing in at the rate of 15 millions lb. (or even more) per annum for an indefinite period that has adversely affected prices. It therefore becomes a question of supreme practical importance to all interested in Ceylon cinchona to set a careful reliable enquiry afloat, and we know no better medium for obtaining the information than the several District Associations.

In this connection we would refer once more to the proposed Ceylon Cinchona Syndicate, regarding which a competent commercial authority offers the following remarks in a semi-private letter to us:—

"About the formation of a Syndicate for the purpose of helping planters who are obliged to crop their cinchonas (in order to meet their expenses of tea-planting), from glutting the market and thus reducing prices to a ruinous rate per unit, not alone for the poorer men, who are obliged to coppice and shave or uproot, but for men who are fairly well off, and whose cinchona is harvested in the ordinary course. In some cases to make room for tea, planters have only lost by rushing their crops into the market and obtaining prices barely sufficient, and in some cases not sufficient, to cover expenses. The matter lies in a nutshell, and all it wants is *cohesion* on the part of the growers of cinchona and if petty jealousy could be got rid of, the Colombo agent would really be as much benefited as the planter, as he would be saved from shipping cinchona when the market was overstocked and the crops could be shipped through his agency and the bills drawn on the London houses to whom he sent crops, just the same, without taking a cent from his pocket. In fact, he would be benefited by it as the prices would be higher and he would thus be in a position to *realize* his advances to the planter against crops. Planters must agree to be guided by advices from home and they would be subject to the control of a Committee of the Syndicate, as to when shipments should take place, the produce for shipment being taken in the order of dates of receipt at Colombo. The more I think of it, the more certain I am of the success of such a Syndicate, which really might be termed a Mutual Co-operative Society.

"We will assume that 100 planters joined (but of course the number ought to be greatly exceeded) and sent their cinchona to Colombo. On its receipt it would be baled by their own agents or by any one the planters pleased. Samples drawn for analysis and those who *required advances* on crops, would have a return sent to the banker or bankers who agreed to advance on such, setting forth *class*, *quantity*, and *analysis*. The advance made on it would be expressed on the warrant, which would be given to the Bank. As soon as the lots were shipped, the usual bill would be drawn by the planter or by his Colombo agent on the London House. The Bank which advanced money on the lot repaid and the warrant being returned cancelled, the matter would end. The Bank's security being the warrant, and *the signatures of the man or men selected in Colombo to manage the business*, such managers arranging *guarantees* with *the Banks*, so as to present any delay in shipping or drawing bills. The whole matter is so simple that there need not be the slightest hitch.

"Unless something like a Cinchona Syndicate be started and worked as suggested herein, the next half-penny or penny rise in cinchona will see millions of lb. shipped and down will come the prices to an amount which will simply ruin some poor deserving men, who are struggling to plant tea and to live on it."

Now it may be said that the collection and publication of reliable returns of the stock of bark (on the trees now growing) in the island would, of themselves, have much the same effect as is anticipated from the action of a Syndicate. We said that the latter would require to procure reliable information as to cultivation and stocks to guide its operations. On the other hand, already we have some wealthy and large owners of Ceylon cinchona playing the part of a Syndicate by holding their bark both in the island and in London off the market, waiting for the opportunity of a more restricted supply and a rise in prices. No doubt, this is what every Ceylon planter would like to do. Each one will say with reference to his harvesting prematurely and shipping hastily,—

My poverty and not my will consents!

But it is just to meet the case of such planters —gentlemen who must get money for their bark,— that a Syndicate is required and it should be the best means to help them, and we would ask our commercial authority whether it is necessary that there should be any general adhesion of all cinchona owners. Let those who do not need the aid of banker or merchant go on as at present shipping; but if a considerable number would prefer to get a moderate advance on their bark and to have it stored until the market rises, they should be able to make a considerable impression on the distribution of this staple from Ceylon. We do not see why it should need all our cinchona owners to form a Syndicate. Indeed, our correspondent supposes 100 planters joining together, and we think that if rules or articles of Association were drawn up and circulated, there would not be much difficulty in getting that number of cinchona planters to support a Syndicate. Meantime we trust the Planters' Association in Dimbula will prosecute their enquiry without loss of time and that their example will be followed in Dikoya, Maskeliya, and throughout Uva. For the rest of the country there ought not to be much difficulty in forming an approximate estimate of the cinchona trees and bark in the several districts.

THE OUTLOOK FOR INDIAN TEA.

Planters usually feel interested in what their candid friend the dealer thinks about them, and the following article from the *Grocer* indicates the prevailing views of members of the wholesale and retail tea trade concerning Indian tea trade concerning Indian tea and its prospects:

"The estimates of the tea crop for 1886, prepared by the General Committee of the Indian Tea Association a few months since, showed that there was likely to be a yield of nearly 76,000,000 lb., as compared with 68,735,000 lb., actually produced in 1885. This represents an increase of over 7,000,000 lb. for the season now commenced, and means a very considerable addition to the existing supply.

'These figures relating to the deliveries show a difference of 1,126,400 lb., and mark the first decided phase which has been witnessed in the rapid extension of Indian teas in this market during recent years. There can be no doubt that the trade experienced a severe check in the early part of this year through the disturbed state of Irish affairs, politically, socially, and commercially; and as our Hibernian brethren, who were previously free consumers of the strong and pungent teas that come from India, have since used them in a more stinted manner, the ground at first lost has not subsequently been recovered. To correspond with this modified taste in the consumption of tea there has also been a change in the character of the demand, which has of late run chiefly upon the commoner kinds, or, as we expressed it in our market report of Friday last, 'upon teas for price,' and at such prices too as are 2d to 3d per lb. lower than they were a twelvemonth ago. Whether this is the cause or the effect of the altered

style of the new season's imports, we cannot positively say, as both circumstances have happened simultaneously and as it by accident; but of this the dealers and those who daily inspect the teas are pretty sure, that the supplies of Indian descriptions now contain a larger proportion of inferior and badly made sorts than they did in either 1885 or 1884, with the natural consequence that both qualities and value are markedly below those in preceding years.

To what then shall we attribute the real cause of the deterioration of business in Indian teas? Is it from necessity or choice, and are the tea-planters in India sacrificing quality to quantity, by gathering the teas from their gardens before they have had proper time for becoming matured and full-conditioned? If so it may be a serious matter for them in after years, as they have powerful rivals against them in the growers of Ceylon tea, who are rapidly advancing in public estimation, and may wrest from the importers of Indian as well as China teas the special advantages of the market generally, which they are supposed to hold over and above all other competitors. India up to this time has successfully contended for the approbation and support of her tea industry in the British market, and for many years has displaced large quantities of China productions from the annual consumption of the country; but from the facts already stated, it can hardly be denied that at this moment Indian teas have not the same name and reputation for richness and strength which they had formerly. The home trade themselves, however are the final judges of what Indian, no less than other teas, are or should be in the cup, and as they determine by their rejection of, or preference for, this or that kind of tea, so will the planters everywhere shape their course and regulate the process of cultivation and the mode of preparation and manufacture from time to time. We believe that the question of profit is the secret of all the changes that are taking place in the tea trade just now, and not till this is fairly decided will it settle down into a steady and healthful condition throughout.

"In considering the position and prospects for Indian teas, it is also desirable to entertain a broader view of the whole situation of the tea trade in general, if only for the purpose of pointing out one great inconsistency which prevails therein at the present season more than at any other we can remember—that is, the outcry against rubbishing and ill-prepared teas being imported here, and the coolness and indifference of the reception which fine and superior qualities meet when they arrive. To illustrate our meaning more fully, we will remind our readers that in February last remonstrances and warnings were addressed to the Tea Guild of Shanghai, against the careless and imperfect preparation of China teas for the London market, and assurances were thereupon given that in future more attention should be bestowed upon the teas grown and shipped from the Celestial Empire; but with what result? The new season's teas, it is true, came to hand in all respects better than those in 1885, but, as we observed in the *Grocer* only a fortnight ago, 'tho dealers often will not look at them, and many highly respectable houses are beginning to consider whether it is not a complete farce to have choice teas to sell, when nobody appears inclined to purchase them at any price.' If preferable teas—whether from China, India, or Ceylon, does not signify in the least—are thus at a discount, what encouragement is there to make them and send them across the seas? And if the trade are supplied with the improved article which they ask for, why do they not patronise it when it is placed at their disposal? These are questions which the importers are almost sure to put to the trade the next time complaints are made of the inferiority of China or even other teas, and unless the wholesale dealers can answer them satisfactorily, it will be in vain to expect any but common and poor trashy teas to find their way to the United Kingdom one season more than another. To be quite consistent, if the trade cannot afford to pay the necessary price for good tea they should not order it: and if, instead of the desired article, they get a weak substitute, they must take it and say nothing." —*Home and Colonial Mail.*

THE subject of Balata Gum and its capabilities has been attracting increased attention of late, but wide differences of opinion exist as to the commercial value of this article. As regards the advantages of growing this product in the West Indies, Mr. James John Day, who claims to be the first European who systematically cultivated Balata, states that a company formed by him in 1874 to work it came to grief, because the gum was so unfavourably reported on by telegraph engineers as being quite unfit for insulating purposes. He warns West Indian planters, therefore, not to waste time and money on Balata.—*Indiarubber and Guttapercha Journal.*

NEW ZEALAND EDIBLE FUNGUS.—For the benefit of a correspondent who made enquiries of us lately we extract the following from the current number of that excellent periodical, the *Pharmaceutical Journal*:—"An edible fungus, which is shown in the New Zeland department of the Colonial Exhibition (Hirneola polytricha) forms an article of considerable export to China, where it is used largely as an ingredient in soups, &c., and also as a dye for silks. It is imported from New Zaland to the extent of about 100 tons per annum. This fact suggests that other objects of Chinese commerce might be worthy of cultivation in the colonies, such as the true Gingseng. It bears considerable resemblance to the Jew's-ear fungus of this country, which is common on Elder trees in damp shady places."—*Gardeners' Chronicle.*

VARIETIES OF GNEISS.—The protean structure and colouring of gneiss are well known and according to the *Madras Mail* are strikingly exemplified in the crystaline rocks of Vizigapatam district as described by Dr. King, the Indian Geological Survey:—The only original work previously published on the geology of the district was that of Dr. Benza, who in 1835 accompanied the Governor of Madras on a tour in the Northern Circars and published his diary in the Madras Journal of Literature and Science. His notes show the almost universal prevalence of crystaline rocks, but in some points he was mistaken, as when he supposed that the Bimlipatam hill was capped by coast laterite. As a matter of fact it has no capping at all, but consists throughout of quartzoze and garnetiferous gneiss is as a rule, a very uninteresting rock to the amateur geologist, who, unless he be skilled in petrography, sees little difference of importance between one gneiss and another. To those, however, who have spent years in the study of the geology of Madras this is far from being the case, and, just as Mr. Bruce Foote recently made the important discovery that nearly all the gold fields of the Presidency lie in a peculiar formation which he has named the Dharwar rocks, so Dr. King, when surveying the Kistna and Godavari districts some years ago, found in the neighbourhood of Bezwada a more decidedly bedded and presumably newer form of gneiss than is usually met with in Madras. He then named this rock Bezwada gneiss, but from the predominance of this form in the districts now surveyed he is inclined to speak rather of the Vizagapatam gneisses. Amongst the other geological features of the district may be mentioned the Waltair red sands. These consist of bright red deposits of a fine-grained clayey sand occurring over most of the northern half of the Waltair ridge. Besides its red colour this sand is notable on account of its isolation, there being no visible source from which it could have been derived. But in reality it is only a particularly highly coloured example of what is common over the coastal plains of Southern India. Similar deposits of red sand and gravel are common round the hilly regions of the Trichinopoly, Salem and South Arcot districts, and since they have yielded a number of palæolithic stone implements they probably ought to be classed amongst the post-pliocene alluviums. The most interesting geological features of the district are to be found in the bands of crystalline limestone, which occur in the gneiss of the hill-tract. This limestone may hereafter be found to have great economic value but at present the interest in it is chiefly due to the circumstance that it contains a number of swallow holes, or caverns, one of which is of considerable size and magnificence.

Correspondence.

To the Editor of the "Ceylon Observer."

QUERY AS TO ALLOWING SEVERAL STEMS OF CINCHONA TREES TO GROW.

DEAR SIR,—Can you or any of your numerous readers give me practical information on the advantages of allowing two or three stems to each cinchona tree? What will be the probable increase in weight of bark by following the system, and are there any known or probable drawbacks? —I am, dear sir, yours faithfully, SUBSCRIBER.

THE PACKING OF TEA IN CEYLON AND THE WEIGHING AT THE LONDON CUSTOMS; PROSPECTS OF CINCHONA.

12. Great Tower St., London, E. C.

DEAR SIR,—Although doubtless many in Ceylon are quite familiar with the peculiarities, of the "London Customs" in weighing tea, the following particulars may be of use to those who are on the point of sending their first breaks into the London market. In order to save loss in weight in making up packages, care should be taken not to exceed the round figure in lb. by too many oz. For instance, say a package weighing gross weight 90 lb. 14 oz. would be called by the Customs 90 lb., and a package weighing gross weight 90 lb. 4 oz. would also be called by the Customs 90 lb. the difference between these would therefore mean a loss per package of 10 oz. The same with the tare. A tare weighing 24 lb. 2 oz. would be called 25 lb., yet a tare weighing 24 lb. 14 oz. would also be called 25 lb., meaning a further loss to the shipper of 12 oz. (being the difference between 2 oz. and 14 oz). Therefore, to avoid loss in weight, let the gross weight be say 90 lb. (or any other unit of lb.) plus 4 oz. = 90 lb., and the tare of the package 23 lb., 14 oz. = 24 lb., which would be 90 lb. gross and the tare 24 lb.

Boxes should not exceed 28 lb. Customs gross and should be made up as under—gross 28 lbs. 2 oz., and the tare 6 lb. 14 oz. which would be called 28 lb. gross and 7 lb. tare. If the weight of a box is declared by the "Customs" to weigh 29 lb. gross, an allowance of *one lb.* draft has to be made to the trade. To give proper effect to this, great care must be taken in weighing up the tea before leaving the island, and the scales should be frequently balanced. The teas in London are weighed by a beam scale; and it is said weighing machines are frequently out of order, and not easily detected and should not properly be used in weighing tea for the London market. If packages run irregularly, they have to be bulked in London, which of course leads to loss in weight in addition to the trade allowance of 1 lb. Small lots of 5 packages and under are always weighed each separately.

It has been suggested to me that we should endeavour to do away with the trade allowance of 1 lb. Such an alteration would of course be of decided benefit to all the growers, but to bring about such an important change is a matter of such enormous magnitude, that in the present state of affairs it is quite hopeless. As I said in a former letter, the whole working of the tea business in London is conducted on a system laborious, expensive, and unsatisfactory to the new order of things now prevailing. The cumbersome "weight note" arrangement must be swept away, together with other obsolete forms and customs only suited to the old working of the China tea trade and its merchant princes. As I pointed out before, the Ceylon and Indian Tea Planters' Associations must unite against them and when sufficiently powerful to make their wishes felt, then and then only will this important article be dealt with on the inexpensive and easy system that all other articles of produce are bought and sold at in the London market. It is supposed that it would be no greater difficulty to sweep away these trade allowances in the tea trade, than it was in the bark trade, which is quite a mistake. In the bark trade a few wealthy buyers only had to be urged to acquiescence, and even in that trade, it took some years to bring about so important a change.

What was the result of the Ceylon Chamber of Commerce's cogitations on this matter? I have never seen the subject mooted since in your columns. Ceylon as a rising factor in the tea trade of the world cannot too soon take the matter up.

Regarding Cinchona, I fully endorse what you stated in one of your recent leaders, that the Ceylon growers have more to fear from themselves than from any other countries. Some of us are afraid of Java, whilst Java is afraid of what Bolivia can do. I don't think Ceylon has anything to fear from the cinchona productions either of Java, India or Bolivia. There is room enough for us all with proper care; and by proper care I mean estates should *not* send forward their very low class bark and twigs which can bring but little profit, if any, in the present unsatisfactory state of the market. Let all combine only to send forward fair 1½ per cent. barks and upwards for the next six months, and planters will benefit quite as much with far less cost to themselves, as if they threw in all their common barks to swell their shipments,—common barks can easily be stored on the estates, until they are wanted. Mr. Von Gorkom in a recent letter to me mentioned that the Java export is not likely to exceed 1¾ to 3½ million lb. per annum even by 1890. Nor does he think the acreage under bark now exceeds 20,000 acres. The heavy shipments lately received from Ceylon have by now been tolerably well discounted, and it will be a pity when the market does revive, as it promises shortly to do, to again crush it hopelessly with too eager shipments of twigs and low class barks which are only valuable with a steady unit considerably above late and present rates. Apologizing for trespassing so much on your valuable space, I am, yours faithfully. JOHN HAMILTON.

SHORT WEIGHTS IN TEA.

18th Oct. 1886.

DEAR SIR,—Mr. Hamilton's letter in your issue of the 16th inst. affords a means of gauging the difficulties which underlie a satisfactory settlement of the short-weight controversy; and his explanation of the manner in which the weights are taken in London goes far to exonerate planters from the unworthy suspicion of systematically putting less tea into their packages than they are invoiced to contain—nay more than this; for it seems to suggest, that if they managed *differently* there would be no complaints of short weight at the other end.

It may be that there is a clerical error in Mr. Hamilton's letter, but as I read it, it seems that whilst in taking the *gross* weight, fractions of ½ lb. and under are disregarded, and fractions of over ½ lb. are counted a full pound, it is not so with the tares; in the latter case *all* fractions, however

small, counting apparently as a full pound—and so, if the actual gross of a package was 114 lb. 8 oz., the actual tare 24 lb. 1 oz. and the actual nett 90 lb. 7 oz., yet when this package came to be weighed at the Customs, the gross would be returned as 114 lb., the tare 25 lb. and the net, weight 89 lb. This is doubtless an extreme caset in which the planter having ingenuously made a present to the buyer of 7 oz. tea in excess of his invoice weight, would be punished for his generosity by being mulcted in a further 16 oz. If, however, this be the system on which weights are taken in London, it is scarcely fair that buyers who—*prima facie*—must be admitted to be sufferers to an equal extent, should call on the *planter* for a further sacrifice to recoup them for the result of an inequitable system. Rather let it be an argument—if the system be unalterable—for an agitation to abolish additional trade allowances under the name of draft. In face of the loss due to such a system as the above, the trifling loss due to sampling in Colombo sinks into insignificance.

Planters will doubtless note the stress laid by Mr. Hamilton on regularity in the weight of packages. No doubt irregularity is often met with, but in my own experience, and dealing with my own standard chests, I have not found this difficulty at all insuperable. In the first place, care should be taken in making up a break to have packages of as nearly as possible the same weight, and this can as a rule only be secured by paying regard to the seasoning of the wood—and getting together packages so to speak of equal ages; which will in most cases ensure even weights. The next thing, as there will always be differences of ounces in the weight of shooks, is to sort out, after putting together, the chests according to weight. Thus in 100 chests it is possible that 25 might run to 22 lb. 25 to 22¼ lb. 25 to 22½ lb. and 25 to 22¾ lb. each. In making up a break take all 22¼ (quarters), or all of some other equal weight, but do not mix them—and still less do so if the difference in weight be greater. Then too in order to secure uniformity it is necessary to have a stock, and as the drier the wood gets, the more it loses in weight, it is advisable to check the marked tares on stock chests immediately before use. Uniformity of weight in lead linings is easy of attainment, but even here care should be taken to mould the linings, on a similar plan, so as to leave the same amount of flap in each. Much tea lead is wasted by inattention to this point, and lead cuttings can always be utilized. To show the need for greater attention in checking tares on the estates immediately before weighing, I may mention that I have known packages lose apparently as much as 2 lb. on the way down in the gross weight, leading to the belief that tea had been abstracted en route; but in nearly all cases I have found the discrepancy to be really due to inaccuracy in the tares, and the actual nett weight correct.—Yours faithfully. C. W. HORSFALL.

PADDY GROWING: CHANGE OF SEED—IRRIGATION.

15th Oct. 1886.

Dear Sir,—The Council will soon be voting away large sums of money for irrigation purposes which is unquestionably right if these are judiciously spent, which I think is open to question. Water is an essential element in paddy cultivation, good seed is equally so, and while our Government go on building bunds, erecting sluices, and cutting channels, the matter of seed is almost entirely neglected, hence the miserable returns for the large amounts spent on waterworks. The native cultivator goes on sowing successively—and has been doing so for how far back, no one knows—the seed his own field produces. Is it any wonder the grain is in so many cases miserably light and a great proportion of it simply 'husks'? In passing through a broad extent of paddy-fields, some months ago in lower Sabaragamuwa, with the owner—a native headman—I remarked, you have very good crops this year? "You would think so, sir," he replied, "but they are very poor. There is plenty straw, but the paddy is very light. We get no good heavy paddy as formerly." "What seed did you sow?" I asked. "The seed was all right," he replied, "we never sow any seed but our own." On my recommending a change of seed from a disance, he smiled, and no doubt pitying my ignorance—said, "We don't know why our grain does not fill, but we know there is no fault to the seed." Is it not surprising that this important matter has escaped the notice of our able Governor, whose mind is so much set on irrigation? and why does the Government Agents ignore it in their Administration reports? Probably some of these sapling A. G. A.'s promoted out of due time, neglect the matter in their reports through ignorance of agriculture? So it is time it were dealt with the the press and brought to the notice of the Council. —I am, sir, yours faithfully, LOOKER-ON.

The Great Value of Coffee is beginning to be properly estimated by the fortunate ones who still own an acreage with our old staple in good heart. We may be sure that full justice will be done to such, now that the prospect is of extreme high prices with a gradual falling-off in the production of Brazil. Every effort will be made in Ceylon to help the trees to throw off the effects of the leaf fungus, bug and grub. As illustrating one phase of the attention given to coffee in Uva, we may quote from a circular recently issued by a proprietor to his superintendents on the subject of "handling" coffee and its general treatment with a view to crop:—

"Now that the price of coffee at home promises to rule *very high*, and will probably continue to do so for some years to come, it becomes necessary to remind Superintendents that it is very desirable that the *fullest attention* should be paid to the condition of their trees. There can be no doubt that the seasons have changed and that no longer can periods of drought be counted upon with the same certainty as they could in the past. Such being the case, it seems more than ever necessary that the trees should be *constantly handled*. Where this system has been strictly carried on good coffee in Uva has, *today*, a fine crop on it. We know of an estate of about 3300 acres coffee that lately produced not more than 3 or 4 days ago a *fine healthy* blossom *adding* quite 2,000 bushels of parchment to the crop already set, and there is another in spike on th ehigher coffee; yet, close by, estates that have ignored this factor of *constant handling* have missed fire! No doubt had the anticipated drought been experienced in due season these estates might have had large crops too, but as they have comparatively nothing *they have suffered from the constant rain*, while *constantly handled estates have not*. Therefore act in future so that every advantage may be taken of whatever sun power you may get. *Handle out the trees well* and *constantly*, *keeping a supply of young wood* (nursery in fact) *always in readiness on the trees* and you will get good paying crops when others fail and work perhaps only to a loss, year after year.—This is proved by many estates we might mention. The net results of both systems have this year been invariably *the same*. Wherever poor cinchona interferes with *good coffee it* is a question if it shou notld now be *removed*."

THE MOUSE PLAGUE OF BRAZIL.

In the colony of Lourenço, Brazil, in the months of May and June, 1876, mice suddenly appeared in enormous numbers. They invaded the maize fields in such great numbers that the corn seemed literally alive with them, destroying in a few days everything that was edible; and where but a short time before bushels of grain might have been harvested, not an ear remained; and the noise produced by their nibbling and climbing was audible for a considerable distance. After the corn-fields were devastated the potatoes next received their attention. Only the largest were eaten in the ground, such as were transportable were carried away and hidden in hollow trees, or other retreats, for future use. Gourds and pumpkins, even the hardest, were gnawed through and eaten. Of green food, such as clover, oats, barley, not a leaf was left standing; even weeds were cut down and the inner parts eaten out. In the house the struggle for existence of these long-tailed invaders was truly amazing. In many of the dwellings hundreds were killed in a single day. The cats could contribute but little aid fighting such a plague, for not only were many of the mice so large that it would have been an unequal contest, but by their great number they drove the cats actually from the houses, not to return until the plague was passed. Nothing except what was composed of iron, stone, or glass, was spared from their destructiveness. Furniture, clothes, hats, boots—everything bore the traces of their teeth. They gnawed the hoofs of the cows and horses in the stables, literally ate up fatted hogs and often bit away the hair of persons during sleep. They penetrated all apartments, and gnawed, their way through boards and walls of houses. Ditches that were dug about granaries did not suffice; the mice would climb over each other in some corner or other and thus reach the top. The foregoing account of one occurence in Lourenço will suffice to show to what an extent the plague reached. The same province had suffered similary in 1843 and in 1863, and in all probability will again in 1889. Similar plagues, though far less in extent, have occured in Europe, in which the field-mice unaccountably appeared in greatly increased numbers. One may well think what would be the result were these little, almost insignificant creatures everywhere in such wise to take the ascendancy. When one considers that on an average of every one or two months from five to eight young are born, and that these young become mature in a few months themselves, he will not be surprised to know that a single pair of common field-mice, in the course of a single summer, would increase to 23,000 individuals. Could all the conditions which now keep them in check be removed, every living thing upon the earth would be consumed in a half-dozen years.—*Science.*

A NEW OPENING FOR THE UTILISATION OF THE SWEET POTATO AND YAM IN THE WEST INDIES.

The root crops, often termed "bread kind," associated with the above plants are largely used in the West Indies for food purposes. The sweet potato (*Batatas edulis*) is the main food crop at Barbados, where yam is little known, whereas at Jamaica the converse is the case, the yam (*Dioscorea*) being very largely grown all through the interior hills, while the cultivation of the sweet potato is confined to a few places in the lowlands. Since the large emigration of negroes to the Isthmus of Panama there has arisen a considerable trade in yams between Jamaica and Colon, to the manifest advantage, in present cash returns, of the former country. Unfortunately, the cultivation of yams entails the cutting down of forest year by year, as good yams seldom do well, in the manner cultivated at Jamaica, except by the "rotation of land"—a peculiar negro mode of interpreting the European idea of "rotation of crops." Hence it is not very desirable, from a general economic point of view, to extend or encourage the cultivation of yams. With the sweet potato, however, it is different. This tuber can be grown without the sacrifice year by year of valuable virgin forest, and it is, in many respects, a crop well adapted to all the lowlands, not only of Jamaica, but also of the West Indies generally.

Besides being utilised directly for food purposes, it would appear that a new demand is likely to arise for the tubers of the sweet potato in connection with the production of the alcohol. The first notice of the sweet potato being utilised in this manner appeared in a report to the Foreign Office given by Consul Hertslet on the trade and commerce of the Azores for the year 1884.

Owing to a variety of causes, it appears that cultivators at St. Michael's and other islands of the Azores, who had hitherto looked upon oranges as their staple production, were so disheartened by low prices and the diminished crops yielded by their trees, that they resolved to clear their land of everything and plant it afresh with sweet potatoes. The whole of the crop thus raised was used in the preparation of alcohol.

During the year 1884, 1,326 pipes of alcohol, of the value of £40,588, made from sweet potatoes, were exported from Azores to Lisbon; and, as will be incidentally shown later, the trade has assumed still larger proportions.

For the imformation contained in this article we would mention at the outset that we are indebted to Mr. D. Morris, late Director of public Gardens and Plantations, Jamaica, now of the Royal Gardens, Kew, who has obligingly placed it at our disposal for the use of West Indian planters.

Encouraged by the success of the enterprise at the Azores, it appears that an enterprising French chemist, Monsieur A. Ralu, having much experience in chemistry, as connected with distillation, and possessing extensive relations with the West Indies (Martinique), has taken out patents:—(1) For utilisiug as a commercial and industrial substance sweet potatoes and yams by means of desiccation and conversion into flour; and (2) for distilling alcohol from the above flour.

In relation to the ordinary or Irish potato, white beetroot, and maize flour, sweet potatoes possess an alcoholic richness of 15·50 per cent as compared with 8 and 9 per cent in the Irish potato, and 4 and 5 per cent in the beetroot. The value of raw sweet potato for distillation, and its superiority, both as to quantity and quality, over other substances, has been for some time known and recognised. The difficulty has been in extracting the alcohol on the spot; added to this, there is the danger attending its exportation, for it is impossible to prevent leakage, and the vapour of alcohol at 95° Fahr. in hot climates is said to be inflammable. Alcohol, therefore, is assumed to be a dangerous cargo. As alcohol cannot, it is supposed, be made on the spot and exported to Europe, M. Ralu's patents aim at the preparation of sweet potato flour in the West Indies, from which afterwards the alcohol may be distilled and utilised in Europe.

As already noted, one establishment for distilling alcohol from raw sweet potato exists at the Azores, and we gather that since it began work it has doubled its plant, and all the alcohol it produces is sold in advance at Lisbon, where it is used for the fortification of wines. M. Ralu says:—"The alcohol of which we have specimens is superior in quality to the best marks of France. The distillery obtains 12 per cent (*i.e.*, 12 litres of alcohol at 100° per 100 kilog. of sweet potato) of alcohol. We have experimented with the sweet potato of Algeria. They give 13 4-10 litres of alcohol per 100 kilog. The sweet potato of Martinique and Brazil have given 15 litres. There is here, therefore, a very rich material for distillation. Ordinary potatoes yield only 3 litres of alcohol per 100 kilog."

The objects sought by M. Ralu's patents involve the extensive cultivation of the sweet potato in the West Indian Islands, its desiccation by means of fruit driers, its reduction into a meal, and its export to Europe, where an almost unlimited demand exists for sweet potato meal for distilling purposes.

The alcoholic richness of sweet potato is unquestioned, and the following table will give its superiority over the cereals ordinary employed at present for distilling in Europe:—

	Francs	Litres
Wheat	19·75 to 21·50	28 to 30
Rye	15·50 to 16·25	22 to 23
Barley	17·75 to 20·00	24 to 25
Oats	17·25 to 19·50	20 to 21
Buck Wheat ...	16·00 to 17·00	24 to 25
Maize	14·00 to 14·50	28 to 30
Rice	18·00 to 19·00	32 to 33
Sweet Potato Flour	14·00 to 15·00	38 to 39

Maize, it will be seen, is the only cereal which is as cheap as the potato flour, but it requires 324 kilog. (714 lb.) of maize to make one hectolitre (22 gallons) of pure alcohol, whilst it requires only 235 kilog. (519 lb.) of the flour to make the same amount of alcohol. There is a great saving of time and combustibles when distilling from the flour, as compared with the maize. Alcohol from maize costs 10 f. per hectolitre more to make, and when made sells from 8 f. to 10 f. less than the alcohol made from the sweet potato flour.

The question for the planter, however, is, Will it pay to grow sweet potatoes and to prepare the flour for export purposes?

The sweet potato at present cultivated in Jamaica is mostly intermingled with other plants in the provision grounds of the negroes. Hardly any is cultivated by Europeans. No definite area is returned as exclusively devoted to this cultivation, and no returns or yield per acre are available from authentic sources. A negro in the same ground will have yam (*Dioscoreæ*), corn (maize), sugar-cane, and possibly, also, two or three other plants, such as bananas. plantains, cocos (*Colocasia*).

Sweet potatoes thrive best in rich friable soil free from clay.

At the foot of the Liguanea Hills, and, indeed, in most localities with the soil indicated above, they are found to thrive. They are easily propagated by slips or portions of the stem planted in rows or in hills. The roots come to maturity in three or four months, and the cultivation is continued by covering up the stems when digging up the more perfect roots for use. The crop comes in practically all the year round: there is no regular season for it, and hence it can be best harvested by examining the state of the roots, and taking out those that are found perfectly ripe. The crop may be gathered at least three or four times in the year; but as to the amount or value of each cropping, no data are immediately available.

If the cultivation were undertaken by sugar planters, and large areas were planted with sweet potatoes, there is no doubt that in Jamaica they might be grown as advantageously and as successfully as anywhere.

We apprehend that few of the West India Islands would care to grow sweet potatoes to be utilised simply in the manner indicated by M. Ralu. Why should they go to the trouble and expense of drying the tubers, reducing them to a meal and export the latter to Europe to be there converted into spirit? If the whole process can be accomplished at the Azores, there is no reason why it should not be also accomplished in the West Indies. We say this with due regard, of course, to any patent rights held by M. Ralu or his friends. At least, it is well worth trying; and the number of sugar planters now on the look-out for something to supplement the meagre profits (or something worse) of a West Indian sugar estate should lead to some concentrated and united action being taken to examine and test everything having the slightest hope of aiding them at the present juncture.

In relation to its size, Barbados at present grows sweet potatoes more extensively than other West Indian islands. They are grown as a catch-crop between the regular intervals of planting the sugar cane, and are generally sold as they stand, the purchaser harvesting them himself. Here there would be no difficulty in growing sweet potatoes on the most extensive scale commensurate with the size of the island; but there are no stills already in existence as in Jamaica, and both the plant and the knowledge of distilling would have to be introduced. Jamaica has the advantage in this respect, for every sugar estate there has its still-house, and when once the *modus operandi* is known has regards this special industry, it would be a very simple matter for the Jamaica planter to distil alcohal pure and simple from the sweet potato, as for him to distil rum from molasses. The Barbados planter at present ships his molasses either to Europe or America, or sells it to the distillers at Martinique, where it is used in the preparation of French rum.

It is not our intention to advocate, in any decided manner, the preparation of alcohol from sweet potatoes, or cypress a strong opinion either way. We only wish to point out the West Indian planter a possible means, in these hard times, of meeting a demand which evidently exists for a certain article, and to throw out suggestions which may be of ultimate benefit to him. At St. Vincent, for instance, where nothing at present appears to pay a well-established industry connected with this method of utilising sweet potatoes might give the initial start to local enterprise and lead to a more prosperous state of things. Or, again, there is Tobago, with its Métayer or *quasi* co-operative system, which might offer an excellent opening for and industry of this kind, provided, of course, it were taken up in a business-like and systematic manner, and adapted to the special circumstances of the island. In fine, this is essentially a matter which commends itself for consideration to West Indian planters in general. and they would do well to look carefully into it.—*European Mail.*

THE PLANTAIN AND THE HORSE-SHOE BAT IN BORNEO.

The plantain of Paradise obtains its name from a legend that Adam and Eve clothed themselves with its broad green leaves after they had eaten the forbidden fruit. In India, where it is indigenous, the plantain is termed *Pisang*; here, as elsewhere, it is cultivated as one of the principal sources of food. Jamaica, it is said, would be scarcely habitable without the plantain, as no species of flour or bread could supply its place to support health and strength in the negro. Bananas and plantains, when fully ripe, are eaten as fruit, but unripe are boiled as a vegetable, and eaten with meat or fish. In South America the ripe fruits of both plantain and banana are first dried, then pounded into flour, which is made into biscuits. One hundredweight of dried fruits yields forty pounds of dry meal; four hundred and fifty pounds yield a weight of meal (sic). A fermented liquor, also an excellent temperance drink, is made from both plantain and banana. The ripe fruit of either being pressed through a cane sieve, is first wrapped in the green leaves, and then dried in the sun for future use; one of these dried portions being dissolved in water, there results a pleasant, nourishing, and refreshing drink. The plants of all the tribe Musaceæ attains perfection in ten months from the first planting to the ripening of the fruit. The growth of the fruit, either banana or plantain, is peculiar and unlike any other. When the tree-stem is fully grown, spikes of flowers appear from the centre of the top; these spikes are from four to six feet long with knots of blossom on one side only; this is followed by the fruit, each being about twelve inches long, growing in green clusters, forming a bunch sometimes upwards of forty pounds in weight. The bulb at the end of the spike somewhat resembles in colour and shape a bullock's heart. The cluster of fruit is generally taken off before ripe, it mellows, turns yellow, and eatable. Sometimes it is left to ripen when it becomes a dainty to be stolen by animals. Bats are fond of bananas, particularly the horse-shoe bat, which has a dark projecting ridge over its upper lip, resembling a horse-shoe. These bats are precisely similar to those of Madagascar; there they are termed Rousettes. In Borneo this bat

is known as Melanopis. It is a formidable creature about four feet broad, and one foot long from the tip of the nose to its almost imperceptible tail, the form of its wings, in its manner of flying, and in its internal structure, is similar to our common English bat, but there the likeness ends. The large bats of Borneo and Madagascar resemble a fox in colour, and some of the specimens in the shape of the head and in their predaceous habits. These creatures are often seen darkening the air by day as well as night; they destroy the ripe fruits of the country, drink the juice of the palm trees, and devour indiscriminately fruits, insects and flesh, sometimes settling upon animals, and will attack a human being when sleeping. A portion of the tongue of the bat is constituted as an organ of suction. These bats at night make a noise that can be heard for two miles distance, but at daylight they generally retire to their caves or hollow trees, for they make no nest, but hang by the wing claws to the sides of the dark rock or hollow tree. They are singular creatures, being neither birds nor quadrupeds. They are never seen to walk. The feet resemble long fingers, but are webbed like a duck's feet, the membrane however, being thin. This serves to lift the body for flying, which soon tires it. In some places in South America the bats have a protuberance, resembing a horn between the long ears, and just above the nose. These generally keep to the forests and deserted places, but when they come into a village, as they sometimes will, they darken the air like a canopy, and become the dread of the villagers, as they attack and suck the blood of all domestic fowls, and if interrupted will fly at the face of the intruder doing serious injury.—*Ladies Treasury.*

PRESERVING FRUIT, FRUIT-JUICES, MUST, AND FRUIT WINE BY SALICYLIC ACID.

Dr. F. von Heyden's successor, manufacturer of salicylic acid at Radebent, near Dresden, writes as follows:—

Fruit and fruit juices can be preserved in a variety of ways by means of salicylic acid, and which permits of being employed in all the various methods, jam making and preserving, &c.

1. Cherries, Currents, Raspberries, Green Gage Plumps, common Plumps (*zwetschgen*), Peaches, Apricots, &c., are placed in wide-mouthed glass bottles holding about 1 kilo. (2 lb. English,) without water being added, putting alternately a layer of fruit and one of sugar. The upper layer must be of sugar. Above this last half a gramme about half a teaspoonful of dry crystallised salicylic acid is strewed. The bottles are then covered with parchment paper in the usual manner and placed in a water bath, and the water allowed to simmer for fifteen to thirty minutes, according to the size of the fruit—small fruit requiring less time than large; berries about thirteen minutes. When cool it is advantageous to cover with a piece of salicylic acid paper, and make fast. Fruits treated in this manner have and retain constantly the appearance of fresh fruit.

2. If it be desired to preserve large fruits, such as Quinces, Melons, Gourds, also Rose haws, in great earthen cooking vessels, put into the usual sugar and water syrup, half a gramme of salicylic acid per kilo. of fruit. When filling the bottles a good fitting piece of salicylic acid paper, which must be saturated with a concentrated solution of salicylic acid and rum, must be laid on the surface.

3. When preserving Melons, Gherkins, Pears, Plums &c., in vinegar, a little more than the proportion of salicylic acid given above can be added to the boiling vinegar and sugar, and the rum-paper can be omitted.

4. Russian rum compote.—The making of this is begun at the new year, and ends late in autumn, all sorts of fruit being placed in a large vessel as they come into season. The following is the process adopted in this kind of preserving:—Strawberries, for example, are placed in a layer, bestrewn with sugar, and a glass of rum is poured over the mass, and as this kind of compote easily ferments, half a gramme of salicylic acid per kilo. of fruit must be added each time anything is put in.

5 In making marmalade (must) and some other particular kinds of fruits, as well as the so-called *tutti frutti*, the salicylic acid is added towards the end of the operation, and preferably in the form of the rum solution.

6. Freshly pressed fruit juice, with or without sugar, are preserved in excellent condition in a cool place in resined bottles, by the addition of half a gramme of salicylic acid to 1-2 kilo. of juice. Such kinds of fruit juices, free from alcohol, and not oversweetened, make agreeable drinks, mixed with water, for children and convalescents. The raw juice of small fruits require in the warm season, when they are made, about 50 grammes per hectolitre put into the vessel when no spirits are added, so that fermentation be prevented. Complete exclusion of the air, and a cool storing place are absolutely necessary conditions of preservation in this case. Attention must be paid to the equal division and mixing; and if the acid be dissolved in spirits of wine, ten times the quantity of juice can be diluted, and then be well stirred about. In the wholesale manufacture, when a large addition of spirit is made with the intention of increasing the quantity, and therefore the use of salicylic acid does not appear to be necessary, the mash remains several days in the tubs before it is pressed, exposed to the risk of an injurious fermentation. This evil can be avoided, and the fine aroma preserved, by means of an addition of salicylic acid, dissolved in alcohol in the propotion of .5 to 10 grammes for every 50 kilos. of raw fruit as it is put into the vessel, or after the same is filled. By this means the juice will be more thoroughly and quicker clarified than by the usual method by means of spirit, because all kinds of fermenting organisms, owing to their absorption of the salicylic acid, remain inoperative.

7. Grape juice continues sweet and clear for a whole year, when 20 to 30 grammes of salicylic acid per hectolitre (=half a teaspoonful) per kilo. are mixed with some must into a sort of thin dough, free from lumps, and added to the unfermented must immediately after it has left the press. In fourteen days later the juice after becoming clear can be put into bottles. The latter must be washed out with a watery solution of the acid, and the corks should be boiled in the same.

8. Cyder and perry can be kept for long periods by the addition of 10 grammes per hectolitre. If the articles are preserved in casks, 5 grammes are given in the spring and 5 grammes in the summer. Complete exclusion of the air from the contents of the casks is essential, and by partial opening of the same the air should be passed through a cotton-wool plug saturated with salicylic acid, or, better, through prepared salicylic acid wadding.

Apples and Pears remain in good condition and can be layered in large quantities when each fruit is wrapped in paper impregnated with salicylic acid. This last is readily made by soaking blotting or tissue paper in a mixture of alcohol and acid and hanging it over a string to dry. The complete purity of the acid is essential to success. *Deutsche Garten Zeitung, Sept. 22.—Gardeners' Chronicle.*

Germination of Seeds of the Vine.—M. Nobbe has ascertained that the number of seeds which germinate is proportionately small, and that the process of germination occupies weeks and even months. The seeds of the best varieties germinate less freely than those of commoner kinds. Ripe seeds freshly taken from the berries germinate best: drying of the seed diminishes the germinating power. There is no advantage in heating the soil to 18° or 20° C. (68° F.) A slight fermentatin in the pulp acts favourably, but the same operation if continued for six days destroys the germinating power. The best temperature for germinating Grape seed lies between 12° and 15° C.—*Gardeners' Chronicle.*

PALM KERNELS.

A correspondent seems anxious to know if the importations of palm kernels from Africa which are recorded in the *Reporter* almost every week, go into consumption here. We have been asked before what disposition is made of them. Last week the receipts of palm kernels at this port were valued at $2,000 and a considerable quantity arrived previously. In making inquiry for our correspondent, we were informed that a New York drug house used the kernels in medicinal preparations, or the fatty substance as a base for ointments, salves, &c. If such is the case, the amount used is trifling compared to what is consumed by soap manufacturers. It is understood that nearly all the palm kernels imported into the United States are sent from here to Liverpool and elsewhere on the Continent to be crushed for the white soap stock which is sent to this and other markets. Some enterprising capitalists who understood the business and commanded a good trade for soap stocks, undertook to establish a factory in Boston for manufacturing palm kernel oil, but after all the plans were matured and the contract awarded for erecting suitable works, it was discovered that only sufficient kernels could be secured to run the factory three months in the year, and for this reason the scheme was abandoned. The same parties have since congratulated themselves on their narrow escape from a heavy loss, as since that time prices have declined to some extent and the Boston market has been burdened with heavy stocks of palm oil, up to the present period. Palm kernel oil bears no resemblance to palm oil, and is held at one-quarter and one-half a cent per pound above the latter. Its chief competitor is Ceylon coconut oil.—*Oil, Paint and Drug Reporter.*

GRAIN GROWING AND LABOUR IN INDIA.

The chief secret of India's ability to undersell her competitors is the nominal wage for which the ryot will work. Sir James Caird says that an Indian family of four can live comfortably on 5*l.* 6*s.* a year, and clothe themselves for 30*s.* more. An American, writing from India a month or two ago, said that twenty-five farm coolies cost no more for wages there than one farm hand does in the United States; in addition to which the Indian boards and lodges himself. The Chinaman has always seemed to the Yankee to have reached the lowest possible poin in cheap living, but this writer says that, as compared with the Hindoo, he cannot get a foothold. The tools used are of the cheapest and most primitive character. What passes for a plough is a rough wooden implement which simply tears up the ground. It costs 1*s.* 8*d.*, and is drawn by a pair of bullocks, the average cost of which is 32*s.* the two. The only other implement used is a cold-crusher, and this is merely an ordinary log of wood which is dragged by the bullocks sideways across the field. One of the most serious items in the cost of cultivation is watering the soil. This has to be done three times during the growth of a crop, and costs altogether about 10*s.* an acre. This is an item of cost which, with improved irrigation arrangements may be reduced. The total cost of cultivating an acre of wheat in the Punjab has been stated to be as follows:—

	£	s.	d.
Rent, per acre	0	14	6
Cartage of manure	0	4	10
150 lb. of seed	0	6	8½
Ploughing twenty times ...	0	3	1½
Sowing by hand	0	0	7½
Watering three times	0	10	0
Reaping and carrying	0	2	6
Threshing	0	1	5½
Winnowing	0	0	3½
Total	2	1	11½

On good irrigated land the crops average about 17 bushels per acre. On ordinary dry land 10 bushels is the average. Two crops are got in a year—one in October and the other in April. The North-West Province and Oude are the chief wheat-producing districts. They comprise an area of more than one hundred thousand square miles of excellent soil. Last year the total area devoted to growing wheat in the whole of India was 27,820,223 acres, which produced close upon 300,000,000 bushels. It has been contended in some quarters that as India has with full crops only been able to export about one-sixth or one-seventh of her production, she is not likely to glut the markets of the world to any serious extent. The fact, however, seems to be overlooked that India is only just developing facilities for getting its wheat away from some of the most productive districts. More wheat has not been exported simply because it could not be got to ports of shipment at a reansonable cost. In good years enormous quantities have been left to rot on the ground because there were not means of exportation. But once open up a market for the grain, and make it possible to reach it easily, and there is scarcely any limit to the quantity that can be produced.—*British Trade Journal.*

COCA CULTIVATION IN THE DUTCH INDIES.

The director of the National Botanic Gardens at Buitenzorg, near Batavia, in his report for 1885, states that in the gardens under his control extensive experiments have been made in the cultivation of coca. These attempts have invariably been attended with success: every seed sown has germinated, and the plants flourished with a minimum of care. Many inquiries for coca seed arrived from planters in all parts of the Dutch colonies, and they were in every instance responded to. But strange to say, though sound seed was supplied to every applicant, in most instances the attempts on the part of the latter to raise the coca plants were unsuccessful. The director gives particulars of eighteen attempts at cultivation, of which only five succeeded. The coca plantations which promise well are situated in the residences of Soekaboemi, Tjitjalengka, Malang, and Tjiandjoer. The report attributes most of the instances of failure in raising coca to the unsuitable or neglectful treatment of the seed by the applicants; but the director is of opinion that with ordinary attention the shrub may be successfully raised in different parts of Java. During the prevalence of the east monsoon the young plants suffer considerably from drought, and should be watered daily, and the soil around them covered with mould. The seed decomposes easily, and the application of moisture should therefore be a moderate one. The seeds generally germinate after forty or fifty days. They should then immediately be exposed to the light in order to prevent excessive elongation, which is generally followed by decay. Rats and insects are dangerous enemies to the seeds, especially before the proper development of the cotyledons. During protracted drought coca plants do, perhaps, require some shade, but this should be a light one in any case. In the Buitenzorg Botanic Gardens 1,116 coca plants were put in the ground last October between growing rows of *Eucalyptus pilularis*.—*Chemist and Druggist.*

TOBACCO.

The following extracts are taken from a pamphlet written by Sir William Robinson, K. C. M. G., the Governor of Trinidad.

CULTIVATION.—For general information and guidance I would state from my own experience the following facts:—

1. Any ground intended for the growth of Tobacco should be cleared of bush by the end of July at latest. The bush should be cut as low as possible, and the stumps extracted if practicable.

2. Seed should be sown in the middle of the month of August and not all the year round as is probably now the case.

3. Every plant before being transplanted must have six leaves on it, and those leaves should be as large as a half-dollar piece before it is removed from the nursery.

4. When transplanted, a distance of 18 inches should be allowed between each plant.

5. Tobacco plants are sometimes attacked by insects in November. This, however, depends upon the state of the weather. The plants should be carefully watched, and the insects, if any, picked off.

6. As soon as suckers present themselves they should be ripped off; they will be found between the stem and the leaves. By this operation the vigour of the plant, which should not be allowed to flower, is increased, and the condition of the leaf improved.

7. Tobacco flourishes best on level ground, and red or reddish soil is preferable to any other. If the spot where it is cultivated is at all hilly, the northern portion of the ground will be best, as in that position the plants will suffer less than in any other from the rays of the sun.

8. Vegetable manure will be found an admirable fertiliser, and it will be necessary to dress the ground every two years, as the plant exhausts the soil very rapidly.

9. Care should be taken, in sowing the seed for transplanting, not to sow too thickly.

Curing.—10. The curing of Tobacco—and everything depends upon the curing—is a very delicate operation, and one requiring great care and attention. The most common practice, when the leaves are fit for gathering, is to cut the stems of the plants close to the ground and lay them on beds to dry until the evening. They should then be carried to a drying-house, which should be thoroughly ventilated, laid in heaps to "sweat," covered with mats to keep in the heat, and left for several nights to soften and bleach. The leaves—and no more than twelve should be allowed to grow on each stem—should when supple be stripped from their stems, strung together on packthread and then hung across the drying-house: sufficient room for the air to circulate among them must be allowed. When dry the leaves should, in damp weather, be placed on hurdles in heaps and left for a week or two. During this time the leaves should be frequently examined and turned with a view of preventing undue fermentation. When fermentation is complete the leaves should be sorted according to their different qualities, redried, tied in bundles and pressed.

11. It is necessary in the case of those intended for export that the bundles should be compressed into a solid mass and the air excluded from them.

12. In Jamaica, Cuban, Chinese and native labour is employed in the cultivation of the plant, but Cuban and Chinese labour alone is employed in the manufacture of the leaf into cigars.

13. The cultivation of two acres of Tobacco should cost about £30 and the average produce should be worth £80, leaving a nett profit of £50.

The Director of Kew Gardens informed me for years ago that with "proper methods of cultivation and preparation Tobacco might become a very important article of export from the British West Indies."

If any one should doubt the correctness of my rules let me say, though it may appear egotistical, that Sir Joseph Hooker observed that "Governor Robinson's excellent despatch" (from which they are taken) "really leaves little room for further remark. It is of course desirable to obtain seed of good quality, though this is of less moment than careful attention to cultivation and preparation. Governor Robinson's statement that the finest Tobacco in the world may be spoiled by improper or inefficient curing cannot be too much emphasised." Looking to the fact that Spanish colonists in two distinct parts of the world, east and west, grow Tobacco with pre-eminent success, it certainly is difficult to understand why more should not have been done with it by British enterprise.—*Gardeners' Chronicle.*

THE ENGLISH TOBACCO CROP.

Of tobacco literature available for immediate assistance I would name as the best Spon's Encyclopædia of Commercial Products; the section therein is masterly and exhaustive, referring especially to cultivation and curing in the U.S. and India. Then a shilling pamphlet, "Why and How Tobacco should be Grown," published by Nichols and Sons, Parliament-street, contains much concise information, brought together by Mr. A. A. Erskine from numerous sources. The third edition of the pamphlet, "Cultivation of Tobacco in England," issued by Messrs Carter and Co., 237, High Holborn, contains, beside much general matter, a valuable and practical paper from an American publication lent by Lord Harris, wherein it is noted "five curings are spoilt by proceeding too fast to one failure from going too slow." This American authority recommends as a dry, curing heat that shall expel the sap from the leaves, stems, and stalks of the plants, and catch the colour—yellow, (next one to nature's colour, green)—and to fix this yellow colour indelibly, the employment of stone or brick flues, with furnace and pipes, and with fuel of old wood. As such flues do not exist in England, the nearest substitute should be attempted. In a medium sized tobacco plant is about one pound of water, and this has to be expelled in from eighty to one hundred hours. Thus:

About thirty hours at a temperature of 85° to 90°;
About four hours at a temperature of 100°
About four hours, advancing 2½° to 110°;
About four to eight hours, advancing regularly, 120°;
About six to eight hours maintained at 120°;

until the leaf appears to be cured and all sap expelled; then advance 5° every hour up to 170° to thoroughly cure the stalks and stems in those cases where the whole plant is hung. Of course, where only the leaves have to be cured, the treatment is completed earlier. When cured properly most of the leaf will be of a mahogany colour, the remainder of a bright dapple to a cherry red.

To me the whole of the inclosures (plots surrounded by a single line of hops at right angles) appeared to have been overfed with manure—the result of delay in permission for the experiment to be made. In another season due preparation of the ground by working and manuring should be made in time for the soil to get duly mixed with the fertilisers employed. Farmyard manures, wood ashes, and sheep droppings had been applied to the ground from which hops had been grubbed up. Mr. de Laune raised some of his plants from seed placed in a hotbed during May, and set out from June 10 to June 26. Other plots were from seedling plants reared by Messrs. Carter of Holborn. The distance of the plants apart is about a yard—as recommended by American practice—but the luxuriance of the English plants demands much more space for the large-leaved varieties, so as to allow room between the rows, to cultivate and clean the crop from rapidly-growing suckers, &c. During the past week this work could not possibly be accomplished without a greater evil following, through injury to the finely-grown and ripening leaves overlapping each other.

In reply to a schedule of questions, Mr. de Laune has favoured me with the following particulars:—

1. Names of varieties grown: Kentuky, Connecticut, Pennsylvania Island Broad Leaf, Hester, Virginia &c.

2. Prepared bed for plants with foot of farmyard manure and a few inches of loam on the top. Did not burn over the soil before planting out. Covered the seed plants with sheets on cold nights.

3. Set out plants (June 10 to 26) in hills made by hand.

4. Percentage of first planting which rooted and grew off. Very few died from natural causes, and none from insects or worms.

5. The soil is loamy (formerly a hop garden); last crop turnips, fed off by sheep.

6. Manures: Wood ashes, bats' guano, farmyard muck, &c. How applied: direct to the plant hills and broadcast.

8. Date of first topping—July 24. Average number of leaves left on each plant to mature—ten. I did not prime or pull off inferior leaves.

9. Did not see any horn worm.

10. Earwigs the only insects that preyed upon the plants.

11. Daily record of weather.—(Refer for this to district tables.)

12. Costs of producing crop.—Must have time to answer.

13. Date of cutting.—Commenced Sept. 3 and Sept. 22; am now proceeding. Mode of curing.—By fires in hop oasts.

14. Total yield in pounds of marketable tobacco per acre, and in what proportions of quality.—Answer must be postponed.

I may add that I saw, on Monday afternoon, the prompt enterprise which Mr. de Laune exhibits in all his agricultural undertakings. The tobacco leaves as they were cut were strung together in pairs, and at once suspend from a rod supported by a newly-made wooden horse of the right height. So the leaves, some nearly two feet broad and over a yard in length, cleared the ground, and when the rod was completed it was carried away to a framework on wheels, which latter when loaded was trundled off to the ample oast house. This picking off the leaves for curing, rather than struddle the whole plants in pairs, seemed to me decidedly the best practice, as the stalks require much more time and heat to dry than do the leaves.—*Field.*

PARAGUAYAN TEA.

From its earliest history, *yerba mate*, or Paraguay tea (botanical name *Ilex Paraguayensis*), has gained a greater notoriety than any other article produced in Paraguay, and has been the chief source of revenue. From it Francia and the two Lopezes gained their enormous wealth, as did the Jesuit fathers before them. Lopez I. annually exported about eight hundred thousand dollars worth. The last year of his life the export, of which he had the monopoly, amounted to more than twelve million pounds, of which the value was between five and six million dollars. The curing of *mate*, which like all other active industries, was almost wholly destroyed during the war, has revived with the return of peace and is regaining something of its former importance. Eleven million nine hundred thousand and twenty-four pounds were exported in 1881, of which the official value was $996,752. It was from the universal use of the leaves of this plant in what was then known as Peru that Europeans derived the custom of tea drinking. Paraguay tea was introduced into Europe fifty years before the Chinese herb was known there. It is said that the latter gained the precedence by an opinion which some physicians were hired to give by parties interested in the traffic, that the Paraguay tea was injurious to health. Quite as reasonable an explanation might be found in the different business methods of the parties engaged or interested in the traffic from the two sections of the globe. The plant is indigenous to the entire northern part of the La Plata basin, and grows spontaneously throughout a wider district than the combined areas of France and Germany. In no part, however, does it reach such perfection as in the locality from which it took its name. The finest species is said to be found only in a comparatively small district lying north of Asuncion and east of the Paraguay River. This variety would probably thrive under cultivation in all sections where any species of the plant is found growing wild. The increasing demand for it in European markets will eventually incite to its cultivation. Washburn thus describes a visit to the *yerbales*: "April 8. This morning the work of collecting the *yerba* commenced. The process of curing was as follows:—A dry, level place is selected and a circular spot some twenty-five feet in diameter made perfectly smooth and hard, and a layer of damp clay spread over it and stamped down till it becomes a hard and smooth floor. Within this space a number of small trees are set into the ground in circles of about eighteen feet in diameter. The tops of the trees are bent over and interwoven into each other so that an oval roof is formed. Then, commencing some three feet from the ground, long *withs* are woven in longitudinally with the upright poles, forming a sort of open basket-work at the top. The *peons* next go in search of the *yerba*, which they collect and bring to the camp. They take with them a sort of basket made of thongs of raw-hide, that they adjust on their shoulders and neck in such a manner that they carry enormous loads. Provided with this and a hatchet, the swarthy native plunges into the woods to look for the *yerba*. That most coveted is the bush from six to ten feet high, which he cuts down, and then, chipping off all the branches and leaves, whips them into his basket. It is the medium-sized shrub that is most sought. Sometimes the bush grows to a tree of twenty-five feet or more, but those are left unmolested when the smaller shrub can be found. So soon as the *peon* collects as much as he can carry he returns to the camp, and the branches, having the leaves still on them, are passed quickly through the blaze of a hot fire, and the leaves are stripped off and thrown upon the ground. When a sufficient quantity has been gathered in this way the leaves are all taken up and worked into the wicker-work of the oval structure before described. They are worked in with great care and so as to be of a uniform thickness over the whole surface. When this is finished the floor beneath is swept out, and a pile of wood that has long been cut and seasoned is placed underneath and a fire kindled. The heat soon becomes very great, and much care is taken that it reaches all parts overhead alike, so that none of the *yerba* is scorched and none that is not completely dried. To cure it thoroughly every particle of moisture must be driven away, and as there are always more or less of the stems of the wood of considerable thickness it is not considered safe to withdraw the fire until it has been in full flame for some thirty-six hours. When the roasting process is finished the fire and ashes are drawn out, the floor carefully swept, and the now cured *yerba* is shaken to the ground. It is then gathered up and placed under cover ready for packing.

"The packing process is not the least singular of the *yerba*-curing operation. First the green hide of a large ox is taken, and a strip about five feet by two and a half is taken and sewed up with thongs from the same hide in the form of a square pillowcase. It is then attached to strong stakes driven into the ground and a quantity of the *yerba* is put into it, when a couple of stout *peons* proceed to press it down with heavy sticks of wood in the form of hand-spikes. It is a very slow progress, as the *yerba* is beaten and hammered in until the mauls, though pointed at the ends, can hardly make an indentation. When as much has been forced in by this operation as possibly can be, the open sides are brought together and laced up with thongs of the green hide, and then it is left to harden in the sun. What with close packing and the contraction of the hide by exposure to the sun, it becomes almost as hard as a rock. The bales, called here *tercios*, usually weigh from one hundred and fifty to two hundred pounds each."

Numbers of these *tercios* may be seen at the various ports along the river and being unloaded before *almacens* in the towns. Small ones weighing an *aroba* (twenty-four pounds) are not uncommon, and those of a half or even a quarter *aroba* put up in the same way may sometimes be encountered. The pounding to which the *yerba* has been subjected to the process of packing has reduced the dry leaves and twigs to a fine powder of a pale-green color tinged with brown, which is highly aromatic. It is called *yerba mate* from the cup from which it is partaken of, and is more frequently simply called a *mate*.

To prepare the tea, which is the universal beverage of the La Plata countries and the unfailing token of hospitality, the cup is half filled with the powder, with or without sugar, the *bombilla* inserted and the cup filled with boiling water,—for which the

kettle is always in readiness,—and the hot liquid is sucked slowly through the tube.

Yerba mate is the one indispensable luxury of all classes throughout the La Plata countries. A cup of the tea is taken the first thing in the morning, and also after the midday siesta. It is presented to a visitor within a few minutes after entering a house, and is not infrequently tasted by the hostess before being passed the guest. The same cup passes from guest to guest and to the several members of the family, being refilled as required. Upon entering a house and finding the lady taking her *mate*, she has immediately withdrawn the *bombilla* from her lips and passed it to me. I have also frequently seen the servant trying the flavor through the *bombilla* while bringing in the mate.—From "La Plata Countries," by E. J. M. Clemens.—*American Grocer.*

Piper Betle Leaves.—According to Messrs. Gehe and Co. (*Handelsberichte*) a supply of the leaves of the *Piper Betle*, L., which are used in India for chewing with arekanut, has recently been imported for the first time into Germany. An essential oil obtained from the leaves by distillation at Samarang, by Herr Schmitz, has been credited by him with having given good results in the treatment of catarrhal disorders and as an antiseptic, and the claim has been confirmed in the experience of Dr. Kleinstück, of Jena. The oil, which seems to be of an aldehyd nature, is said to oxidize with extreme rapidity, losing at the same time its characteristic ethereal odour and therapeutic properties. Great care will therefore be required in the transit of the leaves, if the oil is to be distilled in Europe.—*Pharmaceutical Journal.*

Couch Grass.—In a season like the present one, when heavy rain falls about every fourteen days and showers still more frequently, it is almost useless for the cultivator to think that he can master couch grass. If it is ploughed over it grows as freely from the underside of the sod when inverted as it did before the ploughing, and the furrow slice soon has a sward on the two sides; if the scarifier is put through the inverted furrows it only tears them to pieces, and every joint of the grass grows. The consolation the farmer has is that his crop, owing to the favourable weather, grows equally well, and will repay a little energy bestowed in attempts at keeping down the couch, by a grand growth afterwards, and so will soon be beyond harm from these under-growing weeds. Couch is a good grazing grass, and apparently stands the worst treatment in the way of overstocking better than any grass in the country; it can be eaten down to the roots by sheep, and be none the worse for it; it can be kept thus bare for years, and yet when rain falls and the paddock is spelled the grass is as good as ever; all stok like it, fatten on it, and cows give nice sweet milk and butter when grazed on it. In fact but for couch (*Cynodon dactylis*) the commons, the road sides, the suburban paddocks, and much of the country where close settlement is would be useless for stock. One special feature about this grass that it follows settlement; no matter in what part of the unsettled interior man may elect to put up his house and live, before the year is out the couch will be there too. The grass likes a firm consolidated surface, and appears first in such places as by the roadside, stockyards, or round the house. It is indigenous to the country, but also it is largely spread by the minute seeds getting embedded in the mud by the wheels of vehicles and on the feet of animals, and also it is passed in their droppings. Notwithstanding its being so fatal a grass to all cultivated plants and crops it is powerless to master many weeds, such as sida retusa, catmint, thistles, cobblers' pegs, &c., and in this particular it differs materially from the buffalo grass, although both are creepers and joint rooters; indeed the buffalo does not spread by seed at all, so that the couch has the advantage over it; nevertheless the buffalo will smother it when the two are planted together. In the garden every rootlet of couch should this season be carefully picked out as the forkful of soil is overturned, for if left in the ground they are sure to grow again. —*Queenslander.*

Growth of Rootlets.—Messrs. Van Tieghem and Doubot have recently shown that rootlets, in making their way out from the interior of the axis of main roots, secrete a fluid which destroys the cells in their immediate nighbourhood by converting them into jelly and then dissolving, perhaps absorbing them, somewhat in the same manner that the embryo metamorphoses the albumen surrounding in it and then appropriates it as food.—*Pharmaceutical Journal.*

Vine Manures.—As a result of observations made in Germany, it appears that superphosphate of lime increases the yield, hastens the ripening of the Grapes, and facilitates the ripening of the wood. Nitrogenous manures are useful when the Vine lacks vigour, otherwise they do harm by stimulating growth rather than fructification and maturity. Potash by itself is of no value, but when conjoined with phosphates and nitrogenous manure it is very serviceable. —*Gardeners' Chronicle.*

Caucasus Boxwood.—Vice-Consul Gardner reporting from Poti, says, that the Boxwood forests in the vicinity of Poti are exhausted, and supplies are now drawn from Abkassia, which Province has lately been opened to cutters by the Russian Government. About 2,000 tons were cut and exported during the year 1885 to the United Kingdom. This wood is of fine clean growth, good colour, and great thickness, many pieces being 15 inches in diameter.—*Gardeners' Chronicle.*

Mandioca.—The numerous varieties of the mandioc or cassava plant (*Manihot spp.*) cultivated in Brazil, where, as is known, the roots are worked for the preparation of Brazilian arrowroot, or tapioca, forms, the subject of a lengthy and exhaustive paper by Dr. Peckolt, the chemical section of which (*Pharm. Rundschau*, iv., 148, 174, 201) presents several points of interest. Dr. Peckolt says that the occurrence of hydrocyanic acid is not limited to the bitter mandioca, but extends to all varieties, though it is present in smaller quantity in the sweet kinds. Hydrocyanic does not, however, exist as such in the root while in the earth, but is first formed on contact with atmospheric air, and its formation can be entirely prevented by immersing the freshly dug root in alcohol. The capability of forming hydrocyanic acid proved to correspond with a popular belief as to the time when the bitter mandioca is most poisonous, being greatest at the time of flowering. As a general rule it was found that the richer in juice the roots of a variety are, either sweet or bitter, the more poisonous they are, some of the sweet varieties containing only traces of milky juice. But Dr. Peckolt confirms previous suspicions that the toxicity of mandioca is not due wholly to hydrocyanic acid, for there exists in the juice, already formed, another volatile poison, which he has provisionally named "manihotoxin," as 5 milligrams of it killed a full-grown pigeon in five minutes. This he obtained from ether in stellate crystals, volatilizing completely at 60° C. Another substance, which is non-poisonous and occurs in the expressed juice from both bitter and sweet roots, but in greater proportion in that from the sweet, has been named "sepsicolytin," or "fermentation hinderer," on account of its remarkable antiseptic properties. It was obtained as a thickish light-brown extract, having a peculiar odour and a bitter pungent taste. It is insoluble in absolute ether, chloroform, petroleum spirit, carbon bisulphide and essential oils; freely soluble in ether and alcohol; less soluble in cold water, and only partially soluble in boiling water. Two drops of sepsicolytin mixed with fresh albumen (quantity not stated) are said to preserve it for upwards of six months without deterioration of any kind. It would seem therefore that the antiseptic properties that have been attributed to "cassareep" and the "pepper pot" of the West Indies, both of them prepared from mandioca or cassava juice, have some foundation in fact (see *Pharm. Journ.* [3], i., p. 274). Other compounds separated were "manihotin," a crystalline mannite-like substance, which is a decomposition product, since it does not exist already formed in the root, and Henry and Boutron's "manihotic acid," which has been ascertained to be a decomposition product of manihotin.—*Pharmaceutical Journal*

AGRICULTURE IN MYSORE.

(From a Correspondent.)

From Official Returns recently published by the Mysore Government, we gather that the total area cultivated in the Mysore provinces amounts to 43,54,006 acres. Of this 5,54,554 acres are cultivated with rice; 19,073 with wheat; 32,71,771 with food grains; 1,33,433 with oil seeds; 25,956 with sugar cane; 20,759 with cotton; 1,305 with fibres; 9,860 with tobacco; 1,40,501 with coffee; 32,032 with vegetables; 6,074 with mulberry; 1,38,264 with coconut and arecanut; 280 with pepper and 164 with lac. The Shiringeh District with its 2,07,598 acres takes the lead in rice, while the Kadur district with 91,784 acres takes the lead in coffee. The Tankar District takes the lead in coconut and arecanut, having 45,769 acres under cultivation, while the Kolar District leads in vegetable with 11,915 acres under culvation; the Chitaldoorg Disirict, which adjoins the Bellary Collectorate of the Madras Presidency has the greatest area under cotton. * *

The average rates of rent from cultivated lands in the Mysore province are as follows:—Per acre for rice R5 2 9; for wheat R4 6 9; for inferior grains R1 10 9; for cotton R1 13 7; for oil seed R1 10 1; for fibres R1 9 9; for sugarcane R6 1 4; and for tobacco R3 1 7. * *

The average produce of land per acre in pounds is: rice 1,069; wheat 661; inferior food grains 739; cotton 26; oil seeds 633; fibres 216; sugarcane 1,382; tobacco 379; coffee 501b. and silk 31. * *

The estimated value of manufactures in Mysore is returned at R53,91,946 for a whole year, of this silk realized R1,61,800, and here it may be mentioned that the Bangalore District, which is the great silk-growing district contributed R1,50,000 of the whole. Cotton R21,18,490; wool R2,66,525; other fibres R32,470: paper R400; iron R45,214; jaggery and sugar R8,44,175; coffee R11,14,488; oils R6,55,184; and brass and copper R1,54,500. * *

THE INDIAN TEXTILE INDUSTRIES.

The *Madras Times* has been directing attention to the condition of India's trade with Europe "Then and Now," or its position at the begining of the nineteenth century and the present day, and it occurs to me that as so many of your readers are interested in India, a few remarks on the subject suggested by the topic discussed in the aforesaid newspaper will be acceptable.

Sir Thomas Munro was a careful experienced observer of the state of trade in India sixty or seventy years ago. It was his opinion that European traders would not remain long in India, but from the operation of various obvious cause would be forced to the sea coast. So far as regards the coffee planters and indigo factors, this prediction has been realised. Indigo factors in India are now almost without exception natives, and the coffee plantations are rapidly passing into their hands. But with respect to the textile industries, the forecast made by Sir Thomas Munro was not correct. His words are the following:—"As to the exports (from England to India) it is not likely they will ever, unless very slowly, be extended; opposed by moral and physical obstacles, by religion, by civil institutions, by climate, and by the skill and ingenuity of the people of India. Some increase there undoubtedly will be, but such as will arise principally from the increase of European establishments, and of the mixed race which springs up in their chief settlements. No nation will take from another what it can furnish cheaper and better itself. In India almost every article which the inhabitants require is made cheaper and better than in Europe. Among these are all cotton and silk manufactures, leather, paper, domestic utensils of brass and iron, and implements of agriculture."

The use of machinery driven by steam has falsified this prediction. By its means Europe produces fabrics which only fall a very short way behind the finest hand-made fabrics of India, while the price is considerably lower, and the goods can be produced to any extent required in a very short period of time. Now this state of things has reduced the native Indian industry very low. When the best Indian hand-woven fabric is compared with the productions of English and Scotch looms and found to be as 10 in favour of the Indian, but at the same time the price is as 60 in favour of the British goods, it will be seen at once that the latter would command the native market over the former. This is the case now. The finest cotton fabrics from Indian looms, the admiration of the world, is a decaying industry, and it is difficult to find workmen suitable to produce them, while the coarser native cotton fabrics are subjected to a competition with European goods which prevents their proper development. It must not, however, be supposed that the Indian cotton industry is ruined, for the formation of new companies promoted to establish new mills at once refutes the notion, but at the present time the Indian cotton industry has not kept pace with the increase of the native population. Thanks to European manufacturers, who have sent to India fabrics which from their even threads, close weaving, and thickness look very strong, but are really very rotten, the natives who can afford to do so prefer Indian cotton fabrics to Europeans; still, owing to the cheapness of European goods, clothing is more extensively used among the lower orders than formerly. It may be that in the future, by more equitable modes of raising revenue than that now adopted by the Government, who have removed all duties on imported goods in the interests of European manufacturers, an obtaining an equivalent for the lapsed duties by laying a heavier burden of taxation upon the country, and by encouraging the growth of native manufactures, Indian productions may supplant European goods.—*Textile Recorder.*

THE BRITISH ASSOCIATION.

SECTION D.—BIOLOGY.—PAPERS BY PROFESSOR MARSHALL WARD AND DR. TRIMEN.

On the Germination of the Spores of "Phytophthora infestans," by Prof. Marshall Ward.—One of the objects of this communication was to bring before the meeting copies of some careful drawings of all the stages of germination. These were obtained by actually watching the development, escape and germination of the zoospores from the "conidia," following all the phases in *one* individual. The curious effects of light and of abnormal conditions upon the development of the zoospores were also pointed out, and the author showed diagrams of other forms of germination obtained by interfering with the conditions. In the short discussion which followed Prof. Marshall Ward referred to some points in the development and escape of the zoospores of the Saprolegnia.

On the Flora of Ceylon, especially as effected by Climate, by Henry Trimen, M. B., F. L. S.—Attention was first called to the fact that the Island of Ceylon was practically known to Europeans only by its south-west part, being about one-fifth of the whole area, but including the chief European centres, the planting districts of the hills, and the railway system. The remainder of the country is thickly covered with jungle, thinly inhabited, and rarely visited by Europeans, save Government officials and sportsmen. This difference was shown to be due to climate, especially to rainfall. The distribution of the rain, so far as is shown by annual amount, was exhibited by a map, in which the great advantage to the south-west of the lofty forest-clad escarpment of the central mountain-mass of over 7000 feet was exhibited. The south-west monsoon wind commencing at the end of May deposits an immense quantity of rain here, especially in the neighbourhood of Adam's Peak. In the rest of the island this wind becomes dry, and the country is parched and arid until the arrival of north-east monsoon, which commences in October. This wind brings rain to the whole island, and is the only rain which the dry districts get; in many places it all falls in a few weeks, when the country is completely under water, though parched with drought for the rest of the year. This is very different to the well-known south-west of Ceylon, where save in February or March, a fortnight's drought is a very

rare event. In some parts over 200 inches falls in the year. In these respects Ceylon is an epitome or continuation of the Southern Indian peninsula. The peculiarities of the flora were then gone through in some detail, taking first the low country of the wet districts up to 3,000 feet—in which the number of introduced tropical plants was commented upon; then of the lower hills, the principal home of the planting enterprise and tea and coffee estates; and next of the higher or true mountain districts above 5,000 feet. In the low country the forest has been much destroyed by the indolent and improvident native mode of cultivation called "chena," and but little virgin forest remains in this portion of Ceylon. From 3,000 to 5,000 feet the agent of destruction has been European planting, and the forest has almost wholly disappeared. Above 5,000 feet, land is no longer sold by Government. Attention was specially called to the concentration of endemic species in this wet district—over 800, or nearly 30 per cent of the whole flora—and to the strongly Malayan, as distinguished from Peninsular Indian type of these and of the whole flora. There are no Alpine plants in the Ceylon hills; dense forest covers their summits, but a number of temperate genera are represented. This flora is entirely Indian in type, with no *genus* represented which is not also found in the Nilghiris, but the number of endemic *species* is very remarkable, only about 200 being common to both mountain-ranges. A few remarks were then made upon the naturally open grass lands, called "patanas," in the hills, and their peculiar vegetation. The flora of the great dry tracts of Ceylon was then considered. It is completely distinct from that already considered, being mainly the same as that of the Carnatic or Coromandel coast of India, with no Malayan admixture, and very few endemic species. The whole country is covered with forest, apparently primæval; but in reality much of it is secondary, and not more than 800 or 1000 years old, as is reported by native tradition, and evidenced by the vast remains of temples, tanks, and ancient buildings now overgrown with trees. Most of the timbers of importance in trade are obtained in these districts, and, owing to a very faulty forest conservancy, there is now but little first-class timber remaining, save in very remote places. The botanical characters of this forest, which is everywhere evergreen, were given; and the paper concluded with a few remarks on the coast flora, which is very uniform throughout the tropical belt of the world.—*Nature.*

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

JAMAICA.—Several specimens of annatto are shown, all of which are of very good colour and appear to be the best in the Exhibition. A specimen of the colouring matter in the form of a dry red powder is worthy of notice as being likely to be useful for colouring oils, and as a paint. It is free from the peculiar and somewhat disagreeable odour possessed by the solid form usually met with. This specimen was prepared by the Government Chemist, Mr. J. J. Bowery. Allspice is shown by several exhibitors. The tree, which grows on warm limestone hills in the island at an elevation of 1,500 to 2,500 feet, appears not to flourish so well anywhere else, so that Jamaica practically supplies the whole world. According to the official catalogue the export of this spice from the island during the year 1885 was valued at £53,867; ginger being exported during the same period from Jamaica to the extent of £20,168. Several other spices are exhibited as produced in the island, including some fine nutmegs, also cardamoms, cinnamon, and cassia. The clove, black pepper, and vanilla are also established in the island.

The samples of cardamoms exhibited are small and not well filled with seeds.

Neither the cinnamon nor the cassia exhibited by the Botanical Department present the aspect of the commercial product; indeed it would be difficult to judge from the appearance alone which is cassia and which cinnamon. They are also very deficient in aroma. Unless the cinnamon could be obtained richer in essential oil and prepared in fine quills, as in Ceylon, it is hardly likely to be received in English commerce.

Dyewoods, including logwood, fustic and sapan wood, are exported from Jamaica to the extent of about £100,000 annually. The logwood tree was introduced from British Honduras in 1,715, and has spread spontaneously over the island to such an extent that the export of logwood now exceeds that from British Honduras.—*Pharmaceutical Journal.*

THE NORTHERN TERRITORY OF AUSTRALIA.

HALF-YEARLY REPORT BY GOVERNMENT RESIDENT.

Mining.—The discovery of an alluvial gold field in the Kimberley district of Western Australia has of course, had a sharp effect upon our gold returns for the half-year, which have fallen from 10,112 oz. from January 1 to June 30, 1885, to 6,610 oz. in the corresponding period this year.

Geological Examination and Prospecting Parties.—The Rev. J. E. Tenison Woods arrived here by H. M. S. "Flying Fish," after completing a three years' scientific tour in the East. He writes me from Burrundie:—"I am much pleased with the geological aspect of the country. It has the features of an auriferous district in a way that brings to my mind some of the best gold-bearing tracts I have seen in Australia, and one sees at a glance how little can have been done as yet to explore its deposits."

Agriculture.—The past wet season has not been a favourable one for sugar-cane. We had nearly the usual rainfall, but the rains came in heavy deluges, with somewhat long intervals of drought between. The rain, too, was unusually local. For example, in forty eight hours there was a difference of about 4 inches between the rainfall in Palmerston and at Fannie Bay, only 4 miles distant. On my return from the Katherine, when at Port Darwin Camp, I was shown some splendid bins of rice which had been grown on the Margaret River. The Chinaman who owned the rice informed me (and it was confirmed by Mr. M. D. Armstrong) that the Chinese give 2s. per bag more for this rice than for the rice imported from China. Originally 30 lb. were sown, and the first harvest yielded over 1 ton of fine sample rice. I thought the sample so fine that I purchased a 56-lb. bag for the Colonial and Indian Exhibition in London. At the same place I was shown some splendid cobs of maize. On suitable soil maize grows two crops in the year, and with fair seasons each crop yields 40 bushels to the acre. The prize of maize upcountry this year is £10 per ton. I have no doubt that one of the successes in tropical agriculture will be the growth of rice. I have again visited the Beatrice Hills plantation. The coffee plants were strong and healthy, and many of them bearing fine berries. The indiarubber trees had grown well and flourishing.

SUGAR FROM THE TERRITORY.

We have been shown by Mr. Otto Brandt, of the Shoal Bay Plantation, near Palmerston, Northern Territory, a parcel of sugar, being part of this season's, the first recrushing in our northern dependency. About three years ago there was a very small crushing of a few tons on Delissaville plantation, which is now abandoned, but this was not of very excellent quality. The sample sent to us by Mr. Brandt is an unrefined good white. Mr. Brandt opened his plantation in 1883, but this is the first year of crushing, except for a few tons of sugar made last year in testing the machinery. The operations were at that time affected by the fact that a fire burnt about 20 acres of cane, and the cane could not be put through the mill on account of the machinery having been received from the south and erected too late in the season. The plantation has an area of 761 acres of land selected by Mr. Brandt, and purchased under the 12s. 6d. an acre special survey laws. In addition to this the survey cost 2s. 6d. an acre.

The area under cane is about 200; the yield of sugar by single crushing is about 2 tons to the acre, or by double crushing considerably more. The Queensland average is about 1¼ tons. The cane grown is of three varieties. This season, though it was a miserably dry one, some of the plants gave 12 feet of crushable cane, with a circumference of 7 to 8 inches, running in density more than 15° Beaume, against about 9° in Queensland. Mr. Brandt is now so far the only plantation owner who has a chance of getting the bonus offered by the Government of £4 per ton for the first 1,250 tons of sugar grown in the Territory, and his energy will certainly entitle him to that well-earned reward. Mr. Brandt, from an intimate knowledge of the capabilities of Queensland as a sugar-growing country, points out that the Northern Territory has several advantages for the sugar-grower over Queensland. He remarks upon the absence in the Territory of the frost, which frequently will destroy a whole crop in one night. Another advantage is a certain dry season, which favours the maturing of the cane, rendering unnecessary, as in Queensland, occasional intervals in the crushing or complete stoppage, because if the cane is wet the density will go down. Consequently the Queenslanders sometimes get only one crop in two years, whilst in the Northern Territory one crop a year can always be depended upon. Mr. Brandt further testifies that in the Northern Territory there is an advantage in the labour, which is cheaper than in Queensland. A Chinaman (used in the Northern Territory) costs only 2s. a day, keeping himself, and they can be had at a moment's notice without any difficulty, and re-engaged again in the same way. In Queensland if the planter has say 100 kanakas on the plantation he has to keep them all the year round, whether he wants them or not. They cost the employer, moreover, about 15s. a week, counting everything. It should be added that with the residue of the crushing Mr. Brandt has made a number of casks of golden syrup treacle, which he is having brought down to Adelaide.—*South Australian Register.*

NOTES ON DRUGS IN THE COLONIAL EXHIBITION.

Medicinal Plants and Medicines of Ceylon.

Amongst the many and varied exhibits of drugs and medicinal substances from all parts of the British dominions now to be seen at South Kensington, none is so complete as that from Ceylon, and an excellent handbook accompanies the exhibits, the uses of each plant being given after the scientific and Sinhalese names. In an introduction to native medicinal plants and medicines, the writer points out that in Sinhalese medical practice disease is held to be a disturbance in the equilibrium of the three humours—air, bile, and phlegm—which pervade the human system. These agents preside over certain vital functions, and while susceptible of being affected by temperature, diet, drugs, habit, etc., react on the organs whose functions they control. Every individual is supposed to be born with a predisposition to some one of these humours, or to a modification of one of them in combination with some proximate principle corresponding with the nervous, bilious, phlegmatic, and sanguineous temperaments formerly recognised in the practice of Western medicine. Of the five or six hundred different causes of disease recognised in Sinhalese medicine, more than a fourth are ascribed to the abnormal conditions of the three humours, and the rest to to vitiation of the seven proximate principles of the human body, viz, blood, flesh, fat, etc. Hence, diseases are not classified by their symptoms so much as by their causes, and accidental symptoms are not only confounded with essential ones, but receive special treatment as distinct diseases. The treatment, accordingly, is more theoretical than empirical, every symptom being referred to some derange humour, which alone receives attention, and has to be rectified according to the rules laid down by the recognised authorities. A very common practice with native practitioners is to allow a disease to progress for some time with a view to "mature" it, or "to bring it to a head," before any attempt is made to remove it. A quick recovery, whether under European or native treatment, is deprecated, as likely to lead to a relapse, since sufficient time has not been allowed for the restoration of a permanent, healthy equilibrium between the contending humours. They have great faith in critical days, and in the influence of the different phases of the moon, each of which is supposed to preside over its own set of organs, so that purgatives, for instance, however much they may be needed in any given case, are never prescribed on the day on which the moon exercises its influence on the bowels, emetics on the day on which it presides over the stomach, etc. The Sinhalese seldom make use of powerful or hurtful remedies. In most cases the treatment only seems to change an acute disease into one of chronic character, while recovery from a simple affection is protracted, the patient being kept half-starved on gruel, and made to swallow huge quantities of infusions and decoctions of medicinal herbs, villainously compounded, the number of ingredients in each portion increasing in direct ratio with the continuance and severity of the disease. A mild form of fever, for instance, would be treated with a decoction of the "Five Minor Roots." *Desmodium gangeticum*, *Uraria lagopodioides*, *Solanum Jacquini*, *Solanum indicum*, and *Tribulus terrestris*, which are believed to cure fever due to deranged phlegm, catarrh, etc. A severer form would be ascribed, perhaps, to deranged air, requiring the use of the "Five Major Plants,"—*Ægle marmelos*, *Calosanthes indica*, *Gmelina arborea*, *Stereospermum suaveolens*, and *Premna speciosa*. In remittent fever, etc., all ten may be prescribed together, and in typhoid fever, with head symptoms, the same, with eight or ten other ingredients. When conducted by intelligent and skilful practitioners, native practice is not unlike the morden treatment of European Medicine, viz., that of trusting to nature for efforts to restore health, while placing the patient under the most favourable conditions for recovery by means of suitable diet and regimen, medicinal treatment being directed chiefly to the relief of the more urgent symptoms. It must be admitted, however, that the Materia Medica of the Sinhalese will compare favourably in many respects with the Pharmacopœia of the most enlightened countries of the West. Not only is every class of medicine well represented and supplied in profusion by the boundless prodigality of nature in Eastern tropical climes, but some of the vegetable productions are valuable enough to deserve a place in the medicinal resources of Western science.

The Ceylon Collection.

The collection exhibited in the Ceylon Court consists of 362 specimens, all of which are indigenous or wild Ceylon plants, and the uses of which, as, recorded, have been taken from the mouths of the village doctors themselves. The following is a selection of those drugs which appear to be the most important:—

Abrus precatorius (Olinda-wel).—The juice of the green leaves is used as a purifier of the blood, especially in females. The root, for sore throat, leprosy, stiffness of the joints, paralysis, and nervous diseases; externally it is applied to ulcers and sores. This plant is a common tropical weed, and is well known as the source of the jequirity seeds or crab's eyes, which are sometimes used as an article of food in Egypt, being harmless when eaten, but producing fatal effects when introduced beneath the skin. In India the roots are used as a substitute for liquorice.

Abutilon asiaticum (Anódá).—The root is used in mild fevers, and is considered tonic, diuretic, and stimulant. The water in which the leaves have been boiled is used as a wash for sore mouth, and for fomentation in piles. This is a malvaceous plant and like most of the order it has demulcent properties.

Acacia concinna (Hinguru).—The juice of the wood is used to cure murrain in cattle. The pods are very saponaceous, and are used as a substitute for soap.

Acalypha indica (Kuppa-méniya).—The whole plant is used in worm complaints, and to expel wind. The

juice of the leaves is emetic, and is applied externally to bad sores and ulcers.

Acorus calamus (Wada-kaha).—Used in bowel complaints in children as a stomachic and carminative. This plant is the sweet flag, and is very widely distributed, being found not only on the banks of rivers and other wet places in England, but also in the cooler parts of Europe, India, and North America. All parts of the plant, particularly the rhizome, have a strong aromatic and somewhat acrid taste, in consequence of which it has been used in European practice as a stimulant and tonic, especiall in cases of indigestion and ague. Candied, the rhizome forms a well-known confection, and it is also used in perfumery.

Acronychia laurifolia (Ankinda).—The bark is considered a good remedy for obstinate ulcers and indolent sores. The root, bark and leaves are applied to dislocations.—*Burgoyne, & Co.'s Monthly Export Prices Current.*

STRAY NOTES ON CACAO IN CEYLON.

(*From "Old Colonist."*)

My visit to Matale North greatly charmed and interested me. Twelve years ago, there was not a cacao plant in the district, now its cacao groves are amongst the finest sights in the island, and as Sir Henry Ward said:—"It is difficult to decide where there is so much of surpassing beauty." No longer is cacao a mere experiment, but in North Matale at least, it is assured, as much as any vegetable product can be. I am only sorry there are not, and never can be, 100 Kowdapelelas in Ceylon.

I have seen nothing of *Helopeltis*, and believe *Boreas* to be the only real enemy to cacao in good soil; as "R. B. T." long ago discovered. The lucky proprietors of North Matale are getting an excellent crop this year, and as far as man can judge, it is destined to go on rapidly increasing for many years to come. Warriapolla, also, is a fine picture, nothing could exceed the luxuriance of its healthy and heavy-laden cacao, nor the beauty of its well-trimmed shade trees. Dear old Dumbara, of course, still holds its own, and will probably this year give double the crop it has ever before given.

New Products in Mexico.—Among the most valuable fruits yielded by the Mexican flora is the vanilla, which has been in use in the country for ages as a flavouring for chocolate, the national beverage. Its use was made known in Europe by the Spaniards, and until comparatively recent times Mexico was the only source of supply of the fruit. Mauritius and other parts have since taken the lead in supplying the London market, but the true Mexican vanilla still remains the best of any. In the country itself it is cultivated more for home use than for export, the centres of the trade being the districts of Misantla and Papantla. A wild variety of vanilla is found abundantly in the virgin forests of the republic, but its fruits, not being aromatic, are not gathered. The value of the vanilla exports in 1884 is declared at 83,000*l.* Efforts are now being made by a German agriculturist in Mexico, Dr. Hugo Finck, of Cordoba, to grow the cinchona tree in that locality, one of the most favourable parts for the cultivation of new plants. According to official statements there were in 1884, 15,000 cinchona plants flourishing in Cordoba, and it is hoped that in a few years Mexico will be able to derive large profits from the export of cinchona. Commander Maury, who visited the country in 1868, was the first to suggest the introduction of the cinchona in Mexico, but his advice was not acted upon until several years later. Careful observations have shown that the climate and temperature of large tracts of Mexican territory correspond exactly with that of the Bolivian provinces where the cinchonas flourish most luxuriantly.—*Chemist and Druggist.*

Piperine in Ague.—Some cases of refractory intermittent fever, in which, after the failure of quinine, piperine has been administered with advantage, are reported by Dr. C. S. Taylor) *Brit. Med. Journ.*, Sept. 4, p. 449). In one case, immediately on the accession of an attack three grains of piperine were given every hour until eighteen grains had been taken, and on the following day, when the intermission was complete, the same dose was given every three hours. Dr. Taylor remarks also that piperine does not produce the unpleasant symptoms in the head that sometimes follow the use of quinine.—*Pharmaceutical Journal.*

Extract of Pomegranate Root Bark.—The official preparation of pomegranate bark is open to objection on account of its nauseousness, and three years since Mr. Siebold, in order to obviate this, suggested a process for removing the astringent principles (*Pharm. Journ.*, [3], xiv., 396). With a similar object Dr. von Schroeder has recommended the use of an extract free from tannic acid, but containing all the alkaloid of the bark (*Pharm. Zeit.*, Sept 18. p. 556). The extract is prepared by treating a decoction of the bark with milk of lime to remove the tannic acid, filtering, neutralizing the filtrate exactly with sulphuric acid, evaporating it on a water-bath almost to dryness, treating the residue with 70 per cent alcohol, and then driving off the alcohol from the extract obtained. The product is described as nearly entirely crystalline, and soluble in water with a slight turbidity. The yield is about one gram of extract from twenty grams of bark. In order to retard as much as possible the absorption of the pelletierine, which is present in the extract as a sulphate, it is recommended to add to this quantity one or two grams of tannic acid to convert the alkaloid into the difficulty soluble tannate. —*Pharmaceutical Journal.*

Vegetable Products in Tunis and Tripoli.—The export of Esparto-grass or Alfa, as it is locally termed, has been more active during the past year. This valuable fibre, nine-tenths of which is shipped to the United Kingdom for paper making, affords a livelihood to the Bedouin Arabs, who load their camels with it and bring it a distance of 100 miles from the interior. The Government has not relieved it from the oppressive duty which for the last nine years has weighed upon it, amounting in the northern districts of the Regency to 12*s.* 6*d.* a ton, and to 17*s.* further north at Susa. The largest shipments take place from Sfax. The Alfa from Susa commands somewhat higher prices than that farther south. The unusually large quantity of the fibre which was exported from the Regency in 1881 was owing to a failure of the grain crops in the south, which drove the Arabs to Esparto plucking as the almost sole means of obtaining a livelihood. In 1882 the Arab tribes in the south fled over the border to Tripoli to avoid the French, and that year showed the lowest point to which the export of this grass has sunk. In 1883 shipments of Esparto began to be made from another little port to the south of Sfax, called Skira, which would under ordinary circumstances have found an exit at Sfax. Skira has been selected as the port of exportation by the Franco-English Esparto Company, which has obtained a concession to export that fibre from a certain district inland from Sfax, and which began its operation in 1883. From Tripoli it is stated that business in Esparto, which had become very slack in 1884, had so far recovered itself as again to be in the position it occupied in more prosperous years. Notwithstanding the low range of prices—10*s.* to 15*s.* per ton below the usual rates of the last two years—the supply of this fibre has not diminished, but flowed steadily into market in even greater quantities than before. The quality of the grass is better, as would appear from the general satisfaction it has given in England; and it is anticipated that both the quality and quantity in 1886 will be above the average. Freights for Esparto kept low, ranging from 9*s.* to 12*s.* the ton for hydraulic pressed bales, and from 16*s.* to 20*s.* for those mechanically pressed.—*Gardeners' Chronicle.*

CULTIVATION OF THE ORANGE IN INDIA.

TO THE EDITOR OF THE "INDIAN AGRICULTURIST."

SIR,—I shall be much obliged if you can give me any hints on the cultivation of orange trees in India. I don't want to know about the climate, because no place is better adopted to growing oranges than the place I have selected. I wish to know what distance apart the trees ought to be planted, when they will fruit, and how much fruit they will yield; also what extent of land should be planted to yield a sufficient return to pay for superintendence and up-keep, with a profit of R6,000 annually.

If you could let me know whether there is a good market for oranges in Calcutta, and what prices they fetch, it would be an additional obligation. T.

The orange should be raised by budding on the common lime or lemon. The operation should be performed in February. In the December following, the young trees should be planted out at a distance of 20 feet apart, in large holes 3 feet deep and 3 feet diameter, filled with a rich soil composed of well-decayed cow-dung, night-soil, common black earth, and a small quantity of slaked lime. The trees blossom, as a rule, in February and March, and the fruit is ripe by November, and sometimes earlier. They last till the end of January, and sometimes February; but the fruit should, for the sake of the trees, be all removed by January, to allow the plants to rest a little before flowering again in February. The soil should have a top-dressing of manure every year just before the trees begin flowering. A well-grown tree, say about 3 or 4 years old, will yield from 200 to 500 fruits. We have known them to yield a great deal more. [We suspect orange trees in Ceylon do not bear under twice the age specified.—ED]

WOOD FOR CIGAR-BOXES, &c.

I have read the correspondence on this subject in recent numbers of the *Forester* with much interest. I entirely agree with Mr. S. E. Peal in considering that 'tun* or Poma' wood is the best we have in India for the purpose. There are of course others that will do, and among those referred to by "ex-Student" *Duabanga sonneratioides* and *Alnus nepalensis* might be used, but would not be nearly so good as several other woods that can be named, such as 'bakáyan,' *Melia Azedarach* (very like tun) and *Acrocarpus fraxinifolius*. To put down in a list such coarse woods as *Echinocarpus* and *Elæocarpus* is only to mislead.

The boxes in which Trichinopoly cheroots are usually packed are made of tun, those used in Coconada are made invariably of *Adina cordifolia*, but I doubt if that wood would be used if tun were easily procurable in the Godavari forests. I strongly advise those who want a good cigar-box wood to stick to tun, the Indian representative of the Spanish cedar, which I believe is *Cedrela odorata*.

It is worth noting here that according to the most recent determinations, neither the 'Lali' of Darjeeling nor the 'Súm' of Assam is *Machilus odoratissima*. The real *Machilus odoratissima* is the Punjab tree so common about Simla, the others will, I think, be found under other names, which I am sorry I do not yet know, when the next part of the 'Flora of British India' is published. The three trees of Darjeeling, known to the Nepalese coolies as 'Lali,' 'Kawala' and 'Jagrikat' respectively will probably be described as distinct species, instead of being all placed, as hitherto, under *Machilus odoratissima*. The 'Lepchaphal' has proved lately, from good flowers and fruit collected, to be not *Phœbe attenuata*, but a new species, to which Dr. King has given the provisional name of *Machilus edulis*. I expect "ex-Student" is mixing up cigar-box woods with those suitable for tea-boxes. It would be rather too much to expect Mr. Sutherland to go to Darjeeling for such woods, when he can get tun and bakayan from the N.-W. Provinces.—J. S. GAMBLE. —*Indian Forester.*

*Popular spelling *Toon*,—ED.

THE QUESTION OF MULCHING.

Mulching may serve to keep the surface moist, but it will be found that the portion in contact with the ground is apt to mildew and encourage fungus growth, which does not promote healthful vegetation. We are cautioned, therefore, against the use of easily decaying or fermenting substances. A careful examination of the under surface of most mulchings will develop the fact that it is a snug harbor for slugs, snails, worms and all minor sorts of vermin.

If the material used cannot be usefully or properly dug into the soil after its use as a mulch has ceased, as with tan, sand or sawdust upon light soils, then the labor of spreading and afterwards gathering it together again is by no means inconsiderable. A coating two inches thick on an acre amounts to about three hundred single loads of stuff, which must cost at least $50 to $60 to spread and remove. How many times could you go over an acre with a cultivator for $50? Certainly more than thirty.

Mulching induces a growth of fibrous roots to push up to the surface. It is not a little remarkable that none of those who have recorded this fact so repeatedly have noted that this is not a useful result.

How can temporary advantages of mulching be otherwise obtained permanently? In a well-cultivated field not more than from one-eighth to one-tenth of the rain that falls upon the soil finally passes off by percolation; the remainder is drawn to the surface and evaporated by the process described. Anything that breaks up the uniform continuity of the texture of the soil, by which atom after atom of water is brought to the surface, will accomplish the first step in retaining the natural moisture of the soil within it.

Now, mulching does not do this at all; it only checks or moderates the approach of the atmosphere to the moistened surface of the soil, and therefore retards evaporation to that extent; but the reason why there is so much moisture beneath the mulch is because the capillary action of the soil keeps on pumping up the water faster than it can evaporate.

Dry soil is an excellent non-conductor, made doubly so by being loosened and thus intermingled with air. This is precisely the condition of the soil after a thorough cultivation. When thus rendered fine and light the surface becomes truly a cushion of air and dry earth; the continuity of the insensible process of conviction of the water of the soil is broken, the point at which the upper passage of the water of the soil ceases is removed to the depth of the cultivation, the free access of the air to the continuously moist surface is hindered and you have accomplished all of the beneficial effects of mulching in a cheaper, more intelligent and scientific manner.—*Proceedings Massachusetts Horticultural Society.*

ANTS ON TREES AND PLANTS.

The ants so often found in great numbers upon plants and young fruit trees cause no injury. Their presence is due to plant lice, a very peculiar insect found upon nearly every part of plants, but usually in the greatest numbers upon young shoots, buds, and leaves. These parasites multiply with wonderful rapidity. It has been proved by Reaumur that a single individual is capable of becoming the progenitor of nearly six thousand millions of these pests in five generations. This accounts for the fact that the tender twigs and leaves of plants and small trees will often become completely covered with a living mass of these minute lice in a very short space of time. Most of these are females, destitute of wings. The winged individuals, according to Harris, "appear only at particular seasons, usually in the autumn, but sometimes in the spring, these being all small males and larger females. After pairing, the latter lay their eggs upon or near the leaf buds of the plants upon which they live, and together with the males soon afterwards perish." The genus to which plant lice belongs is called Aphis, from a Greek word signifying to exhaust. The eggs are hatched in the

spring and the young lice immediately begin to exhaust the vitality of the plants by sucking the sap from the twigs and leaves. They increase rapidly in size and soon mature, and it is a remarkable fact that the entire brood, without a single exception, are wingless females and in condition to propagate their species. Their young, however, are produced alive, and each female may be the mother of fifteen or twenty young lice in a single day. The second generation also consists of wingless females, which grow up and have their young in due time, and thus brood after brood is produced to the seventh generation, or even more, without the appearance of a single male, but the last brood in autumn consists of males and females, upon which wings are developed, the eggs being laid by the females as before mentioned, and remaining upon the twigs until the following spring, when they are hatched and their work of destruction begins. The leaves and bark of plants much infested by these insects are often completely sprinkled over by a sticky, sweetish fluid discharded by them, which upon drying turns dark, greatly disfiguring the foliage. This sweetish fluid is what attracts the ants, which are very fond of sweets of all kinds. The ants are very careful not to injure or disturb the lice, which they treat with remarkable gentleness. Probably the most effective remedy for plant lice is strong soapsuds, which can be applied in the same manner as for canker worms, by means of a garden pump. Some fruit growers use a decoction of tobacco with the soapsuds, which makes the remedy much mere effective. *American Cultivator.*

CURING A COLD IN THE HEAD.

The commonest type of cold is that called "cold in the head," to distinguish it from "cold on the chest." This "cold in the head" has certain well-marked symptoms, a feeling of general *malaise* is experienced, often accompanied by a slight feverish sickness. Then comes a sensation of fulness in the head, there is sneezing, a profuse flow of tears, an irritating and copious discharge from the nose. This means that the mucous membrane of the nose is inflamed, and if this spreads down the back of the throat the sufferer becomes hoarse. The best way to treat this troublesome complaint is to take a "hot drink." An orange sliced and put into a large cup with a little sugar sprinkled over it, and boiling water poured upon it, and then drunk as hot as possible, is both pleasant and beneficial. The feet should be put into hot water, with or without a little mustard. This foot bath should be taken at the bedside; the patient should be well wrapped up, and a blanket placed across his knees should be drawn outside the bath, so as to confine the steam. After keeping the feet in the water for from five to ten minutes, the patient should lose no time in getting into bed, where he will probably derive great benefit from the general feeling of warmth, and from the flow of perspiration which has been induced. If possible, at this stage, the patient should remain in bed for two days, with a fire in his room, which should be well made up at night, so as to keep alight till morning. But keeping in bed will do little good if the patient persists in holding a newspaper or a book to read, for thereby he is more dangerously exposed to cold then if he were up, dressed and going about as usual. The main point is to keep throughly wrapped up and constantly warm. Even an uncomfortable degree of heat may be beneficial.

A small piece of camphor chewed and sucked is very good. So is the inhalation of sulphuric acid gas—a remedy which was found to be in constant use by the weavers of Kircaldy, who had it among the materials of their work. Buy two ounces of sulphurous acid (dilute) from a chemist, and then take out the cork and inhale—through the nostrils only, of course—the pungent gas which is given off. Some use Ferrier's snuff, and find benefit therefrom; but it must be used cautiously, as it contains a powerful drug—to wit, morphia. Ten or twelve grains of Dover's powder taken in gruel at bed-time is good for an adult, but should not be administered to children, as it contains opium, which should never be given to them without a doctor's prescription. To avoid an unpleasant excoriation of the nose and upper lio during the course of a cold in the head, they should be often washe l thoroughly with soap and lukewarm water and a little vaseline should be applied. If the throat feels sore a chlorate of potash lozenge should be sucked ocasionally.—*Household Words.*

MEMORANDUM ON KILLING, PRESERVING AND TRANSPORTING INSECTS.

For killing insects, the best thing is a tin cylinder—say, an empty tobacco-tin—with a closely fitting removable cap lid at each end. The ordinary half-pound tobacco tin, which is about 6½ inches long with a circumference of 9¾ inches, is a convenient size for most insects. Into this a perforated tin diaphragm may be fixed, at about 1½ inch or 2 inches from one end of the cylinder. The larger chamber will contain the insects to be killed, while the smaller one will be used as a receptacle for poison.

The most effective poison against insects is cyanide of potassium, but its peculiar property of deliquescing with either heat or moisture renders it difficult to use. I have tried making up strong solutions of it with plaster-of-Paris (calcined gypsum), but I find the effect goes off too rapidly, and the hardened cake soon becomes perfectly innocuous. I have also tried enclosing solid pieces of cyanido of potassium in plaster-of-Paris, but I have not yet succeeded in getting the plaster to set properly. Should further experiments in this direction turn out better, I hope to be able to supply a convenient form of insect poison to any one who wishes to possess it.

Hitherto, I have employed essential oil of almonds, a drop or two of which on a small piece of sponge is quite enough to fill a tobacco tin with strong fumes of prussic acid. In place of the oil, ordinary flavouring essence of almond may be used, but its effect is not so good. The oil may be obtained from any chemist at every large station, while the flavouring essence is procurable from all provision dealers. Ordinary benzine is also very effective, and is easily obtained from any chemist. It has further the property of removing greasy stains from the wings of moths, when directly applied. Before being placed in a collection, the insect should be painted over with a fluid composed of:—

1 quart of methylated spirits.
1 oz. of mercuric chloride (corrosive sublimate).
1 oz. of carbolic acid.

This will preserve it from insects and mould.

Larvæ of insects—grubs of beetles, bees, wasps, &c., and caterpillars of butterflies and moths—may be preserved in spirits of wine.

For transmission by post, larvæ may be sent in bottles of methylated spirits. Beetles, grasshoppers, and hard-bodied insects generally, should be placed in tin-boxes with saw-dust, over which benzine should be liberally sprinkled.

The various species of insects in one box may be separated by layers of paper. Lepidoptera (butterflies and moths) should be packed, with their wings together, in pieces of paper folded into triangles with the edges overlapping. The specimens must not be left loose in the box, but so arranged that they cannot be shaken in transit. When packed with insects, the box should have all its interstices covered with gum paper carefully applied, so as to exclude all enemies.—M. H. Clifford.—*Indian Forester.*

Origin of the Blood Orange.—A correspondent sends us the following cutting from the *Tropical Agriculturist* respecting the origin of the Blood Orange in the hope that its appearance in our columns may lead to a discussion tending to confirm or refute the ideas suggested in it:—* * * (see page 93.) Of course no gardener would admit the preposterous notion that a Pomegranate would either graft or hybridise with an Orange.—*Gardeners' Chronicle.*

THE NATURE OF DEW.

The researches of Dr. Wells into the nature of dew, made a great many years ago, are still acknowledged as disclosing the true theory of the phenomenon, and yet there is ample room for further investigation. The popular idea is that dew falls, and anxious mothers still caution their children, especially if they are delicate in health, against exposing themselves to the falling dew. Dr. Wells proved that dew did not come either from the earth below nor from the sky above, but that it was condensed out of the air in contact with plants and other cold surfaces. And yet the popular idea not erroneous, for the vapor in the air may be condensed on floating motes and dust, giving rise to what may fairly enough be denominated falling dew, although it is really a gentle rain formed not far from the surface of the earth. Whether it should be called dew or invisible rain is a mere matter of taste, and a question of definition. There is really no reason why the popular phraseology should be changed, and even from a scientific point of view the term "falling dew" may be defended as preferable to "invisible rain." During a fog the beards and whiskers of men frequently collect quite a large quantity of dew, while in very cold regions the eyebrows may collect dew which is converted into hoar-frost. The fact is that dew is deposited whenever the grass, the air, or the hair falls in temperature below the dew-point. The analogy may be carried further, and it may properly be asked whether fog is anything else than floating dew. If the answer be in the affirmative, then the whiskers may be supposed to collect the dew already existing in the air, and the difference between falling dew and fog may merely be one of mass or quantity. Dr. Wells was no doubt quite right in saying that the dew which is visible on the surface of leaves, is condensed upon them directly from contact with moist air and yet it is quite possible that the quantity is increased by the incidence of falling dew—the phenomenon thus being the result of two or more influences. Prior to his time, there had been much discussion as to whether the dew rose from the earth below, or fell from the sky above. It had been ascertained that there was a heavier deposit of dew inside a bell-jar than there was outside, and it was argued that the dew inside must have ascended from the earth. The correct inference is that the vapour already pre-existent in the air is reinforced by an accession of vapor from the earth, the heat absorbed during the day serving to maintain evaporation after sunset, while the bell-glass merely served to prevent the dissipation of this vapor by the wind.

Some further light has been thrown by Mr. Aitken, of Edinburgh, on the dew question. He asked himself why dew was not deposited on gravel paths and dry ground, as well as on the vegetation in adjoining beds, and he has found the answer, which is—that dew is deposited on the gravel and dry earth, but it has to be looked for in the right place, namely, on the under-side of pebbles, while some of it is no doubt absorbed. There should, however, I imagine, be less dew on dry patches, because there is a more free circulation of air by which the vapor is carried off. The vegetation itself imprisons the moist air, and thus favors the deposition of dew.

Another form of dew, or of what is taken for dew, was discovered by Mr. Aitken. He found that some plants were more bedewed than others, that the surface of the leaf was not wet all over, and that the deposit on any part had no relation to its exposure to radiation or access to moist air. The position of the drops of apparent dew had a close relation to the structure of the leaf. On brocoli plants the drops were all placed at the points where the veins of the leaf came to the outer edge. On grass the moisture was in drops attached to the tips of some of the blades. Other considerations led him to the belief that these drops were not dew at all, but exudations from the plants. That plants exude such globules has been pointed out by other observers, but Mr. Aitken is the first to point out their relation to the appearance of dew. The explanation is exceedingly probable. The exudation is no doubt going on in all weathers, but it is only on dewy nights that the drops will hang to the plant. When the air is dry they are likely to be carried away as vapor. Experiments were made on leaves protected from all contact with the atmosphere, and on these the exudations made their appearance. These facts do not in any way invalidate the accepted theory of dew, but they serve to show that the phenomena are more complicated than has hitherto been supposed.

Mr. Aitken also made experiments on the radiation by night of several substances, and he found that they gave very different results from those obtained by experiments made in the day time. Black and white cloths were found to radiate equally well, a result which invalidates the received theory that absorption and radiation are equivalent. Franklin's experiment on the melting of snow under patches of black and white cloth in full sunshine will be here called to mind. Soil and grass radiate equally well by night. Lampblack and whitening are also alike. Snow in the shade on a bright day was 7 degrees colder than the air, while a black surface was only 4 degrees colder. This difference diminished as the sun got lower, and at night both radiated equally well. These facts are exceedingly instructive.—*Leader.*

ENEMIES OF THE SUGAR-CANE.

In India little or nothing has yet been done in the way of protecting its agriculturists from the losses caused by insects. There is a school of forestry at Dehra, and the instruction given there includes some account of the insects useful or hurtful to man and his industries, and we see references as to individual insects from time to time made to Mr. Wood-Mason. Some years ago Mr. Thompson, of the Forest Department, contributed a valuable pamphlet on the enemies of the forest trees; Mr. Haldane's "All about Grubs" mentions several beetles which injure the coffee shrubs; and Mr. Nietner in Ceylon, and Dr. Bidie of Madras, have added considerably to the existing information regarding them. But India has no reports or compendiums such as in England periodically issue from Miss Ormerod's pen, and the first attempt to furnish a general view of the Indian agriculturists' insect foes has been given in the "Cyclopædia of India," the third edition of which was mentioned in our issue of July 6. Yet the tillers of the soil of India are skilful, hard-working husbandmen and gardeners, but they are great sufferers from blights, and their patient toil should win for them all the care which the scientific skill at the command of Government can bestow. They are in many tribes and of different races, the farmers of recognised superiority being the Chasa and Khisan of Bengal, the Kunbi and Kurmil of the Western and Northern Provinces, the Tamil Vellalar, the Teling Reddi, Kapa, and Kama, and the Canarese Wahala, the finer garden work being carried on by the Tota-Kara, the Mali, the Kachhi, the Lodha, and others. We have been led to these remarks by the perusal of a pamphlet on, "The Animal Parasites of the Sugar-cane," by Hy-Ling Roth (Trübner & Co.). The cane is to be seen growing everywhere throughout British India, and, although used by the people more as a fruit than for sugar-making, it takes a prominent place among their garden plants. It receives from them great care for it is a costly plant to grow, occupying the grounds for many months, requiring a rich soil, with plenty of manure and abundance of water. It is liable to be attacked by several insects, and if, from boisterous winds, the tops become twisted, the growth is checked and the cane rots. The planters of the West Indies, South America, the Mauritius and Australia, have given much attention to the investigation of the diseases and injuries of the cane, and Mr. Roth has done good service to the planting industry and to science by summarising all that is known of its animal parasites. An examination of growing cane exhibits a variety of animal life which is simply marvellous; and the planter who thinks little of a single parasite

ignores two important facts: firstly, that parasite breed most rapidly; and, secondly, that myriads make up for want in individual side. Mr. Roth tells us that a species of Hoplosternus is the common chafer of Queensland. Its grub destroys the roots of the cane, causing the leaves to become brown and dry up; the growth of the cane is then arrested, and the first high wind knocks it over. In this manner whole fields of cane are killed. In the early stage the larvæ are occupied in gnawing the roots. In November and December the chafers, fully developed, appear above ground in swarms, inactive during the day but feeding eagerly at night. An ant, the Formica saccharivora, is supposed to get at the sweet juices of the plant and injure it. Another insect, the waxy sugar-cane louse, is known to the Mauritius and Bourbon planters as Le Pou a Poche Blanche. It is the icerya sacchari, and occurs also in Queensland, and Mr. Roth supposes that it is milked by a small black ant, Formica rufo-nigra, in the same manner as species of aphides are by other ants. He considers the Pou to be a cause of very great injury to the cane. The cane has its enemies in other countries. The sugar-cane beetle of the United States is the Ligyrus ruficeps, *Le C.* It is a stout black beetle, half an inch long, which bores into the stock of the sugar-cane under ground.

Sugar-cane ravages in Grenada are caused by the cane-spittle fly, Delphax saccharivora; in Natal by the cane smut, Ustilago sacchari, a disease, analogous to the smut of wheat and maize; in the Mauritius by the Proceras sacchariphagus, which Mr. Westwood has supposed may be indentical with the Diatræa sacchari; *Guilding*, and Phalæna sacchari, *Fabricius.* The Borer of the Queensland planters has been supposed to be the larva of this Diatræa sacchari. It enters the cane above ground and eats up the heart. It is supposed to be indentical with the Borer of the Mauritius, the Proceras sacchariphagus. The wire-worm, larvæ of the chick beetle, are found at the roots of the Queensland cane, but no damage from them has been detected.

Many suggestions have been made for the destruction of these and other insect pests. In this country Miss Ormerod is devoting herself, to the investigation of the field, and garden, and forest enemies of the vegetable kingdom, and has suggested several means for preventing or lessening the severity of their attacks. It has lately been said that many insect marauders are killed or scared away by a kerosine emulsion; a gallon of kerosine is mixed with three pints of water and a pint and a half of milk, and churned into a butterine consistence. This is diluted with twelve or sixteen times its weight of water, and has to be at once applied, because the component parts separate if allowed to stand. W. Bancroft writing in 1878, mentioned that he had with advantage sown the Dolichos lablal and Cajanus Indicus pulse among the sugar-cane fields, with the object of attracting the Ichneumon flies which destroy the cane louse. On lands which are cultivated on the rotation system all parasites have to seek fresh feeding-ground once a twelvemonth or oftener, and are thus kept away for a considerable period, or left to die in the absence of their special food. And the protection of insectivorous birds and bats has been recommended, with the hope of keeping down the pests by their means. The smut and rust, and yellow blast and black blast are planters' names for diseases of the cane which need scientific investigation. —*Overland Mail.*

The Indian Government Quinine factory sold, in ten years, something like 75,233 lb, of the drug. In other words, supposing that each patient took 20 grains—sufficient in most cases to greatly incommode all but the most hardened users—very nearly 22 millions of fever-smitten people had reason to bless an "oppressive and tyrannical bureaucracy."—*M. Mail.*

NOTES ON BAMBOOS.*

Bamboos may be propagated either by planting out sets from existing clumps, or by sowing seed. If sets are used they should be taken from vigorous two or three year old shoots with their rhizomes, and transferred with soil about the roots to the pit in which the bamboo is to grow. The stem should be cut back above a joint at about 5 feet, and the set planted about 8 or 10 inches deep in the early rains, and as quickly as possible after removal from the parent clump. The new shoots will then be thrown up from the eyes, and, all things being favourable, bamboos fit for sale will be produced on good soil in about six or seven years. The stem may be removed and the set laid flat under the soil, as is done with sugar-cane sets. This method has given good results, but the sets were regularly watered from a well.

If seed is used, it should be put down in worked earth, just below the surface, and should be lightly watered. It will throw up a shoot like grass, from the eyes of which new shoots will be thrown up during the first year. In the second year, other and larger shoots will be thrown up, and so on, each year's shoots being larger in girth and taller than those of the preceding year until the full size of the culm of the kind of bamboo is attained. With sufficient rainfall, and in a good but not too moist a soil, bamboos fit for sale may be cut in from about seven to ten years. On poor dry land, or on sandy soils, the period may extend to twelve years or more. The seed used should be not more than a year old, and should be sown very sparsely in the bed.

The first shoot that comes up from a seed never grows into a bamboo. As already explained, the eyes throw up shoots which develope into stems. Each stem comes up as large in girth as it ever will be. It first appears as a scaly cone covered with sheaths. It then rapidly attains its full height, when the leaf sheaths at its nodes either diminish in size or gradually fall off and give place to leaves; the stem branches on its upper half, and on completion of the branching is matured. It does not grow any taller or stouter, nor does it solidify or fill up inside year by year, but stands in the clump till it dies off and dies in from twelve to fifteen years. Each stem matures under ordinary circumstances in about twelve months. A clump of bamboos of, say, twelve years of age is thus a collection of stems from one to twelve years of age and of different sizes, the variety of size being caused not by the annual increase of the older stems, or of any individual stem, but by the fact that each annual crop of shoots produces stems of greater diameter and height than those of the preceding year until the limit of the normal size of the species in both height and girth is reached. That limit may be reached in very favourable circumstances in five years, a shoot of that year coming up, perhaps, two or more inches in diameter in the first heavy rains, and rising by October to 40 or 50 feet in height. The new shoot not being branched at first is able to make its way through its companions, and, as already said, it begins branching on attaining its full height. All that has been now written of the manner of growth applies equally to stems produced from sets or from seed. But a clump produced from seed has its normal period of life before it, whereas a clump from a set has before it only that portion of life period which had not been already spent by the parent clump from which the set was taken. The life of an individual stem is by no means the same as that of the clump to which it belongs. Individual stems die off in from ten to fifteen years, while the common life of the clump may extend over from twenty to forty or fifty years. Some species are shorter lived than others, and the duration of

* The above is taken from a very readable little pamphlet by Colonel van Someren, Conservator of Forests, Berar, and obtainable from Messrs. Thacker & Co., Bombay. It consists of papers on Indian Forestry originally published in the "Indian Agriculturist" for 1884, intended by the author to answer, in a popular manner, the question "What do you Forest officers do?"—Ed. *I. F.*

the longer lived species is not accurately known, but fifty years is probably the extreme. Individual stems thus dry up and die in succession without seeding, but the clump lives out its normal period, when it flowers, seeds, and dies; all stems then living, whatever their age or size, seeding and dying together.

As each stem matures separately, and, once matured, will never becomes any larger, it may be thought that when a clump has attained sufficient age to produce stems fit for sale, such clums might at once be cut out and utilized. But this would stop the increase of the clump, for it is only the young stems that are less than four years old that send up fresh shoots from their rhizomes. It thus follows that the younger stems should be left till at least their fifth year, while the older stems may be removed, for they are matured are no longer reproducing themselves and are saleable.

This peculiarity of the bamboo makes it a matter of some little difficulty to decide whether a block of bamboos is, or is not, being overworked. The condition of the separate clumps, or of a large proportion of them, must be studied, and measures must be adopted, and enforced, to prevent the reproducing stems being cut out. They are often among the finest in the clump, and often also the handiest to the axe of the cutter. They must be preserved, while if too many old stems are left, the young shoots will be hampered in their growth and become much twised in their lower portions. Owing again to this peculiarity the closing of blocks of bamboo forest against cutters for a term of years may indeed protect the newer culms, but will also lead to many of the older ones being wasted. Each case must be settled on its own merits, but where good supervision can be enforced the closing of blocks is not advisable.

In Bengal, in parts of the North-West Provinces, in the Deccan, in Mysore and Madras, and possibly elsewhere in India, it is an article of common belief among natives and acted up to in practice, that bamboos cut in the bright half* of the month are sure to be attacked by insects and to turn quickly to powder; while those felled in the dark half of the moon's course will last for a long time. It is also held that the new shoots are not sent up, even if rain falls, till the thunderstorms that precede the monsoon have set in; and, further, that the more the thunder, the larger will be the number of new shoots sent up that year.—*Indian Forester.*

THE VALUE OF SULPHATE OF AMMONIA AS A MANURE.

By Mr. F. J. Lloyd, F.C.S., Lecturer on Agriculture at King's College, &c, London.

Writing to the *Journal of Gas Lighting*, Mr. Lloyd, F.C.S., says:—Of late the *Journal* has contained some interesting matter in reference to sulphate of ammonia. Perhaps, therefore, a few words on this subject from an agricultural point of view might not only prove of interest to its readers, but, while dispelling from their minds the false views regarding the future of this product, enable them to rightly estimate the true relative merits of nitrate of soda and sulphate of ammonia as manures. Each of these substances has a manurial value; and both owe this value to the same fact, viz., that they contain nitrogen. In the one the nitrogen exists combined with hydrogen as ammonia; in the other, combined with oxygen as nitric acid. It is a well-known fact that 100 parts of commercial sulphate of ammonia, of 94 refraction, such as is now usually sold for manurial purposes, contains about 20 parts or more of nitrogen; while the detrimental impurities, the various cyanides, which used twelve or more years ago to be somewhat prevalent in sulphates of ammonia, are now seldom met with. On the other hand, commercial nitrate of soda, of 95 refraction, contains little less than 16 parts of nitrogen. Hence, unless it can be shown that the nitrogen in sulphate as ammonia is less valuable to the farmer than the nitrogen in nitrate of soda, it is evident that, so long as a ton of nitrate of soda can be bought for £10 (which is approximately its present price), sulphate of ammonia is worth £12-10s. a ton. Now, is the nitrogen of ammonia as valuable to the farmer as the nitrogen of nitrate? In order to answer this question, which lies at the root of the whole subject, it is necessary to briefly state some facts regarding the function of the roots of the plant, and the properties of the soil. The majority of plants take most, if not all their nitrogen from the soil as nitric acid. There can be no doubt, therefore, that nitrate of soda will act upon vegatation more rapidly than sulphate of ammonia. But it is equally certain that every properly cultivated soil possesses to a high degree the power of nitrification—that is, it converts all nitrogenous substances gradually into nitric acid. Ammonia is one of the substances most easily so converted. Hence it is certain that, when sulphate of ammonia is used as a manure, the soil will gradually convert the ammonia into nitric acid, and supply to the plant nitrogen really in the very same form as is supplied by nitrate of soda. So far it is evident, then, that nitrate of soda is only more beneficial than sulphate of ammonia, inasmuch as it acts upon vegetation more rapidly.

Next let us consider the action of the soil on these two substances respectively. The late Dr. Voelcker, among his valuable additions to agricultural chemistry, left none more valuable than his researches upon the action of soils on manures. By analysing the water flowing from the drains of large fields, where crops were cultivated under varying conditions and manures, he proved that nitrate of soda is washed rapidly through the soil by rain, so that a large quantity of the nitrogen so applied to the soil is never taken up by the roots of the plants; and during the time there is no crop growing the nitrate of soda is being merely washed away. Not so with sulphate of ammonia. Only once or twice in all his experiments, did he find ammonia being washed through the soil into the drains, and then only in minute quantities, and this was found to be the case even where the land had been manured with 4 or 5 cwt. of sulphate of ammonia—far larger quantities than are usually employed. What then became of the ammonia? It was found that all fertile soils had the power of retaining ammonia, which became only gradually converted into nitric acid; and then only, and not until then, was it washed out of the soil. Meanwhile any plant growing in the soil would be well able to take up the nitric acid as it was formed, so that less would be lost, than where the nitrogen had been applied as nitrate of soda. If then nitrate of soda is more active than sulphate of ammonia, still the latter is more lasting and less wasteful. It is evident that manure manufacturers are well aware of this fact, for one seldom finds nitrate of soda admixed in compound manures, except for special and forcing purposes, while sulphate of ammonia is largely and rightly used for mixing with phosphatic manures. If I have made my meaning clear, it will be evident that the producers of sulphate of ammonia have nothing to fear, from theoretical reason, as to the supposed inferiority of this manure, when compared with nitrate of soda.

As might be anticipated, practice in the field confirms these scientific conclusions. Thus the renowned experiments of Sir J. B. Lawes and Dr. Gilbert at Rothamsted, and the experiments by the late Dr. Voelcker at Woburn, for the Royal Agricultural Society, yielded the following results, where equal quantities of nitrogen were applied as sulphate of ammonia and nitrate of soda respectively:—

* An experiment to decide this, was carried out at Dehra in 1884, and the popular theory was fully confirmed, the 100 bamboos cut in the bright moon being riddled by insect borings, whilst the 100 cut in the dark half of the month are almost untouched. It is probable that, the insects which cause the borings only deposit eggs on bright nights.—Ed. *I. F.*

	Rothamsted.		Woburn.	
	Barley.	Wheat.	Barley.	Wheat.
Sulphate of Ammonia—				
Bushels	42⅞	31¼	41·2	29·1
Weight per bushel (lb.)	45⅜	60¾	52·4	57·1
Nitrate of Soda—				
Bushels	45	37¾	42·6	28·9
Weights per bushel (lb.)	48	59	52·3	56·9
	Aver. of 13 yrs.		Aver. of 6 yrs.	

At Rothamsted the ammonia salts were applied in the autumn; but at Woburn in the spring. In both cases the nitrate was applied in the spring; and it is evident that there is an apparent superiority of nitrate of soda over sulphate of ammonia (and chlorides, for they were mixed) at Rothamsted. I have, however, brought forward these results because they illustrate very forcibly how much the value of a manure (and especially a manure like sulphate of ammonia) depends upon the time of its application. Undoubtedly the best time to apply sulphate of ammonia is in the spring—early spring—and in damp weather. And this is why the Woburn experiments yield more favourable results. Had the nitrate of soda at Rothamsted been applied in the autumn, it would have been largely washed out of the soil, and proved useless; and then the sulphate of ammonia would probably have yielded much larger crops than the nitrate. The fact that the sulphate remained in the land all through the winter, and produced a crop very nearly as good as the nitrate applied in spring, is a strong proof of its great value as a manure. In fact, the only legitimate conclusion which can be drawn from the preceding is that the nitrogen in sulphate of ammonia is every whit as valuable as the nitrogen in nitrate, provided the sulphate be properly used. But there is another advantage possessed by sulphate of ammonia, as opposed to a direct disadvantage under which nitrate of soda labours. It is this: nitrate of soda will often prove of more harm than good on stiff clay soils; while on such soils, sulphate of ammonia proves a most valuable manure. Indeed, there is no soil upon which sulphate of ammonia has proved to have any injurious effect; while there is evidence of farmers having found nitrate of soda injurious on their wet stiff clays.

It must not be supposed for a moment that in upholding the value of sulphate of ammonia, I wish to detract from the value of nitrate of soda. Each has its proper use; and each to give good results, requires care and judgement in its use. There are circumstances and conditions when, as shown, sulphate of ammonia is superior to nitrate of soda; but there are equally circumstances and conditions, when nitrate of soda is superior to sulphate of ammonia. This, however, is not the place to enter into the conditions. All that I wish to point out to gas companies and sulphate of ammonia manufacturers is this—that sulphate of ammonia is most valuable as a manure, and can be applied in the majority of cases with as great advantage as nitrate of soda. The unite value of nitrogen therefore in these two substances is (for the farmer identical; so that the price of sulphate can never be above that of nitrate of soda, except in so far as it contains 20 parts of nitrogen to 16 parts in nitrate of soda, and the market value of these two articles must regulate one another.

But the question of demand must be taken into account; into the supply of sulphate we need not inquire. What the manufacturers want is to create—or rather to increase—the demand. Those interested in nitrate of soda have already realised the importance of this; and hence, no doubt, the tempting bait of £500 which has been offered for the best essay on its advantages. That this essay will be in strict accordance with scientific and proved facts is certain from the names of those who have been selected as judges. Hence it will carry great weight and conviction; and the impetus which will be given, not only in England, but throughout the world, to the use of nitrate of soda as a manure, will be immense. Some twelve months at least must elapse before the prize essay can be published; and the producers of sulphate of ammonia will have none but themselves to blame if they refuse to utilise the interim in making more widely known the advantages of sulphate of ammonia as a manure—advantages which are as real, and as well proved, as any of those which can be brought forward in favour of nitrate of soda.—*North British Agriculturist.*

Cardamons in Queensland.—The Acclimatisation Society have just received, from India a small parcel of the seeds of those valuable plants *Elettaria cardamomum* and *E. robusta*. The cardamom, being of a purely tropical nature, is unfitted for cultivation in the southern portion of the colony; but in the far North many favourable localities an be found where the plant would luxuriate. The Society will therefore be pleased to supply with a small quantity of seed any of our Northern settlers who are desirous of giving this plant a trial; application should be made to the overseer, Bowen Park. It may be interesting to note that a plant of *E. robusta* was wintered at Bowen Park (in the bush-house) without any protection, the lowest temperature being 30°. This proves the plant to be much hardier than is generally supposed, although the higher the temperature the more success will attend its culture.—*Queenslander.*

The Subject of Tropical Fruits, and a probable future market for them, is one of great moment to Queensland settlers; therefore, we have watched with interest the doings of the sister colonies in their experimental shipments of fruit to Europe, and have from time to time informed our readers of the success or otherwise of these ventures. Considerable interest also has been felt in Britain at this sight of splendid fresh fruit "all the way from Australia." The other of the British colonies have not been behind and also in forwarding fruits, and notably from the West Indies have fine specimens of tropical fruits been sent. Being the nearest colony possessing a tropical climate, the West Indies will naturally supply the English market with pineapples, bananas, mangoes, &c.; still there is abundant room for Queensland competition, and the ease and success with which such a perishable fruit as the banana can now by the aid of cool store-rooms and swift steamers be landed in London argues well for a similar success from this colony, though the distance is somewhat greater. The taste for tropical fruits is one which increases the more they are eaten. Few people think much even of the banana the first time it is tasted, but soon the fruit becomes almost a necessity. The same with mangoes, &c. Once let the liking for these fruits get hold of the populous countries of the temperate portions of the world, and the demand for them will be insatiable.—*Queenslander.*

Peermaad.—A correspondent writes:—"The rise in the coffee market has cheered planters both in this district as elsewhere, but owing to the transformation of many coffee properties into tea and cinchona, there are not many proprietors who will benefit by the rise To those a golden future is in store, as the rise, from all accounts, promises to be a permanent one. Tea cultivation is increasing, and that too in the face of a fall on the market of 20 to 25 per cent, and a good deal of tea finds its way down to the Coast. Tea and cinchona have done much to save planters here from shipwreck, and were it not for the illiberal condition of the Travancore cardamom monopoly, that product would also have materially assisted them, as it grows well in the forests and belts attached to estates. Under the present rule, growers have to hand over their crops to Government agents, and when the cardamoms, are sold receive one third of the value for their expense and trouble. This rule is, however a dead letter, and the crop picked by planters nearly a year since has not been yet settled for, while the Government has realized on the sale as far back as April. Under these circumstances, it is not to be wondered at that planters scarcely care to work their holdings, and the cultivation of the spice must eventually be given up. The fault does not appear to be at the door of the manager of the department, who is a well meaning man and anxious to do his best for the growers, but the blame seems to rest with the upper administrators of the State."—*Madras Mail.*

THE TEA PLANTER'S MANUAL*.

25th October 1886.

"The Tea Planter's Manual" of Mr. T. C. Owen which has lately been issued from the Press is a useful little book, and comes to meet a much felt want. With tea as its topic, it has a wide horizon, and should have a wide circle of readers. Every manner of subject connected with our new product is more or less discussed, and the budding tea planter who is all alive for information and has an insatiable appetite for "wrinkles" as well as the man who poses as an authority and is above such things, may find in its pages something instructive to the one, and interesting to the other.

The book is unambitious; "more a compilation of the opinions of others, and the results they have arrived at than an original work" is part of the modest preface which introduces the reader to the "Manual."

Still Mr. Owen does not efface himself when in the presence of our most authoritative names, but objects to their finding when he sees due cause—"checks up" in the planter's vernacular—and in so doing he but evinces the every day characteristic of the class to which he belongs, who having acquired their knowledge in the school of experience are unwilling at the bidding of any to resign the heritage won therefrom.

In works of this kind there are several classes—compilations and compilations in fact—and those of my readers who are acquainted with an ambitious London book entitled "Tropical Agriculture" will, when comparing it with "The Tea Planters' Manual" appreciate the difference I speak of. The former is a thing of paste and scissors, bundled together any way, contradictory, confusing, and unsafe; whereas the "Tea Planters' Manual"—albeit largely the work of the paste pot and cuttings—has like the famous artist's paints, a mixture of brain therewith, and is all the more valuable for the addition. It is in fact a practical treatise from a practical man.

Yet it is not perfect and has some sins of omission, which might be remedied in another edition.

For example, in the estimate for opening 200 acres there is an item for roads and drains, and we can suppose a student of the "Manual" anxious to get some information as to the best kind of roads to cut. R15 an acre is allowed for roading and draining; but when he turns to the chapter on "Field cultivation," he finds nothing whatever to guide him regarding roads except a few general statements as to the desirability "to make all portions of the estate as readily accessible as possible." The information about the drains is complete enough: "good 18-inch drains at from 30 to 50 feet apart according to the character of the land, at a gradient of 1 in 15 ft." What I complain of is that similar definite information has not also been given regarding the roads. In a Manual there should be no taking for granted. A similar objection applies to the item under nurseries. It runs as follows:—"Nurseries and cost of 25 maunds seed which should have been laid down previously R2,000." Now how is this to be a guide to any one? How much for seed? How much for nurseries? Again I turn back to the chapter on "Seed and Nurseries," and although there is no reason to complain of the general information in this case, which indeed is very full, still the cost of making beds, planting, &c., is not given. All you have to guide you as to cost is the remark, "I do not think R2 per 1,000 is too high an allowance for the cost of raising good plants including cost of making a nursery." What a student of the "Manual" wants is *detailed* information which will be useful to him in his work as it progresses day by day, although the other is not without its value. To the experienced planter details are not so important, yet even he cannot carry about in his head the cost of everything, and I do not think that a Manual can be too explicit or too full. One man wants one thing and one another, and if both knew the whereabouts to enquire for everthing, they would go there.

The book has two coloured plans of factories drawn to a scale, which must have added very much to the cost of the "Manual," more I think, than they are worth: and although they help to wear your book out earlier than it otherwise should, still when you add to the plates the figures estimated to erect such a building—and remember what such estimates are worth, those who don't care for them as plans, can regard them as illustrations of what is expected from the Ceylon planter, and more especially from the favourite product, to the cultivation of which he is now so devotedly attached. May it prove a true prophecy.

There is very much in the "Manual" to which I should like to refer, but already I am near my limit, and must deny myself the pleasure. If I here objected to some things, it is not that I do not appreciate this new addition to the Ceylon Planting Manuals: but rather that I should see its present value enhanced. The book is stuffed full of information, and the wonder is not that there are some omissions, but that these omissions are so few. As an "Enquire Within" for everything about tea, I would commend it. PEPPERCORN.

*By T. C. Owen; published by A. M. & J. Ferguson, *Observer* Office, Colombo, 1886.

DR. H. J. FOX announces, in the *St. Louis Medical Journal*, that creosote is almost a certain cure for erysipelas, for he has treated some hundreds of cases with only one fatal result. The affected parts are kept constantly covered with cloths soaked in a solution of creosote in water—six to twenty drops of creosote to one ounce of water; or a poultice may be formed by stirring ground elm into the solution so as to make a paste.—*Madras Mail.*

ADVANTAGES OF CROWN GRAFTING.—By adopting crown grafting, almost all the advantages of budding upon single stocks are secured, and in this way part of the work can be done in the winter, and not all rushed into the hurry and bustle of summer. In crown grafting it is best to use good, first-class stocks shortening the tap root a little, leaving 9 to 10 inches of root, and use scions shorter than piece-root grafting, say about 3 inches, and make the splice or union just at the crown or collar of the seedling. Plant the graft about 1 inch below the joint, leaving 2 inches of it above ground. Should any of the scions fail, the seedling will throw up a sucker, which can be budded the same fall, and thus have nearly a perfect stand.—N. H. ALBUNGH.—*Journal of Forestry.*

LEMON.—The *Gardeners' Chronicle* says:—The lemon plant, or sweet-scented verbena of our gardens (*Aloysia citriodra*), holds a foremost place among Spanish herbs. Every leaf of it is treasured and dried for winter use, and it is regarded as the finest cordial and stomachic in the world. It is taken in two ways—either made into a decoction with hot water and sugar and drunk cold as a *refresco* and tonic, or, better still, with the morning and evening cup of tea. Put a sprig of lemon verbena, say five or six leaves, into the tea-cup, and pour the tea upon it; you will never suffer from flatulence, never be made nervous, never have cholera, diarrhœa, or loss of appetite. Besides, the flavour is simply delicious; no one who has drunk their Pekoe with it, will ever again drink it without a sprig of lemon verbena. It may not be generally known to our readers that some of our most successful tea mixers have acquired fame by using the leaves of this plant amongst their tea.—*Planter and Farmer*—["Is that so?" as they say in America.—ED.]

INSECTICIDES are always a subject of more than passing interest to cultivators, for they are brought directly face to face with these pests experimentally. A new and very promising one consists of camphor dissolved in methylated spirits to saturation, and mixed with soft soap to the consistence of cream. When diluted so as to be fit for use with a syringe, this has been found an efficacious substitute for fumigation in the case of mealy bug, scale, red spider, &c. &c., —*Planter and Farmer.*—[Too expensive on a large scale, we fear.—ED.]

FINE SALE OF CEYLON HYBRID CINCHONA BARK.—We have lately been favored with an inspection of an account sales of 6,124 lb. of bark from the Broughton estate, in Haputale, which netted, after paying all charges, £308 6s 5d, or about 1s a lb. nett. One lot of Hybrid renewed bark analyzed 3·72 per cent. sulphate of quinine, and realized 1s 3d. per lb., whilst another lot of renewed Hybrid analyzed as much as 5·73 sulphate of quinine, and fetched 1s 8d. per lb. These fine hybrid trees which are planted at an altitude of about 5,000 feet, are *robustas* of the most vigorous and robust type, and are naturally highly prized by the proprietor of the Broughton estate, to whom they must be a little gold mine.—Local "Times."

CEYLON TEA.—The *British Trade Journal* states :—The Ceylon Tea Agency, Thames Street Chambers, E. C., are offering to the public, in packet form, the "Colombo" brand of pure Ceylon tea. These lead packages, of various quantities, are carefully got up for the retail trade, each bearing the trade-mark of the company on a neat wrapper. The tea is selected from the best gardens, and possesses those qualities for which tea is growing in favour in this country. The leaf is free from mineral or other facing matter, clean, well-formed and free from dust, while its flavour and colour are excellent. It should need but little effort to induce the British consumer to patronise so good an article offered at so reasonable a price.

QUININE IN JAPAN.—Vice-Consul Russell Robertson writes from Yokohama :—The low prices ruling in Europe for quinine have tended greatly to increase the consumption here, and continental manufacturers, by reason of competition, have been bidding for the trade by coming into the market direct themselves to supply the demand. Leading French and German makers have their agents here, and consequently prices that have been ruling during the year have not offered any inducement for resident business importers. The English makers have not been so pushing, and their quinine is now almost unknown in this market.—*Chemist and Druggist.*

HOW SUNFLOWERS ARE USEFUL.—This plant is a vigorous grower and has been extolled as a preventive of malarial diseases. The seed affords excellent food for hens and also for horses. It is said that there is no kind of feed that will keep horses in health, give them a sleek appearance, and make them lively and spirited like the seed of the sunflower, feeding half a pint night and morning. It is particularly recommended for giving a horse power of endurance, being fed half a pint night and morning with other feed. The stalks and heads, after the seed is worked out, also make good material for fires, and are especially convenient in summer when a quick fire is desired and an enduring heat is not wanted. In their growth they make a showy appearance about dwellings and give an agreeable fragrance to the air. The latest direction in the line of utilization of the sunflower is the planting of a seed in a place at the proper distances, so that the stalks as they grow will serve as been poles. We have seen them started in that way this season, and as the stalks grow the leaves are removed, thus forming an excellent stalk for the beans, but what the effect will be upon them remains to be seen. The roots must tax the feeding capacity of the soil quite heavily.—*Germantown Telegraph.*

PLANTING IN WYNAAD.

(From *Annual Report of Wynaad P. A.*)

We have been ably represented on the Coffee Committee of the Colonial Exhibition by Mr. H. Pasteur. As you are all aware, he has for many years fought against the legalised adulteration of coffee, and though he has been unable to get Government to interfere in the matter, I hope that great good will result from his Committee's efforts to expose in a small pamphlet (thousands of which were distributed at the Exhibition), the frauds of the retail trade, and also from their sale of pure Indian coffees. We are indebted to Mr. Jowitt and his colleagues for an exhaustive report on the causes of colour or want of colour in coffee, which, if the result is not quite satisfactory, is from no fault of theirs, but from the difficulties inherent in the nature of the enquiry. However that it has been appreciated by the outside public is apparent from the numerous requests that I have had for copies. We are now carrying out experiments in barking C. Ledgeriana, which I hope will prove of general utility, and I only regret that Government has not seen its way to substantiate its avowed '*raison d' être*' as a cinchona planter by assisting us with free, or at any rate cost price, analyses. I must congratulate you on our improved prospects. During the struggle of the last years I know that I, and I daresay many others among you, have felt that another bad year might be my last in the district, and indeed if you only compare a list of our members of 1880 with one of today, you will see how many good friends have had to succumb. But at last we stand in the clear dawn of better times. That it is so as regards coffee, the following facts and figures which Mr. Pasteur has very kindly sent to me will I think, convince you. During 1885-86, for the first time for many years, the consumption of the world has overtaken the production, and stocks in all European ports have fallen nearly 70,000 tons. On the 1st Sept. last they stood at 146,000 tons, against 217,500 tons on the 1st Sept. 1885. This is the lowest limit that has been reached since 1881, and in that year prices ranged from 96s to 85s. The immediate future depends on this coming Brazilian crop, which is variously estimated from 380,000 to 300,000 tons. If the latter estimate prove the right one, as is generally expected, stocks must fall another 70,000 tons, and I need hardly point out to you that this could not happen without an extraordinary rise in prices. If coffee was to reach 110s or 120s per cwt. again, as in the days of 1875, with the present rate of exchange, we who have tried over the bad times should reap a golden harvest. The prospects of cinchona are also good. The two great scares of these latter days have ended in nought. The story of an artificial preparation of quinine, which was to reduce the price to 3d per oz., has ended in a ridiculous fiasco, and we have the satisfaction of knowing that even if they do succeed in preparing quinine synthetically it is sure to be an expensive process. As regards the 175,000 acres scare from Java, it is pronounced by people who ought to know as a gross exaggeration, I now beg to submit the accounts for the year, and lay my resignation in your hands."—*Madras Mail.*

CROTON-OIL PLANTS.—Wattagama, 26th Oct.—The caterpillar which proved so destructive to the croton seems to have disappeared and along with it the fear that the tea would suffer from the same cause, so that it is hardly to be wondered at that, the proposal to root out the croton trees and compensate the growers should have been lost sight of. I do not know whether croton growers would look with a more favourable eye on this proposal, than on their trees, now that they are again covered with leaf and showing signs of blossom. An authoritative and regular quotation of the price of croton seeds would be of advantage in making a decision.

WATTLE CULTIVATION.

We and our readers are indebted to "W. R. T." (see page 359) for the interesting information that there are wattle trees (*Acacia decurrens*) growing in Nuwara Eliya, 30 feet high at 25 to 26 months from the seed! We had previously heard from Mr. Nock, who showed us at Hakgalla, what he regarded as the true "golden wattle," that it was rare, if it existed at all, amongst the trees grown in Nuwara Eliya and on estates. But we did not understand Mr. Nock, to impeach the value as bark-yielding plants of the species which are now so common here. The truth is, that the number of acacias in Australia is very large and probably the majority of them yield yellow blossoms and are popularly known as "golden wattles." We shall never forget the glorious golden borders of the Mitchell river as we steamed up its channel to Bairnsdale *en route* to the Gipps Land Lakes, comparable, with their surrounding mountains, to the Loch Lomond district in Scotland. The varieties of acacias in the Melbourne Botanic Gardens, some of them exquisitely beautiful, is quite bewildering and many Australians are as much puzzled as we in Ceylon can be to distinguish the different varieties. This is shown by the extract from the *Australasian*, one of the foremost papers of Australia, to which our correspondent refers as appearing in the *Tropical Agriculturist* of 1881-82. We quote the note by the agricultural editor of that paper to a letter making enquiries as to species and varieties :—

[The real black wattle, or true tanning variety, is the acacia delbata. The silver wattle, which is considered inferior to the black, is the acacia mollissima, which can be easily distiguished by the silver appearance of the under part of the leaf, and the glaucous appearance of the bark; the flowers of the latter are a bright yellow, that of the former a dirty yellow. The silver wattle is in general found on the banks of creeks the black wattle on high dry ground. The black has rough bark, the silver being comparatively speaking smooth. The seed, so long as it is good, may be gathered from any tree.—Ed].

If that information is misleading, it was given not by us, but by one of the best authorities in the land of the wattle, and it is not fair to warn persons against "misleading statements in the *T. A.*" which are quotations, even if they were misleading, which we are not prepared to admit. For a note on page 251 of the volume referred to we are personally responsible. It runs thus :—

[All the wattles are acacias: the black wattle is *A. affius* or *mollissima*. It propagates only too readily from the roots, spreading all around, and being difficult to keep within bounds: a very deep trench must be cut for the purpose. It does not need topping, but grows very fast and shrubby, much more so than the gum. It is an excellent break-wind.—Ed.]

What is there misleading in this? Of course, there is "blackwood" as well as "black wattle," the former a tree the latter a large shrub. We did not speak of the value of the black wattle for bark but as a "break-wind," and what our correspondent says about the rapid growth of the trees in Nuwara Eliya shews how valuable the wattles are calculated to be as shelter belts and we should say for firewood for tea furnaces. But our personal experience induces us to warn planters not to plant wattles amongst tea. Some were inadvertently so planted out on Abbotsford and the result has been that in the cold, drizzly, windy weather which prevailed some weeks ago, the wattles shed their leaves, the tea bushes immediately around them following suit. The wattles have not, like the symplocos, killed the tea bushes but given them a shock. The wattles will, of course, be removed. They and gums and almost all other trees, ought to be cultivated in separate lots and not amongst tea,—Of course the £87 per ton of the *Indian Agriculturist* was a gross error for £8, which we ought to have corrected in taking the paragraph over. We scarcely think it would pay in Ceylon, to grow any of the wattles for the sake of the bark, but experiments in this direction might well be tried on the patanas around Hakgala and in Nuwara Eliya by Mr. Nock, from whom a paper on the whole subject would be valuable.

We take this opportunity of again quoting the reliable information given by Mr. Gamble in his Manual of the Timber Trees of India, regarding the species of Australian acacias hitherto cultivated in India. From the information thus given, it will be seen that *A. dealbata* is the silver wattle; *A. melanoxylon* is the Australian blackwood; while *A. decurrens*, so common in Ceylon is the black wattle. *A. pycnantha* is the broad leaf or golden wattle, which is *said* to be the most valuable for gum and tanners' bark. If this species has not been supplied by Australian seedsmen, it is matter for surprise. But any one specially interested in the subject and desirous of trying experiments, might apply direct to Mr. Brown, the head of the Forest Department in South Australia, or to Mr. Wm. Ferguson, Forestor of Victoria. Baron von Mueller, too, and Messrs. Guillefoyle and Moore of the Melbourne and Sydney Botanic Gardens, would readily give information and aid. Mr. Gamble writes :—

A. dealbata, Link,: Benth. Fl. Austr. ii. 415; Brandis 180. The Silver Wattle.

A tree spreading rapidly by numerous root-suckers The wood is moderately hard, light brown,, but warps considerably. Pores small, often in short linear groups. Medullary rays short, fine and moderately broad, well marked on a radial section,

Indigenous in New South Wales, Victoria and Tasmania. Introduced on the Nilgiris, and now naturalised since 1840.

The wood is extensively used in Australia for timber, and the bark for tanning. It is being tried in plantations on the hills of the Punjab, North-Western Provinces and Sikkim. Our specimen was cut from a tree 11 years old and 46 feet high, and was about 12 inches in diameter. Colonel Beddome, in his report on the Nilgiri plantations of April 1878, says that this Wattle grows very readily from the stool, but comes up in a dense mass of small twig-like stems so that it can only be depended on for very small firewood.

A. melanoxylon, R. Br.; Benth. Fl. Austr. ii. 415.; Brandis 180. Australian Blackwood. A large tree with hard and durable wood; heartwood dark brown and beautifully mottled, soft, shining, even-grained; pores mostly oval, moderate-sized and divided into compartments conspicuously marked on a vertical section. Medullary rays short and fine.

New South Wales, Victoria, Tasmania and South Australia. Introduced on the Nilgiris since 1840 and now completely naturalised. Also being grown in the hills of the Punjab, Kumaun and Sikkim.

With regard to its rate of growth, Colonel Beddome, in his report of April 1878 on the Nilgiri plantations, says that in the Bleakhouse plantation, Wellington, the average girth of the trees in the portion which is 21 to 22 years old, taken from the measurement of 30 trees as they came, was 35 inches at 6 feet from the ground (about 4 rings per inch of radius), the girth of some of the largest trees being 56, 55, 50, 46 and 44 inches. Our specimen was cut from a tree 20 years old and 90 feet high; it gave a plank 2 feet broad. The wood seems to be regarded on the Nilgiris as very inferior to that of *Eucalyptus Globulus*, either for timber or firewood; its growth is much slower and it is attacked by species of *Loranthus* which parasites in time kill the tree. It does not coppice well, unless cut very young.

Weight, according to Mr. Newbery (Timbers of Victoria, 1,877,) 41 to 48lb. per cubic foot; our specimen gives 36 lb.

It is used in Australia for cabinet work, coach-building, railway carriages and agricultural implements; on the Nilgiris chiefly for firewood. Its bark is used for tanning

Besides *A. melanoxylon* and *A. dealbata*, there are several other species of Wattle, some of which are cultivated in India. *A. decurrens*, Willd., the "Common" or "Black" Wattle, is a small or medium-sized tree; larger in moist localities. According to Mr. Newbery, the wood weighs 45 to 48 lb per cubic foot. It is being grown in several places in India. *A. pycnantha*, Bth., the "Golden" or "Broad-leaf" Wattle, is the most valuable species for tanner's bark and gum. Its wood weighs 51·5 lb per cubic foot. *A. homalophylla*, A. Cunn., is the Myallwood, a small tree with a hard, dark wood with the scent of violets.

Wattles grow in almost any soil, but their growth is best in loose, sandy places or where the surface has been broken for agricultural or other purposes. It is well, before sowing the seed, to soak it for a short time in warm water; this moistens the outer shell and induces more speedy germination. The seeds generally germinate in from 7 to 10 days, and are apt to damp off if too carelessly watered.

GOW'S TEA WITHERING MACHINE.

The experimental machine, which we cannot honestly call "a thing of beauty," for, externally it presents the appearance of a revolving horse box, perforated at intervals—was tried today in the presence of a large number of gentlemen interested: merchants, brokers and tea-tasters, planters, members of the local press, &c. The tea leaf used was only very partially withered by atmospheric air, was somewhat heated and contained a good deal of *banjy* or hard leaf. The quantity filled in was 200 lb., and the time occupied in withering was, as nearly as possible one hour. Good judges pronounced the leaf, when taken out, well withered and it must have gone pretty far in the process of fermentation, for it felt quite hot to the touch. Mr. Gow attracted attention to the bright appearance of the pekoe tips, although a good proportion of the banjy leaf was but partially affected by the withering process. The verdict of a tea-taster was, "The withering is well enough: let us see what the quality of the tea will be." We waited long enough to see the withered and heated tea put into one of Jackson's rollers, and to have our attention attracted by Mr. Gow to the readiness with which the roller acted on leaf withered in his machine. We were, therefore, surprised to hear him say that he wished to give the leaf an hour's rolling. Hearing this, we came away to write this paragraph (time, 20 minutes to 1, the experiment having commenced shortly after 11), but at Mr. Gow's request we promised to go "back again," which promise we hope to be able to fulfil.

Meantime we may say that the withering machine will require motive power to cause the huge drum to revolve, and to drive it into a stream of hot air which, with the moisture from the leaf, escapes through rows of perforations at intervals over the surface. There is nothing new in this application of hot air, so that the distinguishing principle of Mr. Gow's machine is avowedly borrowed from those original tea manufacturers, the Chinese. To imitate the celestial process of flapping the tea leaf between the hands, a series of wooden fans or flappers, working on hinges, is placed inside the drum, by which the leaves are struck in mid air (the hot air of the interior) as the drum revolves. In this flapping process the cells of the leaves are broken and fermentation is thus added to withering, both of which actions would be considered fatal to the tea in the ordinary process of withering, thinly spread on floors or shelves or webs, by means of atmospheric air, or by air, slightly warmed by the heat from sirroccos or other driers. As Mr. Gow claims as a distinct, indeed the distinguishing merit of his invention, the cell-breaking and partial fermentation so much dreaded by tea manufacturers who use the ordinary process of withering, we and others shall, of course, wait with great interest the final result of today's experiment and of the more perfect carrying-out of the process by the finished machines which are shortly expected in the island. The heat, we ought to have stated, was 140° when the leaf was put into the witherer; it rose spedily, after the door at the end was shut, to 160° and this was the height sustained until towards the end when Mr. Gow said he wished to see it up to 180°. Having heard so much of the cell breaking, we confess we were somewhat surprised to see how little in external appearance and to the feel, but for the great heat, the withered and partially fermented leaf differed from leaf withered by being spread at the rate of 1 lb. of green leaf to 6 feet of superficial space and operated on merely by atmospheric air of a shade temperature as is usually the case. When we are satisfied that leaf withered by Mr. Gow's process, makes good tea; then the question will arise how far the withering machines (and at what comparative cost) will supersede the enormous stores, with numerous floors and multitudinous Hessian web shelves, which are now deemed necessary for withering purposes. Of course longer machines can be built to take in more than 200 lb. at a fill and we suppose much less time than the hour occupied today, will suffice for the withering process. If the work is well done and speedily, then, of course, will arise the question of price. Our impression at present is that Gow's withering machines are not so much likely to supersede withering floors and webs (Mr. Gow prefers wire or small mesh fishing nets,) as to prove useful adjuncts to existing appliances in high and cold or very wet districts. In the Kelani Valley, too frequently, the heat of the atmosphere is so intense, that the tea leaf is withered prematurely. In wet and cold districts on the other hand, planters this past season especially were driven almost to despair by seeing their leaf still unwithered on the fourth and even the fifth day after plucking. It would seem that it is in the latter class of places that Gow's Witherer, if really a success and attainable at a moderate cost, is likely to be chiefly used.

3-15 p. m. We have now to add that the tea, which was not fermented in the usual fashion before being put into the roller, took a very good roll. It was then roasted under difficulties, by means of two trays and the sloping tube of an American Evaporator. All the tea showed a fine colour in leaf and cup, and that which was perfectly dried gave a good liquor. In answer to our remark that it was "very fair tea under the circumstances," a leading Colombo Tea Taster said, "It is very good tea under the circumstances." Samples are to be sent to the brokers and to the press, so that we shall be able in a succeeding issue to give the final verdict.

THE SALE OF CEYLON TEA IN LONDON.

The information sent to us by our London Correspondent by this mail detailing arrangements that have been made by well known Ceylon men for the sale of our island teas in the Metropolis and elsewhere throughout England will be decmed

satisfactory without doubt, as being a step in the direction we have always desired to see followed. But the particular case instanced is, after all, but a single step, and can scarcely be held to fulfill *all* the requirements of the position. The names of the gentlemen by whom this new venture is supported will certainly be a sufficient guarantee that, under their auspices, all will be done that can be done by a limited Association. But, while expressing this amount of satisfaction we cannot but feel that, if we are to obtain all the success that we desire towards the assurance that tea of a high quality shall always with certainty be obtainable by English consumers, it will have to be secured by means far more extended than are likely to be at the command of the Ceylon Tea growers Company, Limited.

It is to a Syndicate of the main body of those interested in tea-growing in the colony that we must look for the full realization of our desires. It must be by compact action that such will be obtained; by the sinking of rivalry and unworthy competition such as we fear we are not likely to be altogether free from when private interests are held paramount to the public good. Such a Syndicate has been much discussed in our columns. Our planters one and all should give it their support, and they must do so if they hope to see the chicanery of the retail grocer defeated, and to convey assurance to the Home consumer that what he purchases as pure Ceylon tea is what it is represented to be. We by no means undervalue the possible result to the enterprize now started. We have no doubt that the article it will submit for sale to the English public will be all that the best well wishers for the prosperity of this colony could desire. But they are bound in the very nature of things to have to submit to a competition by unscrupulous parties. Unless that competition can be effectually wiped out, such complaints as have of late been addressed to us by several correspondents are not likely to escape the need for repetition. It is only, as we have said, by quite a crushing influence being brought to bear, that the sale of inferior and impure teas which has brought our produce into comparative disrepute can be altogether stopped.

We think therefore that, valuable as this new agency is likely to prove, its establishment ought not to induce our planting community to slacken their efforts to effect such a desired combination as we have referred to. It will be seen from what our London correspondent writes that, as with previously formed agencies, it is the intention to practically limit its sale, so far as the primary effort of the Association goes, to those of the produce of particular estates. When that sale passes the limits of the producing powers of those particular estates, recourse will have to be made to purchase in the open market to make up the deficiency of supply. To ensure that purchases so made, shall be of corresponding quality to that of the produce of the estates concerned, it must manifestly be necessary to ensure that the agents employed are not alone perfectly honest but also entirely competent. Human nature being but what it is, we are driven to ask ourselves the question whether such ensurance can invariably be guaranteed? Even a single failure to obtain those qualities may altogether undo all or nearly all the good the Ceylon Tea Growers Company may on other occasions have effected.

Now, if the whole body, or the larger proportion, of Ceylon Tea Estates was represented by a Syndicate entirely representing their interests, it is scarcely within the bounds of probability that any demand would be in excess of the guaranteed supply by men who would have a direct personal interest in the quality of the supplies. In fact the interest which, in the case of the Ceylon Tea Growers Company, is centred in comparatively a few individuals, would be extended to a representative body so large and so influential that shortcomings such as we have of late had reason to complain of, could scarcely be dreaded. Under no circumstances hardly—in such a case—would resort have to be had to promiscuous purchases in the open market. Such a course, as we have pointed out, is always likely to prove the weak point in the armour of those who are acting as private individuals only. We wish the new concern every possible success, and appreciate the efforts and intentions of those who have devised it and are bringing it to a practical issue. But nevertheless do we feel that it is scarcely by such an agency, or by any multiplication of such agencies, that the peculiar needs of Ceylon Tea Estate proprietors can be met.

We have alone and specially noticed the Ceylon Tea Growers' Company, because it seems to some extent to be a rival to the proposed Syndicate, though on a much narrower basis; but this Company is by no means the only one affecting our teas of which the present mail has brought us information. We have besides the prospectus of "The Ceylon Pure Produce Company Limited" (£20,000 in 4,000 shares of £5 each) with such well-known names on the list of directors as Messrs. Dobree, R. W. Forbes, John Hamilton, J. H. Roberts (S. Rucker & Co.) and C. J. Scott. "This Company is formed"—says the prospectus —"for the purpose of supplying the Public with pure and genuine Ceylon tea, and to combine with it also the sale of pure coffee." Further we read:

"The intention is to open a Central Depôt or Warehouse in London, and, as opportunities offer, to establish Branch Depôts or Agencies in different parts of London and the Provincial towns, and to adopt all the necessary sources and means for publicity. It is intended to make the entire purchases in the London Market from all the importations as brought forward. In adopting this course continued uniformity of each description sold by the Company can thus be ensured, instead of depending always and solely on any particular estate, the quality from which may vary season by season. No other than Ceylon tea will be bought or sold by the Company. It would be premature to form any calculation as to the quantity of tea likely to pass through the Company's sources of disposal, but estimating the amount at only a quarter of a million of pounds weight, the profit would amply justify the expectation of a very good dividend. The sale of Coffee also should produce very satisfactory results."

Then our advertising columns have for some time shown that the "Direct Tea Supply Association of India and China (Limited)" claims the attention of Ceylon planters having 40 agencies for the delivery of tea direct to consumers. This mail too has brought us interesting information respecting the "tea" work of Mr. Pineo in America; of Mr. MacCombie Murray who is on his way thither—there is plenty of room for a dozen independent promoters in the United States—and of Messrs. Shand, Haldane & Co. in London. The last-named firm deal only in Ceylon teas and coffees and supplies asylums, hospitals and charitable institutions at actual cost price, and lay themselves out on all sides not so much for large gain as a large connection. Apart from all these agencies, and from Messrs. Buchanan Bois & Co. started locally, we learn that several other Ceylon Tea Companies are incubating in London, so that after all we begin to think there may be no room for the Syndicate in the old country; but certainly it could do much good in America and Australasia.

NATIVE CULTIVATION AND CATTLE MURRAIN—NEW PRODUCTS—SUITABILITY OF UVA FOR TEA.

(*From Mr. E. A. King's Report as Govt. Agent, for 1885.*)

Industries: Native.—The greater crop of the year (the maha) is reaped during the five months May, June July, August, and September; the lesser crop during the five months November, December, January, February, and March. The greatest activity in reaping is in June and July. The area of paddy land sown during 1885 is given by the headmen at 26,688 amunams, or 35,584 acres. There was certainly a larger area under crop than had been for many years, notwithstanding that there were complaints of want of seed paddy in Wellassa and Buttala in the early part of the year. Where there was plenty of water the crop may be estimated at twenty-five bushels an acre, but on the average it would be only safe to estimate at fifteen bushels the acre. The area of dry grain and Indian corn was 5,508 amunams, or 7,344 acres. The average crop was eight bushels. The sown area would have been larger had it not been that heavy rain in the end of 1884 had prevented the burning of many clearings. The chena harvest was accordingly rather shorter than might have been expected, and the cropped area was below the average. There is only one harvesting season for dry grain in the year, viz., during December, January, February, and March. It is gratifying to note that paddy cultivation is extending in Bintenna in the neighbourhood of the Horaborawewa, Kudawewa, and Hembarewa tanks. The native coffee crop for the year was extremely insignificant. Indeed, by far the greater number of the native gardens have died out completely. For the most part, what was once flourishing gardens is now a wilderness of dry sticks. It is no uncommon thing to see coffee gardens being felled for the cultivation of kurakkan. In the few cases where there has been utter neglect, little more can be said than that the trees have been just kept alive. The present state of things contrasts painfully with the luxuriance of native coffee in former days, when it put in circulation among the villagers annually in this district as much as R600,000. It was this that ensured the regular and cheerful payment of taxes, crowded the court with suitors, and filled the pockets of the arrack renters. There were occurrences of cattle disease in the first and third quarters of the year. Altogether 239 black cattle and 159 buffaloes are reported by the headmen to have died from disease. These figures do not include the mortality among transport bullocks, of which it was not possible to procure full information. Murrain and theft have been thinning the village cattle for some years back, but never were people accustomed to take so little pains to herd their cattle, preventing their associating with animals infected with disease, and guarding them against slaughter by cattle-stealers, as the Kandyan peasantry.

Industries: European.—Allowing for different products growing upon the same land, the following is a statement of estate cultivation in the district of Uva at the end of 1885, as compared with the previous year:—

	1885	1884
Coffee ...	31,755 ...	35,602
Tea ...	6,538 ...	522
Cinchona ...	10,629 ...	11,650
Cocoa ...	1,184 ...	482
Liberian coffee ...	132 ...	132
Rubber ..	122 ...	Not ascertained.
Cardamoms ...	488 ...	do.
Other products ...	186 ...	do.
	51,034	

Unlike other districts of the Island, coffee-picking in in a greater or lesser degree goes on all the year round in Uva, but the great harvesting seasons are in Spring and Autumn. The Spring crop is the chief of the year for high estates (say over 3,500 feet), the Autumn crop for the lower estates. Planters count the seasons from the middle of one year to the middle of the next. The Spring crop of 1885 was the best the estates had produced for many years, but the Autumn crop was poor. Though the Spring crop of 1886 is understood to be very short, it is gratifying to hear on all sides most encouraging prospects, based upon the blossom which has just set (April 15th, 1886). It is estimated that the later crop of 1886 will be a magnificent one. Encouraged by the promising appearance of the trees, many estates are giving special attention to manuring, when cultivation was beginning to be abandoned as unprofitable or absolutely wasteful. Coffee produce during the past season, 1884-85 (June to June), was much greater than the previous one, as the following figures will show:—

	Bushels.	Cwt.
Coffee crop of Uva for 1883-84 ...	386,589 =	128,860
Do. 1884-85 ...	542,387 =	180,795

A similar increase is shown in the produce of cinchona:—

	Cwt.
Cinchona crop of Uva for 1883-84 ...	7,545
Do. 1884-95 ...	10,880

Taking coffee and cinchona together, we have therefore the satisfactory result that the crop in 1884-85 was about half as much again as in the previous season. The ruling transport rates were 66 cents per bushel in 1885, as against 55½ cents per bushal in 1884. Cart hire rose 1885, owing partly to the larger crop to be carried, and partly to the presence of cattle murrain on the Ratnapura road. The result was the crops were very late in being despatched, causing great loss of colour to the coffee, which consequently fetched a low price in the London market. The coffee crop for the season 1885-86 is expected to be less than half what it was in the previous season; but it is believed that the quantity of cinchona to be sent into the market will be the largest Uva has ever produced. Leaf-disease in coffee is believed to be fast disappearing, and some planters are beginning to think that they made a mistake in clearing out coffee to make room for tea. In examining the figures at the head of this section, attention will be at once arrested by the large increase in the acreage of tea. Great and praiseworthy vigour has been thrown into this new branch of estate cultivation, notwithstanding the hardness of the times. Indeed, the manner in which the planter has roused himself from grieving over the shipwreck of his fortunes, and bravely entered upon new fields of industry, merits our greatest praise. It is now admitted on all sides that, in Uva, soil and climate are as well suited to the growth of tea as anywhere else in Ceylon, and that the only impediment in the way of our taking the position we ought to take in this industry lies in our isolation.

COFFEE PRUNING.

(REVIEW OF THE "WRINKLES AND HINTS ON COFFEE-PLANTING" WITH DIAGRAMS AND SPECIMENS OF FORMS BY GEORGE WILDES; MADRAS, ADDISION AND CO., MOUNT ROAD.

By an Old Ceylon Coffee Planter.)

It cannot be said, that in his article on pruning Mr. Wildes* adopts a false principle but the whole affair appears to me rather meagre and unsatisfactory The man who puts himself forward as teacher should be able to go to the roots of his subject, clearly explain and logically support his opinions. As the character given and mode of growth of the coffee tree varies with every variety of soil, climate, and exposure, within the range of its possible cultivation, the experience of any one individual planter is too narrow to embrace all the possible combinations and the danger, therefore, arises of elevating local circumstances into universal principles. However carefully the planter may study his own set of circumstances; however just the views he may arrive at and however correct the system that grows out of his experience, it is only a local system after all and may in many of its appliances and operations be totally inapplicable on the other side of his own mountain range, or even on the same side with a few hundred feet of difference in elevation, and this more affects the art of pruning than any other operation of cultivation.

In looking at an Arabian Coffee shrub two years old in its natural state any stranger to the habits of

the plant would conclude that through its whole life the plant would continue to develop its straight vertical stem with a fresh pair of primary branches over each pair of fresh leaves. This is not, however, what happens to the natural bush, the first crop is borne on the lower primaries and these may bear a small proportion of the next, but the second crop will be chiefly borne on the primaries developed while the first crop is coming to maturity. The same course will be followed by the third but as the tree is now nine or ten feet high and the stem has not gained a diameter in proportion to its height, it becomes unequal to the support of its vertical position under the increasing weight of its crop and droops into a curve; one or more suckers start from the point at which it leaves the perpendicular to assume its functions and be in their turn supplanted. Meantime the old wood, branch and stem, gradually rot and drop off, the plant assumes its regular regimen sending out fresh suckers every year to bear subsequent crops, none of which ever attains a height exceeding eight feet.

The bulk of the crops of the natural coffee bush being borne at the height of from five to seven feet from the surface and as wind tells disastrously on them during the first few years those facts originated the idea of the artificial bush in the minds of its cultivators. The advantages gained by this form were that the whole growth of the plant being kept within three feet of the surface the collection of the crop could be accomplished with less than one half the labour necessary to the natural tree, and the bushes being all stopped at the same height, the wind passes over them after the third year without doing any material injury. It is likewise generally held that the average crops of the artificial is greater than the natural tree bears, but this is one of those opinions that every one accepts but no one has brought to the test of actual experiment.

In imposing and maintaining the artificial form on the coffee shrub consists the science and the art of pruning. In treating of the science and the art of pruning coffee, or forming and maintaining an artificial bush I must choose my own set of circumstances, premising that only under the same conditions can my system be applied in all its details.

My elevation runs from 2000, to 3500 feet. I get 100 inches, more or less, of rain in the course of the year; more in the N.-E. than, in the S.-W. Monsoon. My soil is a dry crumbly one rich in decayed organism and becomes the loser from rain from sunshine and from treading on. The subsoil is a sandy and gravelly loam, in which quartz predominates and the presence of lime becomes evident on the application of acids. On this land I have planted my coffee 7×7 feet, I could not do justice to my trees with less room.

The first operation in the formation of an artificial tree is to take off the top of the stem, but if the tender stem be merely pinched off leaving the next pair of primaries to their free development they will in the course of two years most probably split the top of the stem down to the pair next below them. To avoid this the pair of branches next below the topping height should be pinched off at the same time. The suckers on all occasions originate at the highest buds left on the stem; thus the joint immediately above the highest pair of primaries left gains growth and strength to resist any pressure brought to bear subsequently. This first act of aggression, is the opening of a war with nature that admits of no truce. Two, three or four suckers immediately make their appearance and as after as they are stripped fresh ones succeed them. The sap beaten back by constant stripping at the top of the stem, seeks an outlet in the branches the upper primaries rapidly reach the same length as the lower one, and the latter begin to develop secondaries. The secondaries come out in pairs one on each side of the primary with which they form an angle of 45 degrees on the same horizontal plain. The first secondaries are seldom complicated with irregular growth but they are frequently too numerous in which case they must be thinned. Mr. Wildes assumes that this is always the case and proposes to remove one half of them either in alternate pairs or alternately from each side of the primary, but in the local circumstances I have chosen to treat, the quick growth of the primaries, assures a good length of joint and sufficient distance between the secondaries to prevent crowding and much less thinning that he recommends will generally suffice; its measure must of course be settled by the operator with the plant before him should thinning be judged necessary the first year that secondaries have to be dealt with or whether or not all growth within six inches of the stem should be stripped and next those so far out on the primary that their ultimate weight may sink its extremity below the horizontal line at which it should be maintained in the following year it will generally be strong enough to hold its proper position however weighted with crop. The bulk of the second crop of the artificial coffee-bush is borne on the first secondaries, and all that have borne crop on the greater part of their length should be removed as soon as possible after the last of the crop is gathered and the circular clear space round the stem should be enlarged to a diameter of eighteen inches.

The removal of the secondaries should be done in a clean cut with a sharp knife leaving no vestige of a stump on the side of the primary. As soon as the secondaries are disposed of there is a rush of young wood in succession from the buds round the cuts. As soon as this young growth is sufficiently advanced for selection that one shoot at each joint that makes the nearest combination of approach to an angle of 45 with its primary and a direction in the same plain must be left and all the others stripped, and should more irregular wood appear in the course of the season the operation should be repeated as often as necessary.

The operations of every subsequent year, are precisely the same as described above and may be conveyed in a few words such as

Strip all suckers as soon as possible after their appearance.

As the tree grows out enlarge the clear circle round the stem till it measures two feet in diameter.

Cut off after each crop every secondary that has borne on the greater part of its length.

Strip all superfluous and irregular wood as soon as possible after it appears.

If those directions be strictly carried out year by year, there will always be sufficient regular and symmetrically disposed secondaries, to bear the next crop; the pruning will be light and easily learned by the coolies and the bushes on the soil and in the climate I have mentioned will cover the whole space of seven feet and be equal to a yield of fifteen cwt. per acre in the fifth year from planting.

Inferior soils and situations will of course produce inferior trees and yield less crops; and in many places this system cannot be advantageously carried out in its integrity, but the principles are the same everywhere though practical modifications may be required to suit local conditions. The worst case that ever came under my notice was on a place with soil rather better than the average of its district the elevation run up to over 5,000 feet and a steep lay boldly faced the south-west. As heavy rain fell on something like three hundred and twenty days in the year the soil was always in a state of saturation. In this situation the form of growth was long slender primaries unable to carry the weight of their own foliage and they finally grew downwards like a weeping willow and on reaching the ground run along on the surface when cut back the growth did not go into secondaries along its whole length only threw out a pair at the end. The few secondaries that did grow bore crop on only a few joints and at the end of the crop had always a foot of new wood in front and when cut off the growth went into extending old wood rather than originating new. It was a case in which the conditions rendered the formation and maintenance of a symmetric artificial coffee-bush impossible and the wise course would have been

to leave it entirely to nature whether this was ultimately done: I know not as I have not seen or heard of it for twenty five years.

The cultivation of Liberian Coffee is not yet sufficiently advanced in Ceylon for the study of the mature plant but there are circumstances in its habits that at present appear to me insuperably negative in the matter of disposing of its bearing wood artificially in a limited space, but in eighteen months or two years if I live so long I will have a definite opinion to offer on this point. In the management of this plant there has been and will be great blunders before the true view is struck. I know that in the past I have contributed my fair share of the blunders but a philosopher learns even more from his failures than his successes.

PADDY (RICE) INSECTS IN CEYLON.

No. 1026. Office of the Director P. I. Colombo, 11th October 1886.

The Honorary Secretary, Agricultural Association.

SIR,—I have the honor to forward for your information the annexed extracts of reports received from the Head Teacher of the Walalla Anglo Vernacular Boys School, concerning a cure for paddy insects with which he has made successful experiments.—I am, Sir, Your Obedient Servant, H. W. GREEN, *Director.*

(*Extracts referred to.*)

Of letter of 16th Sept. 1886.

This is the remedy I used: well cleaned ashes and a little kerosine oil. This powder I sprinkled over the plants three or four times which made the insects to retire, the few that remained could do no harm to the ears. As to the efficacy of this powder in driving off the insects, there is not the least doubt; you may kindly recommend this powder with confidence to any body in the Western Province who is in need of it; but the powder most be carefully prepared with the proper quantity of kerosine oil, otherwise it will do more harm than good. It was advertised some time ago that a rope saturated in kerosine oil and drawn over the paddy plants will drive off the insects. I tried this method also, the result was that all the blades of paddy plants and ears that this oil touched withered, and the insects concealed themselves at the root of plants, came up after a few hours. No one is satisfied with the rope method. I have already given orders to my Goiyas to collect ashes to instruct them how to prepare my powder.

Of letter of 1st Oct. 1886. * * *

Take a pint of kerosine oil and mix well with one bushel of well cleaned ashes; press well this powder in a bag and keep in the sun mouth tied from three to four hours. When the powder is sufficiently dry, sprinkle it lightly over the paddy plants both morning and evening when there is dew; if the insects still remain repeat this every other day for sometime, for the second application however not more than half a pint of kerosine oil should be taken for every bushel of ashes. If the application of this powder is made immediately before the ears appear it is preferable. The dams or the ridges of the field also must be sprinkled over with the powder as insects too often take refuge in such places, grass should be cut short. The jungle near about the field especially Lantana or Ratahingura as it is called in the upcountry should be cleared. Even if a few insects remain after the above process they can do little or no harm to the ears. If a Goiya does not succeed in this plan to save his crop, he must be a very unfortunate man. Considering the immense loss that cultivators suffer yearly on account of insects, I suppose my powder will be of great use to them. I am &c., (Sigd.) D L. Wickremasingha.

THE ORANGE CROP IN VALENCIA.—As an illustration of the importance of the Orange crop in Spain it is stated that from the Port of Valencia alone over 3,000,000,000 Oranges have been shipped in the course of one seson. The fruits, which are considered the best of their kind in Europe, can now be delivered in England at 9*s.* the box, leaving a fair margin of profit to the producer.—*Gardeners' Chronicle.*

PRAISE OF CEYLON TEA FROM THE BEST-KNOWN MEDICAL JOURNAL.—We are indebted to Dr. Rockwood for the following extract:—"Analytical records.—Cassell's Ceylon tea. The tea plantations of Ceylon have been a great success, and have added in an important degree to the material resources of the island. The sample now before us is very satisfactory. There is no facing or other mineral matter. The leaves are small and clean, and give a strong decoction of delicate flavour. Such tea may well replace the product of China."—*The Lancet.*

MICA OR TALC: A NEW INDUSTRY.—It is rather a coincidence that just as we were taking up our pen to attract attention to the advertisement in another column in reference to a demand for this article a gentleman in the Fort should have sent us for inspection, two of the finest pieces of talc from Badulla we have ever seen in Ceylon: they measure more than a foot square about ¼ inch thick, beautifully smooth and form a capital mirror. Pieces of this description would meet with a ready sale we have no doubt. Anything above 8 inches is considered good and marketable; while three and six inches' pieces are considered small. We are aware that mica has been collected in Uva for some time. Perhaps the Messrs. Greig & Co.'s demand may give an impetus to the industry.

CINCHONA BARK IN MADRAS.—At an auction held on October 18th, Madras, by Messrs. Oakes & Co., of the Exchange Hall, the following prices were realised for Dodabetta Estate, Natural Crown Bark:—

Description of Bark.	No. of bales for each lot.		Amount realized.
Stripped ...	1	10	R6,400 at R64 per bale.
do ...	11	20	
do ...	21	30	
do ...	31	40	
do ...	41	50	
do ...	51	60	
do ...	61	70	
do ...	71	80	
do ...	81	90	
do ...	91	100	
Shaved ...	101	110	R3,000 at R40 per bale.
do ...	111	120	
do ...	121	130	
do ...	131	140	
do ...	141	150	
do ...	151	160	
do ...	161	170	
do ...	171	175	

Each lot contains 10 bales, with the exception of 171 to 175, which contain 5 bales.—*Madras Mail.*

WHAT IS BHANG?—I have always understood bhang to mean ganja leaves. But those who ought to know explain that bhang is a preparation of *burulla* leaves and opium; that the preparation is used for smoking in pipes, which is called madát, and that ganja leaves, leaves I think of the Indian hemp, have nothing in them in common with bhang. The Ordinance which prohibits the sale of opium and bhang except upon a license, does not prohibit the sale of ganja leaves. But I would wish to have some more information on the subject. As a matter of fact, ganja leaves are sold in many unlicensed boutiques. But they say the police levy a black mail on it.—*Cor.* [The inebriating preparation made from the leaves of the ganja or bhang, the *Cannabis Sativa*, is generally in a liquid form and is a fiercely intoxicating draught. Hemp leaves (washed in water) 3 dr., black pepper 45 grains, cloves, nutmegs and mace of each 11¼ grains. Triturate the ingredients with 8 oz. of water or milk, or with the juice of Water-melon seed or cucumber seed, and strain. The spices render it more inebriating. The dried Hemp plant which has flowered, and from which the resin has not been removed, is called "ganja." The larger leaves and capsules of the dried Hemp plant are usually termed "bhang."—(*Extract from "Balfour's Encyclopædia."*) The leaves or young leaf buds of the hemp plant, ganja, are smoked by themselves or added to tobacco.—From Dr. Vanderstraaten.]

Correspondence.

To the Editor of the "Ceylon Observer."

ELECTRICITY FOR TEA MACHINERY: A QUESTION FOR ENGINEERS.

Theberton, Ambagamuwa, 18th Oct. 1886.

Dear Sir,—I noticed in your paper of the 13th inst. an article on Branch railway feeders, and that electricity might be used to work them. I was just on the point of writing you on nearly the same subject, viz., cannot electricity be used to work our tea machinery? Steam-engines are expensive in *every way*, besides the difficulty to get them on out-of-the-way estates. Water in most places is only sufficient during the S.-W. monsoon. Dams (where possible) are very expensive to make "as a rule," and on our hillsides are difficult to keep water-tight. Through nearly every valley in the hills runs a river or a considerable stream of water, all the year round. Would it not be possible to work a water-wheel or turbine with the water from the river and generate electricity, in a dynamo there? Then bring it to the factory by wires to a second dynamo, which would work the rollers etc. There is generally enough water in most of our principal streams to work machinery, and if we could place our factory alongside of them, we should do very well, but as it is, this cannot often be done.

Do you not think it would be well worth finding out, what would be the cost to work our tea machinery by electricity? Would it be a saving on steam? The first cost, I fancy, would be nearly the only one, as there is no other that I know of; unless the armatures on the magnets oxydize in our damp climate, this could be provided against by covering the wires coiled round the magnets, the same way as deep sea telegraph wires are done. If this could be provided against, there would be only general upkeep of wear and tear of machinery.

To work steam-engines when the present supply of firewood is exhausted, will be a very expensive affair. Is it not worth while for those who have not yet decided on the motive power for their machinery to find out, if it is practicable to use electricity. Could you not give us some information on this subject?

I know farm machinery is both worked in England and on the Continent by dynamo machines. The question is: are they expensive play-things or practically useful? Of course, the question of first cost is the principal point. The wire rusting, etc., could be overcome, as, I believe, steel wires are used in some machines. If you think the subject worth ventilating and this letter of mine worth it, please give it a corner in the *Observer*. Your idea as regards railway feeders is a good one and worth considering.—Yours, very truly,

T. J. GRIGG.

[There are gentlemen in the island competent to give an opinion, and to make a practical experiment in connection with Mr. Grigg's question, and we trust one or other will do so and report the result.—Ed.]

WATTLE CULTIVATION.

21st October 1886.

Dear Sir,—I often read in your columns how profitable the cultivation of Wattles in Ceylon would be. In the *T. A.* of last month, page 248, you say (or rather the *Indian Agriculturist* says), "The bark now sells in London at £87 per ton"! Well, at 3 years we may confidently rely upon 2½ to 3 tons per acre, of bark of the *Acacia decurrens* the) variety referred to) and an additional ton per acre up to the 10th year! Who will henceforth think of the troublesome tea cultivation, with its so-called moderate profits? Who would take the trouble to dig for gold, or search for diamonds?

But I fear £8 per ton is nearer the mark, and that leaves so large a margin of profit, it is inexplicable to me, that its cultivation is not attempted in Ceylon

At Elephant Nook in Nuwara Eliya may be seen trees of *Acacia decurrens* now 25 to 26 months from seed, and just 2 years from nursery, standing considerably over 30 feet in height. These are not whippy and shew no ill-effects from the terrible winds to which they have been exposed for the past few months. There are strong branches from the ground to within a few feet of the top. A boy stood on a branch at 24 feet with the tape-line, his weight insufficient to bend the tree more than slightly.

The seed was brought by Mr. W. M. Mayes from Australia.

From the articles in *T. A.* 1884-85 extract from *Adelaide Observer*, pages 165-167, and report of Mr. T. E. Browne (Conservator of Forests) to Legislative Council, Adelaide, pages 916-918, I learn that there are two varieties of Wattles standing pre-eminent for the production of Wattle or Mimosa bark of commerce. *A. pycnantha* broad-leafed or golden Wattle gives the most valuable bark, but the tree itself is a much smaller one than *A. decurrens* or Black-Wattle.

	Average height.	Average girth.	Average yield tanning materials.	Average yield of bark.
A. pycnantha	25 ft.	8 in.	30 to 40 o/o	70 lb.
A. decurrens	40 ft.	24 ,,	29 to 34 o/o	500 ,,

These regularly planted 4" by 4" a crop is taken every third year. Selected trees I presume.

The wood and twigs all yield tanning materials, but the wood of *A. decurrens* is valuable for cooper's work (staves) and as firewood is very far superior to blue gum.

In your *T. A.*" for 1882-83, page 823, Mr. Jameson's Report, Botanical Gardens Neilgherry, is the following paragraph:—

"In three years an acre of *A. decurrens*, will give 2½ tons of bark selling in London at £8 to £11 per ton" (not £87).

The seed will germinate after being boiled for 7 minutes!

It is quite unnecessary to boil it. Soaked in warm water all night it germinates readily: within a week.

As may be inferred from its name, it spreads, but where there are weeding contractors the shoots may be broken off monthly. They grow readily, when transplanted shoots from the roots of those growing in Nuwara Eliya (before referred to) planted in the patenas some six weeks ago are growing well. I write this to elicit information. Mr. Nock says he doubts that there is a single plant of *A. pycnantha* in Nuwara Eliya; yet we so frequently read and hear talk of the Golden-Wattles in Nuwara Eliya. It is certain that the acacias termed "Black-Acacias" growing in Nuwara Eliya are not all "Blackwood" or *A. Melanoxylon*. Bark and leaves differ greatly.

Of course everybody knows, Black-Wattles and Black acacias (or Blackwood acacias) are totally different things. You will excuse my warning your readers not to depend on *T. A.* Vol. 1 (1881-82) for information *re* wattles and acacias.*

There are some misleading statements.

For instance, see pages 251 and 348 and there are more.—Yours faithfully, W. R. T.

* I refer almost solely to the wrong Botanical names given.

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, October 7th, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 a £7
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2½ a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar per lb.	Clipped, bold, bright, fine	2s a 2s 10d
and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 4d
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	8½d a 1s 11d
2nds	,, ,, ,, ,,	7½d a 1s 6d
3rds	,, ,, ,, ,,	7d a 1s 2d
4ths	Woody and hard	6d a 11d
Chips	Fair to fine plant	1½d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	75s a 81s 6d
	Medium	68s a 72s
	Triage to ordinary	51s a 65s
COFFEE Ceylon Plantation per cwt.	Bold to fine bold colory	88s a 100s
	Middling to fine mid.	71s a 87s
	Low middling	64s a 70s
	Smalls	61s a 71s
,, Native	Good ordinary	50s a 60s
Liberian	Small to bold	33s a 52s
East Indian	Bold to fine bold	82s a 100s
	Medium to fine	70s a 80s
	Small	58s a 63s 6d
Native [per ton	Good to fine ordinary	50s a 60s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£7 a £18
FIBRE, Brush, per ton	Ord. to fine long straight	£15 a £40
Stuffing	Coarse to fine	£7 a £20
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £35
Do [cwt	Roping fair to good	£9 a £13
COLOMBO ROOT, sifted ℔	Middling wormy to fine	10s a 30s
CROTON SEEDS, sifted	Fair to fine fresh	30s a 35s
GINGER, Cochin, Cut	Good to fine bold	80s a 100s
per cwt. ,,	Small and medium	40s a 70s
Rough	Fair to good bold	32s a 55s
,,	Small	22s 6d a 30s
NUX VOMICA, per cwt.	Fair to fine bold fresh	8s a 12s
	Small ordinary and fair	5s a 7s
MYRABOLANES, pale, per cwt.	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	6s a 6s 6d
Pickings	Burnt and defective	4s a 5s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	¾d a 1d
LEMON GRASS ,,	,, ,, ,, ,,	1¼d a 1½d
ORCHELLA WEED [℔ lb	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	8d a 8¼d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	11s a 15s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	6s a 11s
Dust	Ordinary to fine bright	3s a 10s
RED WOOD, per ton.	Fair and fine bold	£5 5s
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £41
Do. chips	,, ,, ,, ,,	£10 a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	8d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2d a 4½d
TURMERIC, Madras, ℔ cwt	Finger fair to fine bold	12s a 13s
Do.	Mixed middling [bright	10s 6d a 11s 6d
Do.	Bulbs whole	9s a 10s 6d
Cochin	Do split	7s 3d a 8s
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 23s 6d
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches	5s a 9s
4th	Low, foxy, inferior and [pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
ALOES, Socotrine and per cwt. Hepatic	Good and fine dry	£7 a £10
	Common and good	£4 a £8
CHILLIES, Zanzibar per cwt.	Good to fine bright	28s a 28s
	Ordinary and middling	25s a 27s
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	9¾d a 10¼d
	Ordinary dull to fair	8¼d a 9¾d

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTATIONS
CLOVES, Mother, per lb.	Fair, usual dry	None
,, Stems	,, fresh	1½d a 2d
COCULUS INDICUS	Fair	7s a 8s
GALLS, Bussorah & Turkey { blue ℔ cwt.	Fair to fine dark blue	50s a 57s 6d
	Good white and green	42s 6d a 52s 6d
GUM AMMONIACUM per	Blocky to fine clean	15s a 40s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts, part yellow and mixed	£13 10s a £14 10s / £10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£ 7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden	Sorts	65s a 100s
per cwt. Ghatti	Fair to fine pale	42s a 70s
Amrad cha	Good and fine pale	80s a £7
	Reddish clean	40s a 73s
ASSAFŒTIDA, per cwt.	Clean fair to fine	30s a 35s
	Slightly stony and foul	20s a 26s
KINO, per cwt.	Fair to fine bright	38s a 40s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 100s
OLIBANUM, drop	Fair to fine white	45s a 55s
per cwt. ,,	Reddish to middling	32s a 44s
pickings	Middling to good pale	9s a 11s
siftings	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage		2s 3d a 2s 6d
per lb. ,, ,, Ball		
	unripe root	11d a 1s 1d
	liver	2s a 2s 2d
SAFFLOWER, Persian	Ordinary to good	5s a 15s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz	Nearly water white	3½ a 4¼d
2nds ,,	Fair and good pale	2⅝d a 3d
3rds ,,	Brown and brownish	2¼d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	2s a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 7d
	Fair to good black	1s 10d a 2s
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	27s a 32s
,,	Common & middling soft	12s a 26s
Natal	Fair to fine	35s a 40s
ARROWROOT Natal per lb.	Middling to fine	3½d a 6d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	65s a 68s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	31s a 32s
	Pressed	27s a 28s
Block [per lb.	Good	22s a 22s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 6d a 3s 6d
Me lium	83's a 95's	2s 1d a 2s 5d
Small	100's a 160's	1s 4d a 2s
MACE, per lb.	Pale reddish to pale	1s 9d a 2s 10d
	Ordinary to red	1s 4d a 1s 6d
	Chips	1s 2d a 1s 3d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 2s 9d
	Dark ordinary & middling	8d a 1s 4d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	7d a 11d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	12s 6d a 15s
medium	,, ,, ,,	12s a 13s 6d
small	,, ,, ,,	8s 6d a 10s 6d
Flour [per lb.	Good pinky to white	3s a 9s
TAPIOCA, Penang Flake	Fair to fine	1¾d a 2½d
Singapore	,, ,,	2d a 2⅝d
Flour	,, ,,	1¼d a 1½d
Pearl	ullets, per cwt.	15s a 17s
	Medium ,,	16s 6d a 17s 6d
	Seed ,,	16s a 17s 6d

FISH-CURING IN CEYLON.

Dried salt-fish, known popularly as "Karawala," forms so large a portion of the food of the inhabitants of Ceylon, and especially of the immigrant Tamil coolies, and disease, including even leprosy, has so often been traced to the use of this article of food in a putrid or semi-putrid state, that all who have given attention to the question must have rejoiced when the Ceylon Government, following the example of the authorities in the Madras Presidency, determined on measures calculated to expand and improve the local industry. This they have done by commencing to open fish-curing yards, such as have been generally so successful in South India, and supplying salt for use in such yards at the moderate price of R1 per cwt., so low indeed as 80 cents at Hambantota. These yards are properly protected and supplied with guards by Government, so that the native fishermen who choose to avail themselves of the advantages offered, not only obtain good clean salt at a low price, but are saved the trouble and expense of watching the fish which, after cleaning they spread out to dry. In Ceylon as in India, one great cause of the inferiority of salt-fish sent into the markets for sale, (next to imperfect salting, often with salt mud merely) is the practice of drying the fish on the seashore sand. It is inevitable under this system that a very considerable proportion of sand should get into the substance of the fish or adhere to it, and so large is this proportion sometimes that the price even of putrid or inferior fish used for manurial purposes, has been regulated by the extent to which it has been freed from sand. In the Government curing yards the salted-fish is dried on wicker platforms. Where forest or scrub is plentiful, we would suggest that the experiment of smoking some of the fish, after the fashion of Scotch speldings or "Finnan haddocks" should be tried. We do not know if the Europeans who recently engaged in the fish-curing enterprise in Ceylon tried any experiments in the direction of smoking or "kippering." In any case, the dried fish they sent into the market was exceptionally clean and well cured, and, although we are not surprized to learn that in a pure y native industry like this, Europeans have not been successful competitors with the indigenous fishermen, we greatly regret the result. Our readers must understand that our Government in taking measures to encourage and extend the local fish-curing industry, must have contemplated a considerable sacrifice of revenue. The more dried fish is locally produced, the less will be the import duty collected on the, at present, very large quantity of salt-fish introduced from Southern India, destined largely, like our imports of rice, to feed the coolies who come to us from the same quarter. A duty on salt-fish, although the latter is a staple article of native food, has always been deemed necessary as to a certain extent a protection to the local revenue derived from salt, the quantity of salt in the imported fish as well as in that locally prepared being calculated in estimating the consumption of salt (from 12 lb. to 16 lb. per caput,) by the inhabitants of Ceylon. Besides loss of revenue in the direction indicated, Government sell salt for fish-curing purposes at less than half the monopoly price, and the yards, supplied by Government with superintendents and watchers, are not yet and probably will not for some time be self-supporting. But this Government, like that of Madras, is clearly acting not merely in the spirit of paternal benevolence, but in the line of positive duty in taking measures to improve and expand a local industry, whereby the seas around our shores shall be made to yield increased supplies in a wholesome shape of a species of food specially grateful to the natives, as giving body as well as piquancy to their curries, so largely composed of succulent vegetables in addition to the unfailing and absorbent staple, rice. The quantity of salt used in proportion to the fish cured, varies widely and any large excess above well-established averages, such as has occurred at some of the Ceylon curing yards, demands and will receive enquiry, so that the abuse of the privilege of obtaining cheap salt for a specific purpose may not be allowed. The following table shews the results, so far, of the fishing-curing experiment in Government yards, in the face of the inevitable suspicions of the natives that the whole scheme was merely a device to impose upon them additional taxation:—

The following abstract shows the results of the establishment of the yards in which work was carried on during the period from October 15th, 1885, to July 31st, 1886:—

Name of Yard	Period during which the yard was opened	No. of applications to use of yard	Weight of Fish brought to be cured		Weight of cured Fish taken out		Weight of Salt issued		Value of Salt sold			Expenditure incurred by Government		Quantity of Salt issued to each cwt. of Fish	
			cwt.	lb.	cwt.	lb.	cwt.	lb.	R	c		R	c	cwt.	lb.
Hambantota.	Oct. 15th 1885, to April 30th, 1886	1168	1217	3	845	38	282	0	225	60		543	29	25	95
Patanagala.	March 16, to April 30th, 1886.....	224	395	74	203	58	46	74	46	74		171	17	13	4
Suriyagahawella... ...	Nov. 15th, 1885, to April 15th, 1886	93	99	110	61	4	23	28	23	25		602	17*	27	76
Gandara ...	Jan. 25th to 31st, 1886	364	680	50	814	5	165	35	175	19		545	24	27	17
Udappu	Feb. 14th to May 31st, 1886	324	492	87	577	86	146	0	196	0		607	32	44	62
		2193	2885	100	2501	79	713	25	666	78		2469	19	...	

Our readers will, of course understand that the discrepancy between fish received into the yards and fish taken out arises from the removal of offal and especially from the drying away of most of the moisture in the "Karawala." The figures shew only 2,501 cwt. of fish taken out for 2,886 taken in. The difference would be still greater, but for the

fact that quite a different style of curing to that generally in use was adopted at Gandara. Here 680 cwt. of fish taken in, had increased in weight to 814 cwt. by the time it was taken out. The mystery is thus explained in Mr. Ravenscroft's report, which was laid on the Council table on Wednesday and which we are reviewing:—

The system of preserving fish in vogue amongst the Gandara people is that known as "jadi," and as fish prepared by this method is wet when taken out of the yard, the excess of "fish out" over "fish in" is accounted for. When at Gandara on the 1st instant, with the Government Agent Southern Province and the Assistant Government Agent of Matara, we made inquiries as to the reason why karawala—*i. e.*, dried and salted fish—was not prepared, and were informed that the people found they could turn over their money more quickly by preparing "jadi," and sending it directly into Galle, where it commands a ready sale. I am, however, in hopes that some of the curers will undertake the preparation of karawala, which is more suitable than "jadi" for transport into the interior; but necessarily this must depend upon the market for "jadi" in Galle. Should the supply of the latter at any time exceed the immediate demand,—and there is a possibility of this,—the price will fall, and there will be an inducement to the curers to prepare karawala; but whether this comes about or not, I think there is reason for the continuance of the yard at Gandara. As I have already said, it has had a good effect in the direction of encouraging the fish-curing industry, and increasing the local production of a cheap and wholesome article of food for the people; and there is every reason to anticipate that it will tend to the further development of the industry.

The "jadi" fish is so cured as to retain its moisture which, of course absorbs a considerable quantity of salt, the weight being thus increased even above that originally noted when offal was included. The result is very different in regard to "Karawala," for it will be observed that in the case of Hambantota only 845 cwt. of dried fish resulted from 1,217 cwt. received as taken out of the sea. The mode of preparing the fish which, notwithstanding the addition to the cleaned material of a considerable quantity of salt, shows so large a decrease of weight, is thus described. We quote from the interesting report of Mr. Murray, Assistant Government Agent of Hambantota, in which much general information is embodied:—

The following few remarks about the fishing itself may not be out of place:—

The boats generally make an early start before daybreak, when the land wind carries them out of sight to the fishing grounds, where they remain the whole day. The return journey is made in the afternoon, when the wind changes, the boats arriving between five and six generally. The fish when landed is piled in heaps, and is either sold by auction to the highest bidder, or by private sale when a fair offer is made, the fishermen thus realising the full value of their fish at once.

At the commencement of the season, when the hauls were small, the prices ran up to R4 and R5 a cwt., but as the season advanced they went down to R2·75 and R2·50. The fish is at once cut open, and after being cleaned in the sea close by, conveyed in the pingoes and carts to the fish-yard, where it is weighed. The curers then set to work to apply the salt, being engaged at this during the whole night. The different process adopted in curing are:—

First, the ordinary one of salting and drying. The fish when cleaned are slit in parallel lines down the fleshy parts, into which pounded salt is well rubbed. They are then put into barrels and kept there for twelve hours, after which they undergo a second cleaning in salt-water, and are then exposed to dry in the hot sun for four or five days on raised stick platforms, so as to keep them free of sand. On the fifth day they are ready for removal.

Another process is that of placing the fish after it is rubbed with salt in jars or water-tight barrels, and sprinkling over each layer a good quantity of salt mixed with dried goraka fruit, the acid juice of which imparts a good flavour to the fish; when the jar is full it is covered over and left to stand for three weeks or a month.

A third way adopted, when large quantities of small fish, such as sardines, sprats, &c., are caught, is to steep them in brine, and then taken away.

The amount of salt required for curing varies according to the size and description of fish, as well as the process of curing adopted. For instance, in picking small fish in jars or tubs the proportion of salt to fish is one to two, that is, 1 cwt. of salt is required for 2 cwt. of fish. For dressing small fish the same quantity is required; for salting and drying large fish the proportion is one to three.

There are three descriptions of canoes employed in fishing, all of them with the usual outriggers. The first is a single-masted large canoe, called in Sinhalese *hedi* or *davalapanné oru*, capable of carrying 6 to 8 cwt. The second, the *vára oru*, constructed in such a way as to be able to sail out in stormy weather, and carrying a large oblong sail supported by two bamboo masts. This boat is chiefly employed in catching the rarer kinds of fish, such as seer, *paraw*, &c. The third kind is a small cockle-shell of a canoe, keeping close in shore when fishing, and only venturing out when the sea is smooth.

The large kinds of fish are caught with hook and line manufactured by the fishermen. There are a few draught nets, made of coir rope, and circular hand nets used in fishing from the shore. It would be well if they were abolished altogether, as the fishermen complain of their frightening away the small fry on which the large fish prey.

The different kinds of fish caught are given in return "A." *Kalamiya*, weighing on an average about 5 lb. is caught in largest quantities. Seer and *paraw* are the most prized on account of their excellent flavour, while the small sprats called *laggo* would make a good substitute for sardines.

A sample of the fish cured here under the salting and drying process in the yard of the European firm was forwarded to the Secretary of the Ceylon Committee for the Indian and Colonial Exhibition, and he writes of the excellent condition in which it arrived.

It is my opinion that this industry is capable of still greater development by the employment of more boats, and that a sufficient quantity of fish could be caught and cured to supply the whole of Ceylon.

I see no reason why tinning fish should not be carried on profitably. A seer fish costing about 15 cents would fill about three good-sized tins selling at R1·50 each. The tins would be manufactured by machinery on the spot for 25 cents each, and the labour, &c. would absorb another 25 cents, leaving a profit of R1 on each tin. No doubt this and other methods of curing will be tried by the English Company next season.

It does not follow that because there are a large number of boats in a populous fishing village fish-curing, is sure to succeed. It has been found that generally the number of boats is limited to the demand for fresh fish and that only enough is caught to meet the demand. I quote the case of Suriyagahawella, where there are over 200 boats, and a large number of fish caught and yet the quantity cured is very trifling. The season closes about the end of April, when the rough weather which indicates the burst of the south-west monsoon compels all fishermen to beach their canoes, and no attempt at fishing is made again till about September. So elated, however, have the men been with the encouragement given by the Government, that they have all promised to return as early as possible next season, and in larger numbers.

This District has probably never witnessed such a large fleet of canoes as came down this season, and residents assure me that never did such a large quantity of salt fish pass through the market and town for sale up-country.

I have endeavoured as far as possible, by the examination of the principal traders in the town, to ascertain the quantity of dried fish cured in Hambantota and Pattanagala the previous season before

the yards were opened, and give the result in the annexed statement marked C. The fresh fish of the previous season has been left out, as it was never weighed. The quantity cured this season is also given for the purposes of comparison. The trifling loss to Government is more than compensated by the large amount of nutritious food manufactured for the benefit of those who, living inland, have not the means of getting it except in a preserved condition. In a separate column will be found the number of boats engaged during the two seasons. Below will be found a statement showing to what District the dried fish has been sent. The quantity shipped to Colombo was by the European Company, while the native curers sent theirs principally to markets in Uva, where good prices were realized.

Abstract of Fish-curing Operations in the Hambantota Yard, from October 15th, 1885, to April 15th, 1886.

Number of applications		1,153
Description of Fish:	cwt.	lb.
Laggo	241	81
Lawayo	196	70
Paraw	39	38
Toru	41	50
Kalamiyo	275	11
Other kinds	412	8
Total ...	1,207	22
Fish removed	855	00
Salt issued	279	70
	R.	cts.
Rate per cwt.	0	80
Receipts	223	80

As far as I can ascertain, the cost of curing fish is R11·31 a cwt., and may be analysed thus :—

	R.	cts.
Cost of fresh fish, per cwt. ..	2	75
Cost of cooly labour in cleaning ..	0	75
Cost of 40 lb. salt ..	0	27
	3	77
Multiplied by	3	
R.	11	31

One cwt. of fish when dried is reduced to one-third its former weight, and the result must, therefore, be multiplied by 3, making R11·31 as the prime cost of one cwt. of dried fish. All native curers send their fish to the markets along the Badulla-road, such as Wellawapa, Koslanda, &c., where the prices range from R15 to R20 per cwt., and often as high as R30; after deducting R 1 per cwt. for cost of transport, the curer reaps a profit of from R3 to R4 per cwt.; where the fisherman is his own curer, the profits to him are double.

Colombo is not a good market at present, as it has to compete with foreign importations, which tend to keep down prices.

Fresh fish, as well as salt, is a favourite food with the Sinhalese, and where there is a full demand for unsalted fish, there is, of course, no motive to induce the fishermen to resort to curing. We are not therefore surprized to learn that one yard failed for reasons thus given by Mr. Murray :—

A third yard opened at Suriyagahawella on November 15th, has not turned out a success, for reasons which are easily explained. Though there were a larger number of boats there, and the quantity of fish caught exceeded that of Hambantota, yet so great was the demand for fresh fish by the dense population in the neighbourhood, and the prices were so high, that it was impossible for curing to be carried on profitably, and the little that was cured was the surplus remaining when large quantities of fish were caught. There is little hope, therefore, of anything being done there, unless curers specially engage boats on their own account.

There is ample scope for the extension of the fish-curing industry where fish is plentiful and population scanty, as the following extract from Mr. Ravenscroft's report shews :—

It was my desire to visit the Mullaittivu District in the early part of the year, and to have conferred, on the spot, with the Government Agent of the Northern Province on the subject of the establishment of fish-curing yards in that District, to which fishermen from the west coast of the Island resort in considerable numbers for the purpose of catching and preserving fish, of which the supply is abundant, during the south-west monsoon. In many respects this District offers special advantages for fish-curing. Fish are, as I have already said, abundant, and even under existing circumstances fishermen are attracted to the District from the other side of the Island. With a very sparse resident population there is a very limited demand for fresh fish; and if facilities could be given that would enable the fishermen to preserve a greatly increased quantity of fish, without the expenditure of a larger amount of capital than is now yearly invested in the business, it is not unreasonable to anticipate that the industry of fish-curing on this part of the coast would be greatly developed, to the advantage, not alone of the fishermen, but also of the people of the Island generally. Owing, however, to the many other calls on my time, I was prevented from carrying out my intention of visiting Mullaittivu, but I trust it may be within my power ere long to visit not only that District, but also the neighbourhood of Batticaloa, where the business of fish-curing is, I am informed, carried on to a considerable extent, both by local fishermen and also by men from the west coast of the Island, and where there are places—so it is reported by officers who have served in, and who are thoroughly acquainted with the District—at which fish-curing yards might be established with every prospect of success.

At Trincomalee, assisted by the Assistant Government Agent, Mr. Reid, I made careful inquiries, in order to ascertain whether it would be advisable to recommend the opening of a yard or yards in the neighbourhood of that place; but although I found and questioned fishermen from the west coast, temporarily located at Trincomalee, it did not appear to me that there was sufficient reason to suppose that if a yard were opened, it would meet with a reasonable amount of success.

In conclusion, I would say, although it is perhaps hardly necessary for me to do so, as it is self-evident that, however well suited a locality may appear to be for the successful working of a fish-curing yard, from the fact that the supply of fish is abundant, that fishermen are available, and that there is little or no resident population, the results must greatly depend on the interest taken in the undertaking by the local officers of Government. Without careful and well-organised supervision and attention to details, and the exercise of the strictest economy compatible with efficiency, by the Revenue Officers, the scheme although it may benefit the fishermen, and to some even to a considerable extent, the people of the country by placing within their reach a larger supply of preserved fish, cannot be expected to pay its way as, under favourable circumstances, judging from the experience gained in India, it may reasonably be expected to do if carefully supervised.

MR. GOW'S TEA WITHERER; THE RESULTING TEA SAMPLES.

To judge by the samples put before us, we think Mr. Gow may well be congratulated on the tea turned out by his new process—a process on which he has been experimenting, and gradually perfecting for some thirteen years. We have received five qualities :—Pekoe Souchong 30 per cent; Pekoe 31 per cent; Broken Pekoe 24 per cent; Orange Pekoe 12 per cent; Pekoe Dust 3 per cent; and the reports of four

of our Colombo tea experts on the same are as follows :—

Description:	Present London value.	Colombo, 30th Oct. Remarks.
Orange pek.	1s 10d to 2s	Blackish small mixed brok. pek. and fannings with gold tips, full dark rich liquor, good quality.
Broken pek.	1s 1d.	Blackish even wiry pek. leaf with ends, little broken, strong dark malty liquor; little pungent good quality.
Pekoe	1s 2d to 1s 4d	Blackish fairly made pek. souch. leaf few ends, dark malty liquor little pungent fair strength and quality.
Pek. Souch.	10½ to 11d	Blackish rather open choppy souch. leaf, dark pungent liquor, little thin.
Pek. dust	1s 2d to 1s 3d	Black, brownish, small. Small broken orange pek. and fannings, full of tips, strong dark pungent liquor.

pp. Somerville & Co., A. H. Thompson.
[E: 1s 6¼d F. £1 15]

Bro. pekoe blackish rather even little flaty bro. or. pek e 12 per et. full of golden tips a d strong 1s 8-10d 90c to R1·10
Bro. pekoe blackish rather even and twisted little bro. pekoe 24 per cent. fairly tippy, strong 1s 6d 88
Pekoe blackish rather bold uneven pekoe leaf 31 per cent few ends and good strength 1s 2d 71c
Pek. sou. greyish very uneven irregular leaf 30 per cent fair s g. 11d 4 c
Pekoe dust handsome tippy flat dust 3 per cent rather thin 1s (fr. app.) 55c

Forbes & Walker.
Exchange. Freight.
1s 6¼d £1 15s 0d

Character.	London value.	Colombo equivalent.
Or. pk. Black rather uneven little choppy leaf. Many orange tips strong thick liquor rather pungent little flavor good quality	1s 9d	1·04 cents.
Bro. pek. Blackish uneven little twisted semi-broken pekoe a few tips strong pungent liquor good quality ..	1s 6d	88 00
Pekoe Blackish rather uneven rather flaky leaf. Few tips; strong rather pungent liquor	1s 3d	71 to 77
Pek. Sou. Blackish uneven semi-bro. pekoe sou., good strength little pungent liquor ..	1s 0d	55 00
Pro. dust Small black flaky fannys full of orange tips. Fair strength	1s 3d	71 00

These teas are especially good considering they are made from leaf plucked from newly pruned bushes. The liquor being strong and of good quality, and the leaf of a fine black colour, free from all greyness.
Herbert Tarrant.

Quality.	Description.	Valuation for London market.
Or. pekoe...	Handsome black leaf with tips... ...	1s 8d to 1s 9d.
Bro. „ ..	Well made Or. Pek. leaf with few tips ...	1s 4d.
Pekoe ...	Well made black leaf...	1s 2d.
„ sou. ...	Good black leaf ...	10½d to 11d.
„ dust...	Small br. pek. dust full of tips ...	1s nominal.

The infusions are good.
The liquors are strong and pungent, with good flavours
For Bosanquet & Co., A. M. Caldecott Smith.

[The bulk can be seen at Messrs J. Walker & Co.'s office.]

TEA IN AMERICA.

Writing from Philadelphia, Pa., under date 18th September, Mr. Pineo has a very satisfactory report of progress to make as follows :—

"The *Overland Observer* comes to me regularly. The paper is perused with the greatest interest and all matter pertaining to Tea has a special attraction, as I am, and have been, introducing your tea into the markets of the United States and Canada. I have established agencies in St. John, Chatham, Beauford, Toronto, Hamilton, Kingston and Montreal in the Dominion of Canada, and have secured the co-operation of one of the largest and best known jobbing houses of New York, hence I am in a position to place any quantity of tea on consignment in those towns. There are two great difficulties with which I have had to deal. First, to get the dealer to handle and the consumer to appreciate Ceylon tea, and second, to get a uniform quality in appearance of leaf and in liquor. There is too much red and irregular sized leaf. I am about starting an establishment here for the sale of Tea and Coffee in packets, and also for selling in original packages by wholesale.

"I have met Mr. Morris, Liberia Consul, and he agrees with me in thinking a good trade can be done here. We are only two hours by rail from New York." [Mr. Pineo's remarks will, we have no doubt, receive attention; and all in Ceylon will wish him success in his good work.—Ed.]

CEYLON *v.* INDIA AND CHINA AS A TEA-PRODUCING COUNTRY.

The following extract from the letter of an influential correspondent in the old country who takes the deepest interest in all that concerns the welfare of Ceylon, merits and has received our careful attention :—

"No one has studied the question of our exports more deeply than you, and I want you to reassure if you can many timid people connected with Ceylon from the Colonial Office to myself on the subject of tea. There is no apprehension as to the failing power of tea, but as to over-production in Ceylon, India and in China which will so reduce profits that the planter having no gain will cease to cultivate and there will be another and final depression of Ceylon. The fall in the price of tea has caused these reflections. The margin of profit is already becoming small, but what will it be five years hence, when our exports of tea shall have reached some 40 millions of pounds, and when the increase of Indian tea will be on the same advancing scale, to say nothing of the Chinese. Once open China by railways and I fear they will send in tea in such quantities and at such a price as to swamp our planters and the Indian also. You have seen what has been done by Indian railways opening up vast tracts from which formerly it was impossible to export the grain which was grown and which might be grown. Now Indian wheat is sent into the market for 29s a quarter, and has utterly swamped Russian and American wheat, to say nothing of our own—and they boast in the Punjab that they can supply the world with the best sample and at a rate of cheapness with which no

other country can compete. If we could get new markets all would be well, but when are they to be found? I am a good deal exercised in mind about all this, not only as interested in Ceylon, but as a tea-planter myself. Suppose you write a careful article on the subject in the *Observer* and send me a special copy, I know the subject will often be discussed hereafter in my presence, but pray do not let it be known that I have misgivings as to the future prosperity of Ceylon. I daresay you will dispel them."

Almost on the top of this, there comes a communication couched in much the same spirit from our friend "Old Colonist," who, fifteen years ago, pointed out to us the western slopes of Adam's Peak as specially fitted for the future tea gardens of Ceylon, just as poor Mitchell of Kelburne so far back as 1864, took us over Baker's Farm reserve forest with the view of starting a Company to cultivate tea in the neighbourhood of Nuwara Eliya, as he had seen it a year of two before grown at high elevations in Northern India. Here is "Old Colonist's" view of the situation :—

"Dikoya, 25th Oct.—I have seen Adam's Peak this morning for the first time in a dozen years, and a blithesome sight it is to an old Ceylon man. Now that I am satisfied it stands where it stood, I begin seriously to take my bearings, and the first thought that occurs to me is to marvel at your moderation in estimating the probabilities of tea, three years hence. I have not yet seen the Kelani and Kalutara Valleys, though from what I know of them I can readily credit them with a super-abundance of good leaf, but when I look at the vast expanse of these three sister valleys comprizing possibly over 40,000 acres of tea, most of which is under two years old, and I am told that shipments of 14 to 15 million lb. are confidently expected for the present year for the whole island, how can anyone be supposed to restrict their estimates for 1889-90 to 30,000,000 lb.? And when I look once more at the vast extent of suitable chena-land from Matale to Kandy and Kadugannawa to Nawalapitiya,—where I still hold that a dozen Mariawattes may be easily carved out,—and again peep at the other side of the Peak where what was the wrong side for coffee is right for tea—even from Bambarabatuwa down to Udugama, where J. C. R pluckily plays his last and winning card,—immense tracks of land will be found eminently suited for the fragrant leaf, to say nothing of Haputale, Badulla and Madulsima which will doubtless yet top the market with finest flavoured pekoe. With all this in view, I simply stand aghast at the bare possibilities of the leaf produce here, and wonder how on earth the consumption is to keep pace with this extraordinary quantity thrown on the top of the China and Indian supply. What *is* to be the upshot? Will the Chinaman cave in? Both Rama samy and Ranghamy are taking very kindly to this tea business and even John Chinaman cannot subsist on a 6d per day. If prices can only be maintained, there can be no possible fear of Ceylon. Meanwhile, capital begins to flow back—the clearest indication you have had of this for many years was the land sale of the 20th:—R48 per acre smacks of old times! Confidence once lost, however, is very hard to regain and much might yet be done to facilitate or encourage the return of capital by remodelling the Mortgage Laws. By all means let every man who can, with all this in view, keep his title-deeds clean, but as business cannot usually be conducted without borrowing and lending, now is the time to make the necessary reform."

We anticipated a good deal of criticism of the statement we ventured to offer at the meeting of the Agricultural Association to the effect that Ceylon tea could possibly, by-and-bye, be laid down in the London market, not costing more than 6d per lb. On reflection we thought this was going a little too far, and referred the question to a gentleman in our midst who has paid special attention to the detailed cost of our Ceylon teas. Here is his reply :—

"Colombo, Oct. 26th, 1886.

My dear Sir,—The reply to your question as to whether Ceylon tea can be laid down in London at 6d per pound, depends a good deal on rates of freight and exchange; the former fluctuates a little from week to week, and the latter from day to day as you know.

Calculating, however, freight at 40s per ton of 50 cubic feet, exchange at 1s 6d per rupee, and taking the cost of tea from estates in full bearing at 30 cents per pound laid down in Colombo, it would require 7d per lb to cover cost.

The home charges with 40s per ton freight, would come to about 1½d per lb. At present prices they are 2d per lb., but Insurance, Brokerage and Commission on 50 per cent under these prices would reduce these charges proportionately.

You have published over and over again in your daily issues, and also in your *Tropical Agriculturist*, statements from the highest tea planting authorities in the Island, proving that the produce of properly managed estates in full bearing can be laid down in Colombo within thirty cents per pound.

This being so, I am tolerably sure that no other country can drive us out of the field without, also succumbing; not even our chief competitor, China, as long as the internal and export duties levied in that country, which amount to the equivalent of 2½d per pound, are maintained.

Exclusive of these duties, the only advantage the China grower has over us, is that his green leaf costs him nothing to produce. Nevertheless, John Chinaman is no more disposed to carry his green leaf to market and give it away for nothing, than a Sinhalese will give away the coir, coffee and other products which also costs him nothing in the shape of wages to produce.

We are informed by the most recent authorities, that the usual price of green tea leaves in the interior bazaars of China is equivalent to 1d per pound. As they cannot manufacture their tea, however low wages may be in the manufacturing towns, (and they are not so low as is generally supposed) cheaper than we can, nor can they make their ornamented boxes cheaper than ours. It would not be difficult to *tottle* up a comparison between the cost of Ceylon and China teas.—Yours truly,

C. S."

Here, we might almost leave the matter, for "C. S." puts the case in a nutshell and if our esteemed home correspondent and "Old Colonist" want further information, is it not given in the pages of successive issues of the *Tropical Agriculturist* from 1880 onwards. For a fair and moderate summing-up on many of the practical points involved, enquirers cannot do better than study the "Ceylon Tea Planter's Manual." But something more will very probably be expected in support of the position which Ceylon tea planters begin now fearlessly to assume. That position involves a challenge both to India and China in respect of the comparative quality, cheapness of production, and probable demand for their teas, and the general feeling of most observers is that Ceylon has nothing to fear from the severest competition which may be offered. We none of us wish

to see the present average of prices reduced. But if there is a further reduction, the Ceylon planter will not be the first to stop. Our planters have already proved what they can do in respect of quality and further improvement in this direction may be steadily anticipated. All the patent tea machinery which has already found a birthplace in Ceylon is but a foretaste of much more to come. In regard to economy of working it is difficult to get those who are not personally acquainted with the advantages of Ceylon to give credit to what can be done here as compared with other tea-growing countries. Our climate, situation, facilities of transport and relative cheapness of labour will enable us to defy competition from any country where labour is paid for; and we certainly do not expect for a quarter of a century to come to witness that fiscal as well as transport revolution in China which would enable that great tea country to beat us in the race.—As to opening new markets for the consumption of tea, no one can say that Ceylon men are not doing more than their full share and we think there is much reason to anticipate that the taste for Ceylon and Indian teas will more and more supersede that for the inferior, and often adulterated China article.

CEYLON PINEAPPLES FOR HOME USE.

A correspondent lately returned from England writes as follows :—

"The best quality of pineapples in England during the month of May fetch half a guinea a piece, at least such was the price asked upon enquiry. Small ones, about as big as a coconut were sold at half a crown each. Ceylon pines are sold in the Colombo markets during April and May at prices varying from five to fifteen cents each ; of course, the difficulty is to get Ceylon fruit placed in the English market in sound condition. Has the exportation of pines from Ceylon ever been attempted ? Good sound fruit carefully wrapped in tissue paper and packed in pure dry cinnamon sand, coffee husks or other suitable vehicle and enclosed in boxes containing half dozen pines each, might prove a success. Each pine so packed could probably be put in the English market at 50 cents each, whilst the retail price would vary from two to eight shillings each, according to the condition and quality of the fruit."

At the old Industrial School, Mr. Thurston used to preserve pineapples and plantains for the home market, but beyond that we are not aware that any experiments have been made. It is a question how far Ceylon could compete with the West Indies, which are much nearer the European markets.

The Deleterious Action of Cockchafer Larvæ on Soil and Roots is thus described in an article in *Nature* :—

"A more extreme case is where the soil becomes damp and clogged with excessive moisture: not only does no oxygen reach the roots, but noxious gases accumulate in solution in the soil, and will hurry matters by poisoning cells which might otherwise live a longer life of usefulness. It is extremely probable that such gases find their way into higher parts of the plant in the air-bubbles known to exist and to undergo alterations of pressure in the vessels of the wood: this being so, they would slowly retard the action of other living cells, and so effect the upper parts of the plant even more rapidly than would otherwise be the case. Damp soil may thus do injury according to its depth and nature; but it need not necessarily be deep to be injurious if much oxygen-consuming substance is present. I have seen excellent soil converted into damp, stinking, deadly stuff from the action and accumulation of the larvæ of cockchafers: these "grubs" may, it is true, accelerate the devastation caused by the consumption of oxygen and the accumulation of poisonous waste matters in the soil by directly cutting off portions of the roots themselves, but the accumulation of oxygen-consuming substance, and the cutting off of supplies to the root-hairs evidently plays a chief part in the destruction."

The Amsterdam Quinine Works.—A general meeting of shareholders in this company was convened for September 15th, but no quorum being present the chairman adjourned the meeting for a month, when it is hoped sufficient interest will have been aroused to ensure the taking of a final decision concerning the future of the works. The board of directors propose to increase the capital of the concern to 3 9,000 florins (25,000*l.*), divided into three series of shares: the first and second of 50.000 florins each, in shares of 250 florins; and the third of 200,000 florins, divided in shares of 1,000 florins, 500 florins, and 100 florins each. It is further proposed to place the management of the works in the hands of a director, under supervision of a committee of five members, of whom two must be Dutch pharmacists of repute. If by October 15th a subscription of 150,000 florins in shares of the third series has not been secured, or no other means have been found to guarantee the possibility of continued existence, the company will in all probability be dissolved, but an appeal is made to patriotic feelings, and the continuation of the Amsterdam Quinine Works is described as matter of national importance. It is said that a committee of experts who have investigated the working of the entire concern have stated that the works are capable of being conducted at a profit, provided the active assistance of all Dutch pharmacists in pushing the preparations of the Amsterdam works in preference to those of any foreign firm be secured. —*Chemist and Druggist.*

China Grass or Ramie.—*The Textile Recorder* has been sent to us with the following paragraphs marked :—

"M. Marius Moyret insists upon his statement that it is only throwing money away to patent processes in Europe for decorticating ramie or China grass. It will not grow in Europe, and it is far too bulky to bring here in its native form. It must be treated near where it grows. He again states that the fibre can be separated from the woody part quite easily and cheaply. The cut plant must be dried gradually as far as possible in the sun, then put into a heated stove for a night. All that is required is now to beat the dried plant ; the wood falls off, and a bundle of fibre is left. If the drying is done too rapidly, the real fibre becomes, as it were, glued to the wood, and nothing can be done with it. A final process is required for separating the fibres from one another. This could be done in Europe. But the celebrated chemist and academician, M. Fremy, who in conjunction with Urbain has made a special study of ramie, spoke to the French Academy upon this substance on June 28th last, exhibiting some very fine samples of manufactured China grass obtained by a process which he has described. He remarked that it was to be hoped that French agriculturists would no longer hesitate to undertake the growth of ramie upon a large scale, for France would then possess a vegetable fibre resembling silk which skilful manufacturers would work up without loss of its silky lustre and produce goods such as China had done for a long period. Another instance would then be created of the services which science could render when it was associated with agriculture and industry. There is, it will be seen, a great difference of opinion upon the matter between the man of science and the man of practice."

The first process is new to us and seems worth trying, but so many sanguine expectations respecting rhea and aloes have been falsified that we are rather sceptical.

Correspondence.

To the Editor of the "Ceylon Observer."

WHITE CASTOR CAKE: AN ENQUIRY?

The Editor "Tropical Agriculturist."

The Siddra Bunnoo Estate, Koppa,
Mysore, 21st Oct. 1886.

Dear Sir,—I should feel much obliged if you would inform me the price of white castor cake per ton in Colombo, and also where the larger part of that shipped to Ceylon comes from? I have made enquiries in Mangalore and Bangalore and cannot get any. My object in writing is to ascertain whence the castor cake comes and to arrange to get some either in Mangalore (my nearest port) or Madras.—I am, dear sir, yours faithfully,

ROBERT BUCHANAN.

[This is a most extraordinary enquiry to make of us in Ceylon, seeing that all the castor cake now in Ceylon comes from India. It is sold here just now, crushed and delivered at Colombo Railway station, in boxes at R65 to R67 per ton, and comes chiefly from Calcutta.—Ed.]

THE CINCHONA ENTERPRIZE IN CEYLON!—AND IN INDIA AND JAVA: THE NEED OF FRESH SEED.

Gampola, 23rd Oct. 1886.

Dear Sir,—A great deal has appeared lately in your valuable paper on the subject of cinchona and it has surprized me that no one has noticed, while on this subject, the gradual though certain extinction of this important cultivation within the island. I shall preface my remarks with *the hazard*, that less than ten years will see the last of the present race of cinchona trees extinct.

In taking a retrospect of cinchona since say 1865, when only a few trees and isolated patches were scattered here and there over the country, all from one original stock and propagated by cuttings only, viz. from the Hakgalla Gardens, until the period between 1877 and 1882 when the cinchona plant threatened to become a troublesome weed, springing up everywhere over estates and being regularly weeded out along with other weeds until down to the present time, what do we see? and what have we learned?

All the earlier planted cinchona took five to seven years to come into seed, grew so far as I ever knew or saw, perfectly free from canker, attained to fine well-grown trees, and when cut down again grew to trees, retaining their original vigour.

When the *cinchona period* arrived and men counted their riches by the number of plants they had planted, (now the seedling period) taken wherever they were to be found, what a different appearance they presented: trees ran to seed from 1½ to three years old; along with this period came canker, sweeping out whole plantations, no doubt hastened somewhat by the abnormal seasons of 1879 and 1882, but I think most observing men will admit the great vital cause to be degeneration of species, till at the present time cinchona seedlings die off wholesale, before they have attained a foot high.

I maintain canker is but symptomatic. The disease is embryotic, *i. e.* the cinchona plant never has been, nor ever can be naturalized in the East and my remarks apply to India and the whole British Possessions where this valuable tree has been cultivated.

Now if we but take into consideration what part *Ceylon alone* has played in this mighty boon to humanity, in the matter of cheapening the cinchona alkaloids and bringing them within the reach of the poorest, is it not sad to contemplate if *extinction be admitted* how soon this gift may be swept away and quinine get beyond the reach of the poor.

I look on this as a *highly important Imperial question*, calling for the immediate attention of the powers that be ere it is too late; at any cost the British Government should keep up a small fresh annual supply of seed and plants from their native habitat and have them propagated and distributed, bringing them easily within the reach of all willing to undertake their cultivation.

What owner of land in Ceylon would not gladly plant up a portion of his estate in cinchona if he were satisfied there would be a healthy permanent growth as attended the early efforts?

I have no hesitation in saying like results would follow if seed or plants were again re-introduced, and planting confined to *original stock only*. I am very desirous to hear the opinions of those who have watched the progress of cinchona planting from its earliest start in the island to the present time, and what they think of its future.

Much might be written of *disappointed hopes*, but also much of the *great aid* it brought the struggling planter in his time of need, also what a lamentable fact it will be if we have to record its decay, when a little foresight might prevent such a calamity and give a fresh impetus to an industry so fraught with good.—Yours truly,

AGRICOLA.

[Our correspondent's idea is a good one, although we scarcely think he is correct in his vaticinations. If cinchona trees canker off in Ceylon and India, so they do in the Andean plantations, while in the forests of America, South and Central, the bark gatherers had to search for scattered groups of the fever trees. We believe we have in the eastern world as good a cinchona climate as exists in the western world, but in both hemispheres, the plant is particular as to soil and especially subsoil, dying off in damp, stiff clay. We should like to hear from other planters also what they have to say about the flourishing of cinchonas on soil opened up and drained by tea plants. Our own experience shows that in such cases they flourish wonderully.—Ed.]

COFFEE IN UVA.

Dear Sir,—I see the Uva men still try to live in a fool's paradise keeping up the hope that *their* coffee may resist the green bug. How true the proverb is that "Wise men profit by the experience of others, fools by their own." My coffee was among the healthiest and most vigorous in the Kandyan side, the soil, climate, cropping and growth were in many respects similar to those of Uva, while it was distant and separate from other estates. Green bug put in its first appearance only last year, but this year it is very bad on all over the coffee, stems, leaves and even fruit. Further it is not even confined to the coffee but it prevails on jungle bushes and even on forest trees. The merry men of Uva must, like their Kandyan brethren, just submit to the inevitable, and the sooner they face it the better. Green bug is far worse than leaf-disease, and neither good soil nor dry climate mend matters. Coffee must be replaced by tea, but for Uva to do this successfully, it *must* have a railway, no matter of what kind. The long weary years have proved the folly of Uva having allowed Rutherford's proposed temporary narrow gauge scheme to collapse—half a loaf would have been better than no bread.

DELENDA EST CARTHAGO.

BREAD AND FLOUR—INFORMATION FOR HOUSEKEEPERS.

Colombo, 2nd November 1886.

Dear Sir,—With reference to correspondence in your paper sometime ago regarding outturn of bread, we annex extract of a letter on the subject, received from an expert, Mr. E. Freeborn of the Western India Flour Mills, Bombay:—a gentleman whose experience in connection with flour and bread industry extends over the past twenty-five years.—We remain, dear sir, yours faithfully,

pp Framjee, Binkhajee & Co.
Pestonjee Dinshawjee Khan.

"Our percentage in bread made with our flour is 140 lb. bread for every 100 lb. flour; but in Colombo, where toddy is pure, and the dough is made softer so as to turn out light bread, the bakers ought to realize about 145 lb. Flour with plenty of strength and very dry will take more water than moist flour, or flour that has not much gluten in it. To distinguish good flour containing strength you need only mix an ounce in sufficient water to make a bolus or pill, and then to knead it well and draw it out into a string to see how long it will go without breaking. If it breaks short you may conclude it has little strength; but if the fibre extends and is elastic it is good strong flour and the percentage will be better. In colour, a pale white or chalk colour is not a healthy colour, good flour must possess a bright rosy hue or what millers call, a bloom on the flour."—pp. F. B. & Co., P. W. K.

A Wrinkle for Tea-planters (By a returned Colonist).—On your tea-chests, put only the nett weight, say "50, 90 or 100 lb. nett"—nothing more; and then state in invoice not simply the total, say "9 chests equalling 900 lb."; but rather put in 9 chests, *each* containing 100 lb = 900 lb. The word "each" is of much practical importance. Of course, a few ounces say ¼ lb. extra, should be put into each chest.

Recent Patents.—Tonic or Coca Bitters. (*Waters. No.* 6,899. May 22nd, 1886.) Any British or foreign wine is taken, and quinine, "cinchona," quinidine, or other bitter alkaloid dissolved in it until the proper degree of bitterness is acquired, and therefore it is mixed with coca leaves or an extract thereof, solution being, if necessary, aided by the addition of sulphuric, citric, or other acid, and the mixture afterwards clarified with isinglass or other finings. The claim is for the preparation termed coca bitters, and for a beverage containing an extract of coca leaf and a bitter alkaloid.—*Chemist and Druggist.*

The Successful Cultivation, since 1884, of the Ramie or China grass plant (*Boehmerianivea*) on the Champ-de-l'Air at Lausanne (altitude 520 m.) by Prof. Schnetzler, is an interesting fact in botany. This shrub, a native of China and Sumatra, has been grown in the south of the United States and of France for thirty years. Recently it has been introduced into Algeria. There is of course a striking difference in the conditions of temperature between Lausanne and the places in Asia where Ramie is grown. While the latitude of the latter is from 15° to 35°, that of Lausanne is 46° 31'. The mean temperature at Lausanne is 9° ·5 C. Last winter the plants underwent long periods of great cold; in one case, *e.g.*, the thermometer being below zero for 124 hours, with a minimum on the ground of—12° ·5 C:—*Nature.*

"London Purple" as an insecticide is thus noticed in the Melbourne *Leader*:—

Enquiries having been made respecting the codlin moth poison, we republish the following particulars from an American source:—Mr. T. G. Yeomans, speaks from experience in the *Country Gentleman* of London purple for orchard enemies as better than Paris green, because it is cheaper, mixes well with water, and does not need to be stirred to prevent precipitation. A pound to 100 gallons is a suitable proportion, the poison being first made like paste in a small dish and then added to the tank. He applies it with force pump, suction pipe, hose, &c.—costing, all complete, 10 dol.—one man driving the team and directing the nozzle, while another works the pump vigorously. Thus hundreds of trees may be sprayed in a day; he thinks the best time is about when the blossoms fall, or as soon thereafter as may be convenient, and the effect is very noticeable in improved quality of fruit, due to the destruction "not only of cankerworms and codlin moths," but of all other insects injurious to the apple.

Mica or Talc.—A correspondent writes:—I saw your para *re* Mica or Talc, and give you the following information received yesterday from a friend of mine in London. I send a large sample of the Talc he took home, and enclose herewith two small pieces, one is a bit off one of my samples, and the other is a piece of a marketable sample, and my friend alludes to them as being as different in color as a white man and a colored one:—"*Mica.* I spent money and time to succeed, but the one white quality is all I could get quotations for. I am in contact with the real buyers, and can sell quantities, but they must be large white clear sheets, any suspicion of amber or brown, I cannot get even an offer for. What I brought home is too brown and wavy, but I learned that a man of colour (a native no doubt) had been in the habit of shipping from Galle to Germany, mica of the right sort and quality, which fetched good prices, but suddenly supply ceased, and sometimes afterwards it was discovered he had died. Who it was I could not learn, but was told he shipped the mica from Point de Galle. It is used in Germany for making lamp shades, as per sketch, also for ovens, Magnetic Instruments, Screen paintings for fire places &c." I send this so that you may make any use you like, as some of those reading about Talc might go to a lot of expense and never get the *right color*, not being aware that the brown is worthless. [The specimens sent are certainly very clear and fine.—Ed.]

Java and Sumatra.—The Colonial report of 1885 has been issued. It shows that the population of Java and Madura was on Dec. 31st, 1884, 37,680 Europeans, 228,464 persons belonging to various Eastern nations, and 20,665,510 natives, together 20,931,654, against 20,630,102 in 1883, the population having thus increased during 1884 by 301,552 persons. In the district of Bagelen an epidemic prevailed during the first six months of 1884, which caused a decrease of the population of 20,239 souls; in all the twenty-one other districts there was an increase of 321,791 souls, viz. 371,824 natives, and 3,967 foreigners. About the condition of Java and Madura the following information is given. Owing to the small Government coffee-crop and the low prices realised for the plentiful rice crop, the natives have earned only a small amount of money, but the sanitary conditions generally gave satisfaction, almost all districts being free from epidemic diseases. Order remained undisturbed, except in certain cases of religious excitement, but which were soon suppressed. The relations with the various native Courts, and the neighbouring Colonial Powers, have continued to be of the most friendly nature. Agriculture was satisfactory, the outturn of the rice crops being plentiful. The coffee cultivation was less favourable, the plant having suffered much from the continued aridity and the prevailing disease of the leaves, which involved considerable damage and loss. The sugar cultivation has been satisfactory, but the tobacco crop unfavourable. Middle and Eastern Java suffered very much from inundations. Volcanic eruptions were only observed in April and October, the consequences of which were of little importance. The amount of the land-rent was 19 265,807 guilders, against 19,304,766 guilders in 1884.—*L. & C. Express.*

FARMING IN INDIA.

It is not always that we see ourselves as others see us. One of our much respected English exchanges (*North British Agriculturist*) has an article of Farming in India in a recent issue, a perusal of which will doubtless enlighten many of our readers, who are quite up in the agriculture of the country. Our contemporary says:—"The Indian farmer has scarcely any food, but what he has is of the simplest kind. There being no hard, gravelly soil, no stiff clay, no hard pan, and no sticky calcareous soil to work, is a great advantage to him. By a very crude implement, which can scarcely be called a plough, the land is torn up. This plough consists of a triangular piece of wood, about 18 inches in length, and 6 inches in diameter at the larger end, the other being pointed. On the flat side of this piece of wood a groove is made, into which a flat piece of iron, a foot in length, an inch wide, and half an inch thick, is inserted, and held in its place by a staple. The staple underneath does not interfere with the rooting. This iron bar, which is pointed, serves as a nose or point to the plough. The larger end of this triangular piece of wood is mortised into an upright stick, the latter about 3 feet in length, at the top of which is a wooden pin on the front side for a handle. About 18 inches from the ground a strip of board 3 inches wide, an inch and a half thick, and 8 feet long, is inserted into the upright stick, and serves as a beam and a tongue. The yoke is a straight stick, 6 feet long, 3 inches in diameter, with four wooden pins each 6 inches long, one on each side of the neck of the bullocks. A small hemp rope, or grass twine, goes under the bullocks' necks to keep the yoke in its place. The beam of the plough has a few notches under it near the end, and is fastened to the yoke by a small grass rope. The plough makes no furrow, but simply roots or tears up the soil, and the ploughman, with his little goad or whip in one hand, the other holding the wooden pin in the upright stalk, walks by the side of the plough. The cattle are of the Brahmin species, white, slender-bodied, long-legged, and very lean. About the only feed they get for months before the rain is 'bhoosa,' or wheat, straw, and chaff. Ploughing is hard work for both the little cattle and the man, and the best a man can do is to tear up three-quarters of an acre a day, and the work then is poorly done." "The land has to be ploughed in this way a number of times, especially for the more substantial crops. The cattle cost from £1 to £4 a pair, but the average price is about £1 12*s*. The average price of a plough is 1*s*. 8*d*. The only other implement used is a log or slab of wood 6 ft. or 8ft. long, drawn sideways across the field by one or two pair of cattle, to crush the clods and smooth the surface. After the land is pulverised, and finally this is well done too, the last ploughing takes place when a man or woman dribbles the seed from the hand into the furrow. The next operations are those of reaping and thrashing. The reaper consists of a blade of iron 6 inches in length, 1 inch in width, and curved like an old fashioned sickle with a notched edge and a short handle. Its cost is 2*d*. The harvester sits upon his heels, cuts a handful of straw which he lays down, and then waddles on without rising, and cuts another lot. He cuts about one-twelfth of an acre a day, for which he receives 2½*d*, out of which he has to board himself. After this primitive reaping machine comes a binder, who gathers up the grain and binds it into sheaves. It is then shocked, and a day or two after carted to the thrashing-floor. The thrashing machine consists of a floor—a bit of hard ground—a stake, a number of cattle, and a driver. The grain straw is piled around the stake in the floor, the cattle are connected by a rope tied to their horns, and one end of the rope fastened to the stake, and the driver keeps them going until the straw is trampled very fine, into what is called 'bhoosa.' This after the grain is separated from it, is fed to the cattle." We trust the English public will not need further enlightenment upon this subject.—*Indian Agriculturist*,

47

LETTER TO AN AGRICULTURAL STUDENT IN CEYLON.

No one denies that agriculture is essentially a practical thing; so is medicine; and will any one be fool enough to suggest that science be put away from the study of medicine? That would be senseless. The land is the subject of the cultivator's operations; how much do the cultivators of Ceylon know about it? Of course, they are convinced they know everything—

"ignaros viæ miseratus agrestes."

The object of agriculture is thus concisely put. To produce, in good condition, the greatest amount of produce in the shortest amount of time, at the least cost, and the smallest deterioration of the land. If this object is to be faithfully carried out, the cultivator must have a certain knowledge of such sciences as would help him. English agriculturists for a long time laughed at the idea of bringing Geology, Chemistry, Mechanics, Meteorology, Botany, and Natural History to the aid of agriculture. Land has been supplied by Nature with an enormous amount of natural food which can sustain it for an indefinitely long period; and for as long a period the cultivator may take no thought of how it fares, so long as it yields its return year by year without decrease. But time works changes, and old methods are not always the better. It must be understood by those who ridicule the idea of seeking the aid of the sciences I have mentioned above, that these sciences are not studied abstractedly, but only as applied to, and so far as they touch on, the main subject *i.e.* agriculture. Now I can assure that you in this sense, of being illustrative of Agriculture, and dealing with concrete things, they form a most interesting and charming study.

Geology, dealing of rocks and soils, tells you what soils you may expect in different quarters; and 'stratification,' 'dip,' and 'strike' all go to help you in draining, well-sinking, &c. Chemistry, of course, principally helps you in the matter of analysis of soil, water, manure, feeding stuffs, &c., and enables you to detect adulterations, and fix upon the relative value of important ingredients. Why supply manure generally and indiscriminately when you can find what element has been exhausted in the soil, or which plant-food the crop lacks. Thus expense is saved, and injury is averted; for certain elements that are superfluous may produce combinations or changes that would be better absent.

Mechanics helps you in the matter of implements. By an acquaintance with the branches of this science you learn the applications of steam, water, and wind; or, to put it in its most attractive form, you will be able to drive a working engine, set up a water wheel, repair a pump, and do a score of such useful things.

Meteorology comes to your aid in matters of weather, temperature, rainfall, moisture, forecasts, &c. Botany—you, of course, know how usefully this science comes in, in agriculture. It struck me lately how careful growers of cattle here are about the grasses of cattle feed on. In a fortnight or three weeks you can be perfectly familiar with all your grasses, know all their names and their nutritive value. How little do you attend to your grazing fields out there, caring nothing about grasses that keep your cattle back in condition, and otherwise exert most injurious influences. Why not have a pasture ploughed up and sown with a good selection of grass seeds, so that you may always have a good grazing ground on which the cattle will thrive?

Natural History *at least* will come to your aid in the matter of insect pests. Veterinary, you know, will be of inestimable value to you, and it is an interesting subject to study. I intend taking out Principal Williams' classes. You know he is said to be the greatest authority on the subject in Great Britain, and his writings are the standard works. The correspondent to the *Examiner* spoke about the variety of agricultural systems in different parts of the world. True, but the broad principles of agricultural science apply generally, and what knowledge you want is, I

suppose, of such operations as of ploughing, harrowing, rolling, drainage, irrigation, &c. I hear you are being instructed in ploughing. Well, you will know by this that even in such a simple agricultural operation you want to know something of the nature, constitution and texture of the soil and subsoil, and the advisability or danger of going deep or shallow; what width your furrow slice should be, &c. But now you must be laughing at the idea of my referring to ploughing at all when you know all about it by this.—"Examiner."

PLANTING IN FIJI.

The Rewa River.—The largest river in Fiji is the Rewa in the island of Viti Levu, the largest island of the group. It is formed by the confluence of the Wanibuka and Wainimala, and at 28 and 11 miles respectively from its mouth receives as tributaries, on its right bank the Waidina and Waimana. Including its tributaries, the river is navigable for about 72 miles, and it drains a surface area of about 1360 square miles, there is an approximate average annual rainfall of 130 in. The Rewa River has five entrances, all of which are, separated from one another by extensive delta. They are, however, protected from the fury of the ocean by a coral barrier reef. Nature has perfected the handiwork by leaving channels wide and deep enough to admit the largest ships through the barrier. After describing other smaller tributaries, Mr. Thomson remarked that the Rewa River system is a most important one, from both a commercial and an agricultural point of view. During heavy floods, which are of rare occurrence, the flat land on the margin of the river is enriched by the deposits from the waters, just as the Egyptian plains are through the overflowing of the Nile. The writer described the nature of the European land claims, and gave a table showing the area so claimed on the Rewa River. The different sugar estates were described at considerble length. The Fijians themselves cultivate cane upon small plantations, and sell it to the manufacturers, receiving the same price as the European grower. There are extensive areas of virgin soil available for the same purpose awaiting European capital and enterprise. The average annual rainfall on the Rewa is over 100 in., and the climate good. Prior to 1881 all the labourers imported into Fiji were Polynesians, but owing to the great competition in the Polynesian labour trade from other colonies, the Government established a system of coolie immigration from India, which has so far proved a great success, and now very few Polynesians are employed in the Rewa district. Each cooly or Polynesian can work from two to three acres of the cane field, and the number of labourers on each plantation is properly regulated. The cost of imported coloured labour, including introduction, &c., per head per annum was as follows:—Coolies, about £28; Polynesians, about £35; and Fijians, £27. Coolies cost £21 16s. 8d. introduction money; wages, 1s. per day for men, and 9d. per day for women. For the first six months the employer has to find the cooly in rations, deducting 5d. per day from his earings for the same. After that period he has to find himself. The term of service is five years. The percentage of sick and absent from work every day showed them to be an expensive class of labour. A new Fijian labour system has been adopted, to be assimilated with the cooly ordinance to allow the engagement of the Fijian by the day or task work, which would no doubt be a benefit to European agriculturalists. At present the European population on the Rewa River is about 2000, being mostly scattered throughout the district. The soil and climate were peculiarly adapted for the growth of all tropical and semi-tropical products. The cultivation of tobacco was much neglected, and was left almost entirely in the hands of the natives. The total value of the sugar exports during the last four years from the colony of Fiji was £708,569 2s. 11d. Sheep did not appear to thrive in Fiji, but horses and cattle did well, and the latter were often met with in large herds. All kinds of birds were there in profusion, and many natives could boast of well-stocked poultry yards. The natives of Fiji were a contented people, and much superior in physical and intellectual capacity to other Polynesians, the Maoris being their only superiors in the South Seas. Previous to the writer's visit there cannibalism existed, but the outrages committed against Europeans were, in his opinion, the result of great aggravation. However, the Fijians were now a useful race and were civilised. The youths were trained at various religious schools, and at the Government Native State Schools.—*Queenslander.*

A NEW INDUSTRY FOR QUEENSLAND: FIBRES.

Amongst the many interesting facts to be met with in the study of the vegetable kingdom not the least interesting are to be found in the history of some members of the nettle tribe. They are widely dispersed over the face of the globe, and like members of a human family exhibit immeasurably different characteristics, according to their habitat and associations. They have opposite or alternate leaves; their stamens are as many as their perianth segments and opposite to them. They have limpid juice. The flowers are unisexual or polygamous. Ovary, free one-celled, with one erect ovule. So much for the features by which we may know them, but in temperate regions they are only herbs, whereas in the tropics they attain the diginity of shrubs. According to Lindley there are twenty three genera and 300 species, but he adds that there are probably more known now.

So common is the Biritish nettle weed that it has given rise to the proverb concerning "Grasping the nettle."

The reason why the nettle does not sting when it is *grasped*, but does sting if it be touched lightly, is not generally known, except amongst botanical students; and almost all books on botany seem to be written with the express purpose of frightening people away by means of using the longest and hardest words that can be found. It is somewhat in the same way that the serpent uses the poison-gland at the base of his tooth that the nettles exude their poison, and one German botanist has fancifully described them as "the serpents of the vegetable kingdom." In the stinging-nettle there is a little bag situated at the bottom of a hollow hair; this bag contains an acrid fluid surrounded by a number of elastic cells. The point of the hair is sharp, and is protected by a tiny cap. When the nettle is touched lightly this cap is broken off, the point of the hair pierces the skin, and a drop of the stinging juice is forced into the blood. If the nettle be grasped firmly the tube is ruptured lower down, hence there is no sharp point to pierce the skin, and the juice is simply poured upon the exterior. Endlicher considers that the "causticity of nettle juice is owing to the presence of bicarbonate of ammonia," but the properties of the juices of virulently stinging nettles is a subject which still requires minute and careful investigation, for in the case of some exotic urticaceæ or nettles the wounds produced are so dangerous as to necessitate amputation.

According to Pouchet, "If we look at the minute quantity of venom with which one of their hairs inoculates us—not perhaps the 150,000th part of a grain—at the rapidity and intensity of the symptoms, it is clear that the poison of the nettle is the deadliest known." In fact, the true stories concerning the depravity of exotic nettles may in a mild way compare with the fabled wickedness of the Upas tree, though it cannot be said that "for three or four leagues around only dead bodies and skeletons of men are to be met with, whilst the birds which ventured into the surrounding air felt to the ground as if struck by lightning." What is true of the Upas tree is that eight drops of the juice injected into the veins of a horse killed it in a few minutes.

Leschenhault says that he has seen the sting of *Urtica crenulata* bring on the most horrible suffering for a whole week, whilst Shleiden declares that if a person is stung by the *Urtica urentissima* amputation is the only remedy, or rather the sole means of saving life.

The natives of Java call the latter the Devil's leaf and say that the effects of its sting last for a year or more when it does not cause rapid death; whilst *Urtica stimulans* in Java is another most dangerous species. Like the much talked of antidotes to snake poisoning, an antidote to the effects of the similarly venomous if less common violently stinging nettles has yet to be discovered. Having glanced at the malevolent and illbred members of the urticaceæ, let us turn to some of the useful and benign members of the family.

The foliage of *Boehmeria candita*, says Lindley, is used advantageously in Brazil in baths, as a relief for hæmorhoidal complaints, and in the same country an extract of *Pilea mascosa* is regarded as a remedy for dysuria. *Urtica dioica* is used as an astringent and diuretic. It is also used as a decoction, strongly salted, which will coagulate milk without giving it any unpleasant flavour. In Abyssinia an acrid species (*Urtica simensis*) is cooked and eaten by the natives as a vegetable. The tubers of *Urtica tuberosa* are esculent and nutritious, and are boiled, or roasted, or eaten raw by the natives.

The common nettles are used frequently in France; sometimes in England and in Scotland I have often seen women of the poorer labouring class carrying home great bundles of the tender and young portions of the nettles to put in their "broth."

The stalks of *Urtica cannabina* were manufactured at one time into hemp, but were not so successful as another species which will be mentioned hereafter.

Urtica tenacissima, called "caloose" in Sumatra, yields an extremely tough cordage. From the *Pooah*, or *Puya*, of Nepaul and Sekkim, which strongly resembles *Boehmeria nivea*, good cordage and strong sail cloth is manufactured in the East Indies. The shoots and tubers of the *Urtica tuberosa* are eaten by the Chinese. This plant is also prescribed by "Celestial" doctors for rheumatism, neuralgia, palsy, and lumbago. But of all the plants of the Urticaceæ family the most highly prized by the Chinese is what they call *Chü-ma*, which is generally known as "China grass" amongst traders, and the *Böhmeria nivea* of botanists, which is the same as the *Kunkhoora* or *Rhea* of India, and said to be similar to the *Caloose* of Sumatra. This *Böhmeria nivea* is most important to Chinese trade, and is extensively cultivated in Che-chang-fu, Kwang-sin-fu, Nam-sing-fu, and Wu-chang-fu. The fibres of the stalks are soaked in native soda, beaten and broken up with a rake-like tool, and heated in a dry boiler. The staple is manufactured into grass cloth and is mixed with silks in making several fabrics. Chinese physicians also hold the plant in esteem for medicinal purposes. The root is said to be cooling, pectoral, diuretic, and resolvent; and the leaves, vulnerary, alternative, and astringent.

But it is as a fibre-producing plant that *Böhmeria nivea* has the most importance. It is a perennial herbaceous plant with broad oval leaves, with white down on the under surface. It is asserted that it is possible to obtain three crops from it per *annum*.

It has lately been the topic of much consideration in the Indian Government, which considers that the manufacture of this *soievégétal* might become of great value in increasing the revenue in India if a practical scheme could be contrived for its accomplishment.

With a view to this end of the Indian Government some time ago offered a reward for an economical method of preparing the fibre of the "China grass." A few months ago Messrs. Fremy and Urbain, of Paris, invented a method for converting the fibres into filasse ready for spinning. Since then a Mons. Favier constructed a machine for gathering the fibres by decorticating the stems by means of steam. Belting for machinery has already been made of this fibre, and I saw a statement the other day to the affect that on this belting being tested it was found that it coud bear a strain of 8,326 lb. to the square inch; whereas leather could only sustain a pressure of 4,239 lb. to the square inch. A piece of water hose made of the same substance was subjected to the high pressure of 600 lb. to the square inch, and it was proved that it only "sweated as much as a good ordinary hose does under a pressure of 100 lb." It remains to be seen whether some enterprising Australian will start the cultivation and manufacture of this valuable plant in the tropical soil of Queensland, where it would probably flourish. So far as is known the Böhmeria is not indigenous to the mainland of Australia; but an allied species, the *Böhmeria calophle*, is endemic to Lord Howe's Island. There seems no reason why Queensland should be behind our Indian colonies in encouraging an Industry which has yet been an exclusive source of wealth to China.

Our friends the nettles may yet be the cause of giving employment to hundreds if not thousands of colonists, and of thus conferring blessings more than sufficient to compensate for the venom and malice of other members of their numerous family.—L. M. Alston.—*Queenslander*.

ROOTS. *

It is a fact which has become more and more evident to the practical cultivator that the results of his efforts manifest themselves on the whole in a sort of compromise between the plant and its environment; I mean that although he sees more or less distinctly what his plant should be—according to a certain standard—it is but rarely, if ever, that the plant cultivated perfectly fulfils in every respect what is demanded of it. Of late years this has of course forced itself more prominently before the observer, because the facts and phenomena constituting what is termed variation have been so much more definitely described, and the questions arising out of them so much more clearly formulated.

Two points can be asserted without fear of contradiction; first, the plant itself is a variable organism; and, secondly, its environment varies. Now within limits which are somewhat wide, when closely examined, the experience of man leads him to neglect the variations occurring around him, and so no one quarrels with the statement that two individual Geraniums belong to the same variety, or two Oak trees to the same species, although an accurate description of each of the two Geraniums or of the two Oaks might require very different wording.

The Water-supply.—It has also become more and more evident that although we cannot ascribe all variations to their causes—very often, indeed, we cannot even suggest causes for them—there are nevertheless numerous deviations from the normal, so to speak, exhibited by plants which can be distinctly referred to certain deviations from the normal on the part of their environment.

To illustrate this we may take the case of two plants of that very common weed, the Shepherd's Purse, growing at different ends of the same small plot of ground: the soil is sandy, and so much alike all over as to be regarded as the same everywhere, nevertheless the plant at one end is large, more than a foot high, and luxuriant, with many leaves and flowers, and eventually produces numerous seeds, whereas that at the other end is small, less than 4 inches high, and bears but a few stunted leaves and three or four poor flowers and fruits. The cause of the difference is found to be the different supply of water in the two cases; and if any one doubts that this may be so, let him try the experiment of growing two or more specimens of this weed in pots: the pots to be new, filled with soil which has been thoroughly mixed, and all the pots exposed to the same conditions—*i.e.*, practically the same—except that those of one series are watered sufficiently often, and those of the other only just sufficient to keep the plant actually living. The experiment is easy and conclusive with such a weed as the above. Now it is just such experiments as that above described—some of them equally simple, others less so—that the physiologist devotes much of his attention to, and

* A lecture by H. Marshall Ward, M.A., F.L.S., Fellow of Christ's College, Cambridge; Professor of Botany in the School of Forestry, Royal Indian College, Cooper's Hill.

in just such a manner has been gathered together a nucleus of information around which more knowledge can be grouped. I may make these points clearer by again quoting an illustration, and, not to confuse or mislead you by going too far afield, I will keep to the same line of investigation, partly because it is quite as simple and conclusive as any other of many that might be selected, and partly because it may be possible to set before you some facts which are interesting or even new to you.

Hairs.—It has been found that in some cases where two plants are growing in the same soil and under the same conditions as above, but where one plant receives less water than the other, that the dwarfed drier plant is more hairy than the larger and luxuriantly growing plant, which has been well watered. On looking more closely into this matter it turns out that the extra hairiness is (in some cases, at any rate) simply due to the fact that the hairs are closer together, because the little cells on the outer parts of the plant which grow out into hairs do not increase so much in length and superficial extent as those on the well-watered plant, and thus the hairs stand thicker together on the same superficial area of the organ—of a leaf, for instance. In other cases, however, the hairs are really increased in numbers and length—the plant is absolutely more hairy. It will be noticed that details concerning growth and turgidity, and of the influence of various minerals, and so on, are not under consideration here. I am not asserting that all cases of hairiness in plants are to be ascribed to this cause; but it does occur, as stated, and the point is a curious one in view of the fact that very many plants which grow in sandy dry soils are conspicuously hairy, whereas allied species growing in or near water, or even only in moister situations, are devoid of conspicuous hairs, or even quite smooth. The above peculiarity is not confined to leaves and stems, moreover, for experiments with roots have shown that the root-hairs, which are so important in collecting moisture, &c., from the soil, can be made to appear in enormous numbers when the root is kept in a soil which is very open and only slightly moist, whereas none or very few are developed on the same roots growing in water: this again is in accordance generally with the fact that the roots of land-plants growing in light soils develop innumerable root-hairs, whereas those of water-plants do not thus increase their surface and points of attachment. I cannot here go into all the interesting facts known about these hairs, but it will be sufficient if you bear in mind the main points just mentioned.

Deficiency of Water.—Let us now vary the experiments a little. It is obvious that we might suppose any number of differences in the amount of water given to the plants used in the experiments described above: but it would be found, as matter of fact, that however little be the quantity of water given to the soil in which the dwarfed plant is, compared with that put into the soil in which the luxuriant plant grows, the actual weight of water will nevertheless have to be considerable, taking the whole life of the plant into consideration—there will be more used than you probably know, moreover, because the soil itself will no doubt condense and absorb some from the atmosphere during the night. There is a minimum of water absolutely necessary, and if the plant does not obtain this it will die. Its death will be ushered in by drooping and withering of the leaves, stem, and roots, and this condition, in which the functions of the plant are interfered with beyond a certain point, passes into a condition of disease.

Excess of Water.—Now take another case. We might so arrange the experiment that we poured and continued to pour too much water into the soil. Here again it would be found that a condition of disease eventually sets in—*i.e.*, a condition in which the functions of the plant are again interfered with beyond a certain point. The symptoms and progress of the disease will be very different in the latter case, however, from those in the former. It may also be mentioned that in neither experiment is death inevitable if the disturbing cause is removed soon enough—*i.e.*, if sufficient water be added in the first case before the cells have ceased to be able to take it up, or if the previous conditions of the soil are restored soon enough in the case of the over-watered plant. Here we come to a matter which is less simple than may appear at first sight. You will note that the problem in the latter case is to restore the previous conditions of the roots and soil soon enough; I put it thus, because the conditions of the roots and soil may soon be very profoundly altered by the over-watering. To understand this, it is necessary to become a little more fully acquainted with the condition of affairs in what may be called the normal case, where the soil is light and open, and plenty of water, but not too much, is at the disposal of the roots. Such a soil will consist of innumerable fine particles, of different shapes, sizes, and composition. No doubt there will be grains of quartz, particles of broken up vegetable matter, and little rugged bits of stones containing various minerals; each of these tiny fragments will be covered with a thin layer of water, and you would probably be greatly surprised if I were to go into the proofs showing how extremely tenacious of its water-blanket each particle is. It may be enough for our present purpose if you accept the fact that it requires enormous force to deprive the particles of the last traces of their water-layers; they will give off some—or in some cases even a good deal—rather easily, and in fact when the layers become of a certain thickness no more water can attach itself to the particles, but it falls away, and the soil remains saturated, as we say.

Air in the Soil.—Now these particles of soil, each enveloped in its water-blanket, are not in close contact; there are spaces between them, and these interspaces influence the quantity of water which can be held back by the soil. Let us suppose such a soil perfectly dry; the particles above referred to being irregular in shape and size, and only roughly in contact at various points, the interspaces will be filled with air. If water be then added in some quantity, each of the particles becomes clothed with a layer of water, and some of the air is driven out, though bubbles of air will still exist in the larger interspaces.—*Gardeners' Chronicle.* (*To be continued.*)

CROPS ON DRY LANDS IN INDIA.

TO THE EDITOR OF THE "MADRAS TIMES."

Sir,—Having received no issue of your journal for the last two months, I happen to be very late, I am sorry, in replying to your remarks, under the head "Dry Lands" in your issue of the 24th ultimo, on a paper on the same subject read by me before the Agricultural Students' Association in March last. With reference to my statement that it will generally be possible to grow on dry land two crops of horsegram for green manure, in addition to the usual crop, you say that the absence or great deficiency of moisture in the subsoil and in the air of the interior of the Presidency is the reason why the ryot cannot adopt the plan proposed. Taking this for granted, the absence or deficiency of moisture in the interior of the country is, of course, no reason at all why the ryots in the more favoured Northern Circars and in the low Carnatic plain should not adopt the plan. Are the dry lands in neighbourhood of the Saidapet Farm, situated under the same or even better circumstances than that estate, cultivated with any more crops during the year than elsewhere? It cannot be denied that there are thousands of acres in the Northern Circars and in the low Carnatic plain, sadly wanting in organic matter, to which, at least, the plan of green manuring is certainly applicable. As regards the interior parts of the Presidency, one might see there, about the month of June, fair crops of gingelly and cumboo, which are, in fact, far less hardy than horsegram, while the adjacent lands, though similarly circumstanced, are quite bare. The reason why gingelly and cumboo are not then extensively grown is, not that the plants refuse to grow at all, but because the ryots are not certain that the supply of moisture will be enough for their *matura-*

tion, and I must admit that the season for cumboo and gingelly is indeed very precarious, though it would not generally be so, if only the production of stem and leaf were cared for. Were the moisture in the air and in the soil of the interior of the country really too little for the growth of horsegram about the month of June, the growth of the far more delicate crops of gingelly and cumboo, even on a single acre, would be absolutely impossible, which, however, is not the case. You have conceded that "it is not much moisture that horsegram requires, but some it must have," and that, even in the driest weather in the interior of the Presidency, hardy plants do endure and survive the drought. It must then be admitted that the fair growth of gingelly and cumboo at the time when I propose the plan of green manuring to be chiefly carried out, is conclusive evidence that horsegram, which is one of the hardiest of the cultivated crops, and which need not mature for purposes of green manuring, would grow far better. You say that in the low Carnatic plain and in the Northern Circars, the supply of moisture is so good that cultivation can be carried on during the greater part of the year, and the soils, though inferior, yield better outturns. Only the former part of this assertion holds good, and that only in comparison with the Ceded Districts, which are indeed exceptionally dry. In Coimbatore and Salem, which are but interior parts of the Presidency, a much larger percentage of the total extent of cultivated dry land bears a second crop, and the yield per acre is not less satisfactory than in Tanjore, South Arcot, Chingleput, Ganjam, Kistna, &c. The meteorological reports show that, from June forward until the outburst of the North-east monsoon, the relative humidity of the atmosphere in these districts is, in fact, more than that of Madras. In these districts, subterranean water is met with, in many places far off from streams and tanks, at no greater depth than on the Saidapet Farm, viz., about 20 feet. It is not unlikely that, even in the Ceded Districts, the character of the prevailing black soils, which will surely retain well the moisture of the few showers which occur from June forward, will make up for the deficiency of the atmospheric moisture. The recent trial borings with the augur at Anantapur prove that subterranean water may be tapped there in many places at even 14 feet below the surface. I beg to add in conclusion that, having seen horsegram cultivated with fair success even under most adverse circumstances on the Saidapet Farm, the plan of green manuring is extensively applicable to this Presidency. I am myself a native of Coimbatore, and my observations and information warrant me in concluding that there will be little difficulty in carrying out the practice of green-manuring there, during the season for gingelly and cumboo at least.

C. K. SUBBA RAO.

GREEN MANURE CROPS ON DRY LANDS.

A letter in our columns on the subject of Dry Lands by Mr. C. K. Subba Rau, Assistant Professor of Agriculture, Madras Agricultural College, ought to be read by those who feel an interest in agricultural matters. It is a rejoinder to an article in which we remarked on Mr. Subba Rau's lecture on the subject. The letter contains information which will be found useful in leading to a right conclusion in respect of crops of gram previous and subsequent to the principal or winter crop on dry lands—which additional crops Mr. Subba Rau proposed to raise for green manure. In relation to this question, dry lands may be classed as those along the coast and those in the interior; and the latter may be divided into lands very dry and under a very dry atmosphere; and lands less dry and under a comparatively humid atmosphere. As to the coast lands, they are very unequal in quality. Some, in the deltaic regions, are rich in the organic matter contained in silt; and they need no manure whatever. But these being wet lands, fall out of the scope of the present discussion. Of the dry coast lands, some we may consider deficient indeed in organic matter but so circumstanced as to grow, with comparative ease, crops that require but air and moisture for their nourishment. On such lands, destitute of, or deficient in organic matter, it would, doubtless, be advantageous to grow horse-gram or green-gram for manure, if the cultivator does not find it can be used to better purpose for fodder, or, if the crop matures, for food for both man and beast. However, for whatever purpose, a second crop of the kind indicated by Mr. Subba Rau would seem possible and advantageous on the poor dry lands of the Eastern Coast. But not all the dry lands in the plains along the coast may be deemed deficient in organic matter and require green manure; and on such as are not defective, or on which the expenditure of organic matter can be made good by cattle manure, it would be a pity to raise crops simply for green manure. If the lands have sufficient moisture to raise a second food-crop, that second food-crop ought to be raised; and if not, horse-gram might be raised for fodder rather than manure. Here at least, but probably in all cases where a green crop and that only can be raised, it will be found advantageous to let it serve as fodder, and to let the cattle convert it into stable manure.

As to the lands in the interior, our correspondent's letter shews that,—what with the natural richness of the soil, and the supply of stable manure at command,—there is no lack whatever of organic matter; the one thing wanted is moisture. Where this exists, the soil is capable of yielding summer crops superior to horse-gram and green-gram; so that these as green manure are quite unnecessary. And the growing of them would probably deprive the land of moisture which might be of use towards preparing it for the principal crop. As to the cotton soil in the Ceded Districts, Mr. Subba Rau himself has said that it is rich in organic matter; what need can there be then to raise a green crop for manure? He says the cotton soil is retentive of moisture. So it is; but there is none to spare, and what there is, is low down; and in years of late and deficient rainfall it requires four or five yoke of oxen to plough the ground with a large plough to break it up for sowing; and that sowing becomes of no avail, if the first rains are very late or scanty, or are not followed up soon by other showers. Even if a green crop could be raised before or after the winter crop, it would be a pity to exhaust the moisture by raising it for manure which is not wanted. Mr. Subba Rau makes use of an admission that in some of the very dry districts, as the Ceded Districts, some hardy plants do live through the hot weather. Yes, they do; but only if they are watered. Does Mr. Subba Rau propose to irrigate a hot weather crop of gram for green fodder in those districts, where, from deficiency of moisture, even the winter crop is on some lands but a poor crop of gram?

The conclusions at which we arrive are, that only on poor soil in the maritime districts would it be both possible and desirable to raise a crop of gram previous or subsequent to the winter crop, to serve as manure; though even here it might with more advantage be given to cattle, and their droppings used as manure. In the interior, in one or two districts, where there is moisture in the soil and air, there is no need of such a crop for manure; though it might be useful for fodder. And in the very dry districts it would not be possible or necessary to raise such a crop for either fodder or manure; and if it were possible, it would be undesirable to exhaust for this purpose the moisture in the ground; when it might be necessary for preparing the ground for the early winter crop. The first great want of the dry lands of the country is water; the second great want of the dry lands is water; and their third great want is water. Indeed, startling as the statement may appear, it is not much, besides what light, air and water can supply, that many plants need for their nourishment; and much of the agriculturist's labour consists in preparing the land, so that it can best absorb and retain water and air and transmit them to the plant. And even some of the manure that is used, helps but to lighten the soil—that is, to fit it for the work of communicating air and water to the rootlets of plants. And such

nourishment as plants require, besides what air and water can furnish, is to be found in a few ingredients, ammonia, lime, phosphorus, potash and the like, in different proportions. This has been shewn by a process of natural analysis; for it has been ascertained by experiment what ingredients plants take out of prepared soils, of which the constitution and composition were noted beforehand, and compared with the same after the growth of the plant.—*Madras Times.*

THE FRAGRANT PRODUCTS OF THE WEST INDIES.

The West Indies, like all warm countries, abound in fragrant products. Most flowers possess there a potency of aroma unknown in colder climes, and many fruits, plants, barks, leaves, gums, seeds and grasses exhale scents of their own, which combine into an harmonious whole. Those natural treasures, however, have, as yet, been but little utilized for commercial purposes, and this Exhibition affords an excellent opportunity for studying them, and seeking the way of turning them to account. This is the object of this brief sketch.

We shall confine our observations to Jamaica and the Bahamas; the former as being the largest and best cultivated British island, the latter as offering some difference with the Southern group.

The most fragrant flowers in Jamaica are the Rose, the Jasmine, the Orange (sweet and bitter), the Tuberose (*Polianthes Tuberosa*), the *Cassie* (*Acacia farnesiana*), the Frangipane (*Plumeria rubra*), the *Unona odoratissima* (called by the Tagals, in Manilla, *Ihlang-Ihlang*), the Mignonette tree, or Henna (*Lawsonia inermis*), the *Olea fragrans* (called by the Arabs *Zensfur*, and by the Chinese *Kwei-hwa*) the Volcameria, and the *Rondeletia odorata*. A strong but less delicate scent may be obtained from the leaves of the following trees:—The bitter Orange, Lemon, Cigar-Bush (*Critonia Dalea*), Mountain Cigar-Bush (*Hedyosmum mutans*), Wild Cherry, Bay, Pimento and Allspice.

Among other indigenous fragrant products may also be mentioned:—The beans of the Vanilla (*Vanilla planifolia*), Vanilloes (*Vanilla pompona*), and of the Tonquin (*Dipterix odorata*); Lemon Grass (*Andropogon citratus*), Kus-Kus Grass *Andropogon muricatus*), Cloves, Nutmegs, Cassia, Cinnamon and Musk-seed (*Hibiscus, abelmoschus*) some aromatic plants of the labiate order, such as Thyme and Rosemary, and various woods, the most remarkable amongst which is a species of rosewood, called *licoria odorata*, which yields an essential oil strongly resembling Bergamot in flavour.

The mode of extracting the fragrance from those various products so as to render it of commercial value differs according to its nature. Distillation is the most frequently adopted, but is only available for hardy substances such as leaves, barks, plants, &c. There are but few flowers that can be treated thus, and the usual processes employed to obtain, their aroma are either maceration or absorption, called by the French *enfleurage*. The former consists in infusing the flowers in hot grease or oil, which is strained off after repeating the operation daily for two or three weeks. This process, however, can only be applied to flowers like the rose, orange and cassie. More delicate flowers, such as Jasmine and Tuberose, are treated by the *enfleurage* system, which may be thus described:—A mixture of lard and beef suet, properly washed and clarified, is laid on a square glass tray and fresh flowers are scattered on it and renewed every morning until the grease has absorbed the perfume of the flowers. Those trays are piled up on each other to prevent evaporation. The same result may be obtained with oil, and in that case a thick cotton cloth, soaked in oil, is laid on a frame with a wire bottom and the flowers strewn on it. The best handkerchief perfumes are made by infusing this grease (called *pommade*), or the oil in rectified spirits.

Among the exhibits in the Jamaica Court is a most interesting one by Col. Talbot, who has the merit of having been the first to establish a flower farm on his estate, Worthy Park, St. Catherine. The products shown, prepared by Mr. John Gray, include Essential Oils of Bitter and Sweet Orange leaves, Lemon, Limes, Lemon-grass and Pimento and some Tuberose Pommade made by the *enfleurage* system above described. To the list of those exhibits is appended a note stating that many of the plants are very abundant and obtainable in large quantities, whilst others, like Jasmine and Tuberose have to be cultivated. The same is the case in the south of France, where there are large plantations of roses, jasmines, tuberoses, and other flowers; but aromatic plants, such as lavender, rosemary, and thyme grow wild in the neighbouring mountains.

The question of flower-farming is evidently exciting some attention in Jamaica, for the Director of the Botanical Department, also exhibits some Jasmine Pommade, made from the flowers of the *Jasminum grandiflorum*, besides Essential Oils of Pimento and Cigar-Bush leaves, Lemon-grass, Mountain Thyme (*Micromeria obovata*), and Juniper Cedar.

Mr. B. T. Scharschmidt (C. E. Mandeville) shows some essential oils drawn from the rind of the orange (*Citrus aurantium*), the lemon (*Citrus Medica*), and the Bigarade (*Citrus Bigaradia*), but they appear to be *distilled* and consequently inferior to those obtained in Calabria and Sicily by *expression*. The letter mode consists in placing the fruits between two cylinders armed with spikes and revolving in a different direction; the minute vesicles on the surface of the rind containing the essential oil thus become pierced, and the latter runs down a funnel at the bottom of the apparatus. The essence thus procured is quite pure, whilst that obtained by distillation carries with it the coarse flavor of the rind. The same exhibitor has some interesting specimens of Oil of Pimento leaves and berries, *Eupatorium Dalea*, Lemon-grass, and Kus-Kus (*or Vétivert*), some Jasmine and Tuberose Pommades, some Extracts of Jasmine, Muskwood, and Rose-wood, some orange-flower water and some rose apple water, distilled from the *Jambosa vulgaris*—a decided novelty.

The Honorable H. J. Kemble, of Kingston, shows some very fine *Oil of Ben* drawn from the seeds of the Horse-radish tree (*Moringa pterygosperma*). This oil was largely used by our ancestors in their perfumery compounds; it is mentioned in almost every page of the recipe-books of the sixteenth and seventeenth century. It has the valuable property of not turning rancid, and it is to be regretted that it is not more frequently employed. It would, no doubt, be found superior to grease in practising in Jamaica the *enfleurage* process—as above described, for it is difficult to keep grease fresh in a warm climate. As the seeds yield 30 per cent of that oil, it might, perhaps, be offered also to European perfumers at a sufficiently low price to induce them to return to its use.

In the Bahamas is to be found nearly the same flora as in Jamaica, and to judge of its richness and variety, one needs but to cast a look on that most interesting collection beautifully painted by Mrs. Blake.

In addition to the flowers already named may be mentioned the following, included in the above collection and possessing all an agreeable odour.—The *Dalbergia amerimnum*, the *Cassia Fistula*, the *Ipomœa Tuberosa* and *Quamoclit*, the *Bletia hyacinthina*, the *Glorisa superba* and the *Nerium oleander*.

The *Eucalyptus* has been lately introduced from Australia into the West Indies, and with its usual rapidity of growth it will no doubt soon spread and render important services to public health. The wonderful properties of the Oil of Eucalyptus, so strongly exhaled by its leaves, in checking fever and curing bronchial affections, are now universally recognized, and wherever that tree has been planted it has purified the air in a remarkable manner. Its latest achievement has been to drive *malaria* completely out of the Campagna of Rome, where it had been prevailing for centuries.*

*An oft-reapeated mistake.—Ed.

Mr. Wentworth Scott, an eminent analytical chemist, thus explains the atction of the Eucalyptus:—

"*Eucalyptoles*, a hydrocarbon of the *Thymole* type, appears to be what might be termed the 'active principle' of the Eucalyptus oil from a hygienic point of view. The oil of *E. globulus* seems to be the richest in this hydrocarbon, upon which its 'ozonizing' property depends; but the same body with numerous homologues in varying proportion is present in the oils secreted by all the plants of this genus, hence the remarkable 'healthful character' of the atmosphere in Australian forests.*

The antiseptic powers of *Eucalyptole* are, I find from crucial experiments, fully 3½ times greater than those of carbolic acid, while its use is certainly free from the danger that not unfrequently attends the latter."

The Eucalyptus leaves contain as much as six per cent of essential oil, which can be easily extracted by distillation, and which will always find a market in Europe, where the consumption is great. Not only is it largely used in medicine, but it makes a capital scent for ordinary toilet soap, and is still more valuable as a deodorizer. It forms the chief ingredient in Rimmel's Aromatic Ozonizer, a pine saw-dust impregnated with that oil, which, by simple evaporation, evolves the refreshing breezes of the forest, and acts as an agreeable disinfectant in dwelling houses or in places of public resort.

Being an orchid, the flowers of the Vanilla require the presence of an insect to fertilize them. This insect exists evidently in Honduras, as numbers of bunches of beans are found on the wild plants, but where it does not, its action may be replaced artificially by taking a little of the pollen which is deposited on the anther with a sharpened pencil or knife blade and letting it touch the viscous disk situated on the front of the white column which rises in the centre of the flower. This forms part of the instructions issued by the Botanical Department in Jamaica for the cultivation of Vanilla, and it would no doubt prove a remunerative one if carried out with proper care and attention, for it sells at a good price—being used both by confectioners and perfumers. The most esteemed sort in the market comes from Mexico and there is no reason why the West Indies—possessing a similar climate—should not produce an equal quality. That grown in Mauritius and Reunion is deemed inferior. There is also a good demand in Europe for bastard Vanilla, or Vanilloes (*Vanilla pompona*) and for Tonquin Beans (*Dipterix odorata*) already mentioned.

The only species of Orange Tree worth cultivating for its fragrant products is the Bitter Orange (*Citrus Bigaradia*), which is easily distinguished from the others by the peculiar form of its leaf, the petiole being heart-shaped. A very fine essential oil, called in Provence *Néroly*, is distilled from its flowers; another one, called *Petit-Grain*, from its leaves, and a third can be obtained from its rind by *expression*, as already explained. The edible Orange Tree (*Citrus Aurantium*), yields very inferior essences, and the Lemon (*Citrus Medica*), gives but one from its rind, which is not worth collecting when the fruit can be sold whole, as it could scarcely compete with that produced in Calabria and Sicily. If West India colonists will attend to this warning they will save themselves the disappointment experienced by the Florida orange planters, who have been of late years attempting to distil their orange leaves, and who, by employing indiscriminately those of all species and chiefly of the edible orange, have produced a very coarse essence of *Petit-Grain*, which has been offered all over Europe, but will only sell at a very low price.

In conclusion, the manufacture of fragrant products in the West Indies will, no doubt, prove ultimately a safe and lucrative speculation, but it requires a deal of study and attention. The first conditions of success are to create plantations of sufficient extent to obtain the necessary quantity of flowers, and the training of a skilled staff of operatives to work them. Distillation, when practicable, is the simplest process; maceration and *enfleurage* are open to the danger of the fatty basis turning rancid during the hot season of the tropics. Another method might be tried, and this is *percolation*, a system which Mr. Rimmel has brought to some perfection by means of an apparatus of his invention, which he calls *Myrogene*. Freshly-gathered flowers are placed in a sort of sieve, and some prepared alcohol drops through them from a great height and carries with it the most subtle part of their aroma. This alcoholic shower, after passing two or three times over fresh layers of flowers, becomes strongly impregnated with their perfume. Mr. Rimmel has been using this apparatus on a large scale for some time at his Nice manufactory for drawing the scent from flowers which can neither be distilled nor treated by the macerating process, and a specimen in operation was shown last year at the Inventions Exhibition.—*West Indian Court Guide Col.-Ind. Exhibition*, 1886.

* Dry atmosphere—leaves do not decay but are dessicated.—Ed.

NOTES ON GRASSE AND ITS CHIEF INDUSTRY: PERFUMES FROM FLOWERS.*

BY WM. SAUNDERS, F.L.S.

A few notes from this interesting old town, with some references to its chief industry, may possibly prove of interest to some of your readers. It is a land of flowers, where a large proportion of the perfumes of the world is made, and such an odd, out of the way corner of the country that but few visit it. Here odorous flowers are grown in immense quantities for the purpose of preparing the sweet scents in which civilized mankind and womankind delight, and it is from this district that perfumers everywhere obtain the chief ingredients from which by skilful combinations their celebrated perfumes are manufactured. On the main line from Paris to Rome, *via* Marseilles, about six hundred and sixty miles from Paris, lies the town of Cannes, on the Mediterranean shore, a noted health resort for invalids from Great Britain and other countries, the winter climate being remarkably mild and agreeable. Here a branch line of railway about twenty miles in length brings the traveller to Grasse. At Cannes the chain of mountains which for many miles on either sides runs along the seashore retreats to some distance inland, and the route to Grasse lies up through narrow valleys and broader slopes of hill and dale. For the first few miles the general aspect of the country is rather desolate; vegetation seems parched and stunted; even the pine trees are dwarfed, and the wayside weeds lack vigour. But soon vegetable growth becomes more luxuriant, fertile belts are reached, and fields of roses, jasmine, mignonette, violets and other flowers are seen on every hand, while groves of olive trees clothe the hillsides, along with plantations of the vine and of the fig tree. As Grasse is approached the valley widens to about four or five miles, the mountain slopes are grey with olive trees, and nearly the whole valley is utilized for flower-growing.

The town, with a population of about 12,000, lies high up the mountain at the end of the valley, where the roads and narrow streets are so steep that the occupant of the ground floor of the back part of a house may often look out of the third story at the front of it, and where the quaint old houses tower up to six, seven, and even eight stories high at the front. The route leads through fields and gardens of roses, jasmine, jonquils, tuberoses, etc., up steep winding streets and alleys, where long flights of steps afford short cuts from one point to another in the town, and where buildings hoary with age greet the eye of the visitor at every turn. Mountain torrents steam down the hillsides here and there, affording water power for the ancient looking olive mills and means of irrigation during the hot weather for the flower growers. These streams also fill the public troughs with pellucid water, where crowds of women may be seeing washing clothes from early morning until dark. It is said that this town was founded three hundred years before the Christian era; it is known to have been an important Roman station, and its excellent water privileges must have been a strong incentive to its early settlement. Nearly all the population excepting those engaged in mercantile busi-

* From the *Pharmaceutical Record*,

ness, and a few hundreds who are employed in the manufacture of olive oil are engaged either directly or indirectly in the flower industry. The shop-keepers display their wares in the tiniest little shops, in which they have scarcely room to turn about; the hotels are antique country inns; but the air at this season is balmy and delightful, and the views from the upper part of the town charming.

There are about sixty firms or individuals in Grasse engaged in manufacture of perfumes from flowers. Three or four of these are very large establishments, the others smaller. The harvest period here is a long one. It begins in February with the violet and the jonquil, which keep the perfume-makers busy until the end of March, when the mignonette comes in, which is followed in May and June by the orange flowers and roses, and in July by the jasmine, then with the rosemary and lavender, which are succeeded by the tuberose and cassia, which keep the trade busy until quite late in the autumn.

The rose bushes are grown in rows about three feet apart, with about eighteen inches of space between the plants. They are closely pruned in the spring, which induces a strong growth of young wood and an abundance of flowers. The jasmine and other flowers, where the individual plants occupy less space, are grown more closely together, the aim in each case being to have the ground as closely covered as is consistent with convenience of picking. The orange trees are about fifteen feet apart. It is the bitter orange which yields the most fragrant flowers; but the fruit of this variety is not eatable, so the trees are grown solely for the flowers they produce and for the oil obtained from the rind of the fruit.

In company with my genial travelling companion, Prof. J. P. Remington, I visited some of the principal establishments, where we were received with much kindness and courtesy; but to Mr. Warwick, of Warwick Fréres, we were indebted for special attention. We found that while most of the larger manufacturers have flower plantations of their own, the bulk of the crop is grown by the peasants and small landholders, who during the season bring them daily to the factories. We rose early in the morning and drove into the country, hoping to see some of the flowers gathered, but the flower-growers were up before us, and had their fragrant crops collected and packed in sacks ready to take to the manufacturer before we reached the ground. Nothing is known here of the movement in favour of short hours for the working man.

It has long been known that fatty substances absorb odours very readily and retain them with much persistence. The perfumers of ancient Greece and Rome understood this well, and made use of such substances to steep flowers in for the purpose of extracting their odours. At Grasse fatty substances are largely used for the same object, and the pomades made there consist of fats strongly impregnated with the odours of flowers, which odours may be extracted from the pomades by exhaustion with alcohol and used as spirituous perfumes.

Pomades are made by two very different methods, the one by maceration, the other by what it is known as the process of *enfleurage*. Pomades of rose, violet, mignonette, cassia and orange flower are all made by macerating the flowers in fat warmed to 6° C. The fat is allowed to remain in contact with the flowers for several hours and occasionally stirred, after which it is put under a powerful hydraulic press, by which means the fat is expressed with but a trifling amount of waste. The same fat is thus treated daily with fresh flowers for from twenty to thirty days, during which time it becomes strongly charged with the odour of the flower.

The jasmine and tuberose pomades are always made by the other process. A large number of frames or "chassis are prepared, each of which is fitted with one pane of glass about 18 × 24, set in a wooden frame, so that the wood may project on either side of the glass about $\frac{3}{4}$ inch and each side of the glass is coated with a layer of fat about $\frac{1}{4}$ inch thick. The woodwork of these frames is so constructed that when laid the one on the other they fit very closely, so as to avoid any waste of odour. The freshly gathered flowers are strewed over the fat in each frame in a thin layer and the frames then piled one on the other to a convenient height, the upper and lower frames in each pile being coated with fat only on that side next the flowers. The odour emitted by the flowers is rapidly absorbed by the layers of fat above and below them, and after twenty-four hours of exposure they are practically exhausted. Every morning the trays are examined, the old flowers thrown away and fresh ones put in their place, the surface of the fat both above and below being broken every few days by a toothed spatula, and mixed so as to present a fresh surface. This process is continued for about thirty days, by which time the fat has become saturated with the odour, when it is scraped off the surface of the glass packed in tin cans, the process being continued with fresh fat as long as the flower harvest lasts. Some of the larger factories have many thousands of these frames.

The buildings in which this work is carried on are built either of stone or brick, where the temperature is maintained as low as possible, so as to prevent the fat from becoming rancid. The fat is composed of a mixture of lard and mutton suet, melted together and carefully washed and treated until it is free from all trace of fatty odour. It is then slightly perfumed with orange flower, which is said to aid in preserving it from change. The fat is usually prepared during the winter months and stored in cool cellers until wanted for use.

Roses are picked in the bud every morning just as the buds are about to open. They are picked with the green calyx attached, and this appendage is removed in the factories by the women employed there before the roses are treated.

Mignonette is picked before the seed pods are formed. The flowers of the violet, jonquil and tuberose are picked with the calyx attached, but the jasmine flowers are pulled free from their calyx in picking.

The following are about the average prices paid for the flowers as they are received at the factories: –

Roses, 8 to 10 cents per kilogram; orange flowers, 17 cents per kilogram; violets, 70 to 80 cents per kilogram; jonquil, 60 cents per kilogram; mignonette, 40 cents per kilogram; jasmine, 50 cents per kilogram; tuberose, 50 cents per kilogram; cassia, 1 dollar per kilogram.

At these figures it is said the growers can make far more off their land by devoting it to flowers then they can from any other crop.

A large quantity of orange flowers are used for the preparation of oil of neroli and orange-flower water. To obtain these products the flowers are placed in large copper stills of water; steam is introduced and the water made to boil, when vapour arising is passed through coolers into suitable receivers. A small quantity of oil gradually accumulates on the surface of the water, which is removed from time to time. The water which collects in the receiver is the orange-flower. water of commerce. The largest part of the rose crop is similarly treated, and rose water with a small proportion of otto of rose the result.

Distilled perfumed waters when first made have a rank and rather unpleasant odour, which is softened and becomes quite fragrant after they have been kept a few months. While undergoing this mellowing process it is necessary that the jars in which these waters are contained should be uncorked. They are left either open or tied over with a piece of brown paper to exclude dust.

It is difficult to obtain reliable statistics of the quantities of flowers grown in this district, but the following may be taken as approximately correct. It is estimated that the sixty firms or individuals engaged in the manufacture of perfumes in Grasse consume annually about 3,000,000 pounds of roses, 4,000,000 pounds of orange flowers, 160,000 pounds of jasmine, 40,000 pounds of mignonette, 40,000 pounds of tuberose, 200,000 pounds of violet, and smaller quantities of jonquil and cassia. They also use large quantities of orange leaves for the preparation of oil of petit grain, and immense quantities of lavender, rosemary and thyme, from which the oils of these plants are distilled.

The aggregate value of the perfumes exported from Grasse is said to be about 3,000,000 dollars annually.—*Pharmaceutical Journal.*

ELECTRIC MOTORS FOR DRIVING TEA MACHINERY, AND THE ELECTRIC LIGHT.

It is necessary to correct the over-sanguine ideas of planting correspondents who, because the subject of Electric Motors has been ventilated in our columns, have begun to rush to the conclusion that the same can speedily be made available to them in supersession of steam engines or water-wheels. No such revolution can be anticipated for the present. We are merely in the early days of invention tending to the perfection of Electric Motors. Besides, where a given head of water is immediately obtainable for driving a wheel or turbine, so placed as to be convenient for the erection of a Tea Factory, no improvement can be made upon the practice in force, inasmuch as there is simplicity of detail and direct power available.

But, there are no doubt, many places in the island where such facilities do not exist and where water power is running to waste from its inaccessible position in reference to the erection of tea factories. By way of example, we may point to the Devon falls. A factory placed at the foot of the falls would be most inconvenient. Here we may well look by-and-bye, for the electrical transmission of energy stored by the aid of a turbine at the foot of the falls working a dynamo. Such power could be transmitted by cable to a second dynamo working the motor at any convenient part of the high land in the vicinity, and the former ought to be, we suppose, sufficient for tea machinery on a large scale. This case may illustrate the direct gain to be had by electrical transmission of energy which enables the turbine to be placed in the most favourable position as regards head and supply of water, and to erect distant factories on the most able favoursites.

As regards economy, the question of first cost and maintenance of working would probably be in favour of electricity against the steam engine with its outlay in fuel and complicated machinery; but here again, we have to wait for that practical experience in Ceylon which is being rapidly matured in the mother country, but which has not yet reached the Far East.

In reference to the cognate subject of Electric Lighting we have been favoured with the following remarks from a Ceylon resident now at home who has given special attention to the subject and who is deeply interested in the various practical applications of Electricity which the present day is witnessing. We quote as follows :—

"You asked me to let you know something regarding the progress of Electric Lighting in England and I therefore jot down a few particulars which may be interesting to you.

"In some respects Electric lighting has advanced during the last three years very materially, but in a pecuniary sense, the position of affairs is not satisfactory. Many of the Companies have been wound up and it is quite sufficient to mention the words electric light to cause the capitalist to close his purse. There are still advertisements in the papers of batteries of high electro-motive force and low resistance capable of doing wonders in the way of electric lighting, and there is now before the public a Library lamp, "the Regent" which is said to be a wonder. If so, the sooner the money is found to start it the better. No one will be better pleased than I shall be to hear of the success of any invention which will provide a good portable electric light suitable for reading purposes, but so far as I can ascertain, we are just as far off as ever we were from obtaining this desirable article and though such a thing is not altogether an impossibility, there is no lamp in the market which I would recommend any one to purchase for use in Ceylon.

"The incandescent light is only suited for enclosed areas, so much so that I am assured by the engineers in charge of the installation at the British Museum, that no number of incandescent lights would satisfactorily light up their vast Reading-Room which is now so admirably illuminated by five arch-lights. Judging from the flicker which is observed in most of the arch-lights which are seen in different places in London, it would appear very difficult to avoid this unpleasant movement, and I am informed that however much this quivering in the light may be controlled it will never be suppressed altogether. The Reading-Room of the British Museum, where the arc-lighting is almost perfect, is the best exhibition I know, of arc-lighting on a large scale, for not only is this quiver hardly perceptible, but the light undoubtedly consumes carbonic acid gas and in this and other ways has a decidedly advantageous effect in purifying the atmosphere.

"Given sufficient horse-power—the most important consideration—and if due regard be paid to cleanliness, Electric lighting may be worked with very little trouble. It is so vastly superior in many respects to gas and oils that it must in time supersede them. Mr. Preece, F.R.S., the other day, remarked at a meeting of the Telegraph Engineers, that no one who has experienced the advantage of having his house lighted by Electricity knows what it is to live until he exists under the influence of the Electric light; the introduction of which will, he says, do more good for society than all the sanitary institutions of the world. This is going a little far, but there is a great deal more truth in Mr. Preece's remarks than most people will be prepared to admit.

"In Ceylon and India we want a light which is not accompanied by heat. For small installations the engine and its management is the chief difficulty, and I am in hopes that something may be done to take advantage of the wind which blows so steadily at Colombo for the greater portion of the year. I am now endeavouring with the aid of Messrs. Siemens Brothers to put together a plant consisting of a windmill, a storage-battery and a dynamo. The windmill can be worked day or night in turning the dynamo which will charge the battery. There are difficulties in the way; but, if an effective and, at the same time, not too expensive storage-battery can be used, there is no reason why the scheme should not answer. As soon as we have given the arrangement a fair trial, I will communicate the results to you.

"In the meantime, I intend to see a great deal more of what is being done in the way of Electric lighting, in the hope that I may come across something which may be useful to us in Ceylon. Quite as serviceable as the Electric light will be a good Electro-motor when such a thing is invented, but I cannot go into this subject today."

"Rushing into Tea," we are told may be one bad result of the perusal of our yesterday" article. But where is land available we may ask ? No one surely would prevent planters who have estates capable of transformation from going ahead ; but apart from this, the Crown blocks the way effectively, by only offering some 5,000 acres per annum of new land for tea cultivation. How long planters may have to wait for the Adam's Peak or other reserve lands suited to the culture, no one knows.

OUR TEA INDUSTRY:

PROPOSED CEYLON-AUSTRALIAN TEA AND TROPICAL PRODUCE COMPANY.

Our shrewd and esteemed friend "Old Colonist" has not been idle during his present visit to the Colony in which the best part of his life was spent and in which he, in over a score of years' residence and hard work, gathered up an experience of the practice and conditions of tropical planting which has since placed him in the forefront of our planting critics and authorities.

Mr. Arthur Sinclair,—to whom we refer and who sails this evening (Nov. 4th) for Australia—is we understand, hopeful of forming still another Ceylon Tea and Tropical Produce Company, more directly linking us with the Australian Colonies. Our Australian cousins are the greatest tea drinkers in the world and though hitherto they have been content to use almost exclusively the China leaf there, as elsewhere, it is already apparent that Ceylon teas only require a fair trial and that few who give it, care afterwards to revert again to Chinese Congous. The object will be to get as many as possible of those directly interested in the wholesale tea markets to take shares in the purchase of suitable land for tea cultivation, and few amongst all our planters, old and young had better opportunities, in olden times, of knowing where to select such and, than fell to the lot of "Old Colonist." The only fault we ever heard attributed to him (Mr. Sinclair) as a planter and capitalist was that he was "too cautious." This ought to be a recommendation certainly to his supporters in the present case, but with caution, we have no ordinary shrewdness and experience of Ceylon combined—so that success ought to be assured.

After a careful inspection of the up-country tea districts, Mr. Sinclair we are glad to hear, is perfectly satisfied with the thorough soundness of the rising enterprise and we can only wish him every success in his efforts, to add another to the thriving Ceylon Tea and Produce Companies already in existence.

NUWARA ELIYA VEGETABLES.

Our chief towns are now likely to be well supplied with English vegetables, first Mr. Young advertised his good supply ready for the market and now Mr. A. Whyte comes before us, with a fuller list of what he can offer. The one difficulty with growers is to find ready *sale* when the vegetables are ready; and a number of standing weekly orders are what are needed to make this a paying experiment. The railway charges for packages of vegetables are now much lower than formerly; they run as follows:—

Cost of parcels of vegetables from Nanuoyato Colombo by passenger train:—From 1 to 5 lb., 50c.; 5 to 10 lb., 63c.; 10 to 20 lb., 93c.; 20 to 40 lb., R1·15; 1 cwt. vegetable R2·60.

The vegetables just sent to us by Mr. Whyte are certainly all that could be wished—fresh and crisp, succulent and tender and fully, but not over grown. We could not wish for finer specimens of English vegetables. In sending them Mr. Whyte writes:—"I send you a box of vegetables which you may look on as a sample lot of what we can do. The collection consists of 33 varieties—not such a poor list, considering I have not yet been a year at the work up here and have had to break up and clean rough grass land to operate on. The list includes:—1, sweet little E. York cabbage; 2, red pickling cabbage; 3, carrots; 4, turnips; 5, lettuces (cos and cabbage); 6, cauliflowers; 6½, spring onions; 7, Scotch kale; 8, beetroot; 9. salsafy or vegetable oyster; 10, artichoke; 11, vegetable marrow; 12, celery; 13, green peas; 14, long runner beans; 15, knol-khol; 16, endive; 17, leeks; 18, parsnip; 19, radish; 20, rhubarb; 21, brussel sprouts; 22, chou-chow; 23, tree tomato; 24, horse radish; 25, parsley; 26 to 33, thyme, sage, marjorum, sorrel and other herbs.—No. 9. salsafy, you may not be acquainted with. It is a regular 'bon-bouche,' is cooked first plain boiled, then pounded up and fried as oyster patties or spread on toast. No. 22, is the new perennial vegetable marrow and is cooked and served with white sauce just as vegetable marrow is. No. 23, the tree tomato, makes a delicious tart or jam. I was to send a dish of mushrooms and one of strawberries, but our beds of the former have been too closely picked and some of my friends, the insectivorous kinds are unfortunately also frugivorous and have pretty well picked the strawberries for me. However, you shall have them another time. When all our new things come into season, I shall have no less than 40 varieties of vegetables available and ought to be able to suit the most fastidious tastes. As these vegetable gardens (over three acres now in vegetables) are the first that have been opened and worked systematically to test the question of 'will it pay?' I think, we deserve encouragement and support, and rail-fare is now cheap for vegetables. By the way while on the subject of gardening, I may mention I have of late been very pleased to learn from several quarters that the cultivation of the splendid yams of the West Indies, which I introduced years ago, has at last been taken up by many of the intelligent Sinhalese of the low-country and others. The delightful little purple '*cush-cush*' yam is evidently the favorite, and is being planted up by some in quantity, so that, I suppose, ere long these really delicious and delicate roots, will soon be offered for sale in our Kandy and Colombo markets and form a most agreeable change, from the everlasting and in too many cases inferior bazaar potatoes.

A WARNING TO TEA PLANTERS.

(From *I. A. Rucker & Bencraft's Weekly Tea Circular*, Oct. 14th.)

Ceylon Teas.—"Bulked Unassorted."—We are glad to see how those who have followed our persistent recommendations to adopt this plan have profited by the same. A very striking instance of the advantage to the planter occurs in this week's sale. The produce of an estate has been apparently dealt with experimentally with a view to testing the correctness of our information. A portion of it has been subdivided in the usual manner into Broken Pekoe, 2 Pekoes, Pekoe fannings, Dust, and Pekoe Souchong, giving the already over-worked dealer six more samples to value than was necessary. A very high price was obtained for the few packages of Broken Pekoe, the remainder of the laboriously assorted parcel pulling down the average to *one shilling and one penny farthing per lb.*

The "Unassorted" portion, one sample only representing the bulk, fetched without trouble *one shilling and five pence farthing.* Loss by dividing into six breaks the remainder of the packet, 4d per lb., in this case nearly £300 sterling say Rupees 4235.

A reference to our Circulars of November 5th and November 26th, 1885 January 14th, March 4th, June 17th and 24th of this year, might have saved much money. [Whose tea was this?—Ed.]

DEATH OF MR. MOENS, THE DUTCH QUINOLOGIST.

Many in Ceylon as well as in Java—and indeed wherever an intelligent interest is taken in the scientific culture of cinchonas,—will hear with much regret of the death of Mr. Moens. We can well add our own testimony to that which follows as to the special attainments, ready courtesy and genial hospitable disposition of the deceased gentleman. We are glad to put on record, so full a notice of our friend as is given in the journals from which the following is taken :—

[*Translated for the "Ceylon Observer" from the Indische Mercuur of 9th October 1886.*]

Johan Card Bernelot Moens, our friend and fellow-laborer, unexpectedly succumbed to a short illness on the 2nd October. In him Netherland loses one of her most meritorious sons in scientific and colonial interests. And not only Netherland, but many friends and kindred spirits through the civilized world will lament his death as an irreparable loss. Since Netherland was restored from her deep humiliation to her position as an independent state, she has had but small weight in the scale of nations. Instead of being, as in olden times, the leader in Europe, she has generally occupied the back ground, and she would in effect have shrunk up into an insignificant and forgotten little land, had she possessed no colonies, and no men to strive in those Colonies with giant might. In the introduction of the cinchona tree into Asia from America, Netherland really set the example, and maintained her ancient renown. And this cultivation, of such vast benefit to all humanity, and which commence under the skilful guidance of the veteran leaders Korthals, Hasskarl and de Vrij who survive—has in a great measure to thank Moens for its success and development.

Born at Kratingen in 1837, he devoted himself from his sixteenth year to the study of Pharmacy and the teaching of the late Professor G. J. Mulder who trained so many learned chemists, directed the course of his life's labor. He went to Netherland's India in 1858 as Military Apothecary of the 3rd class, and in 1866 he had already attained the 1st class.

Heer K. W. van Gorkom who at the time directed the Government cinchona cultivation at Bandong did not long remain unacquainted with the extraordinary zeal and ability displayed by Moens in chemistry—and as early as 1866 Moens stood by him as a trusted friend with counsel and co-operation.

It was just then that the discovery of cinchona Ledgeriana had tended greatly to develop cinchona cultivation. Consequent on the large yields of alkaloids obtained from this sort it assumed the first place in general estimation, and of the earlier known sorts, only officinalis and succirubra were retained. Chemistry had now to come forward to shew how by cultivation the greatest development of alkaloids could be brought about.

And when in 1872 the Government appointed Moens to be Chemist to the National Cinchona Cultivation, the way was prepared for important improvements and for adding to the national name. "A new era," said van Gorkom, "was then opened that constantly brought striking facts to light, and gave more positive form and greater strength to the development of the cultivation." Three important processes were about this time brought into practice by the zeal and perseverance of Moens: the partial stripping of the bark and protecting with moss and other covering (first employed by McIvor at Madras), the collection of bark by scraping, and the propagation of cinchona trees by cuttings. Let a word of homage here be paid to the late Director of the National Botanical Garden, Scheffer, who co-operated with Moens and to Messieurs van Romunde (the present Director) and Venlemans, who have latterly continued his work. The destructive disease of the cinchona trees was discovered by the researches of Moens to be caused by an insect and thus the way was shewn for counteracting the evil as much as possible.

On the nomination of van Gorkom as chief inspector of cultivation in 1875. Moens was appointed to succeed him at the head of the cinchona cultivation—of which he was in sole charge for four years, till in 1879 Heer van Romunde was sent to his aid. In 1880 Moens was commissioned by the Government to undertake a voyage to Ceylon, Madras and Bengal for the purpose of examining the cinchona cultivation in those countries. This voyage, of which he published an account in December 1880, contributed not a little to establish the value of the new processes. In 1883 after a residence of 25 years in India he obtained two years' leave for the restoration of his health, and in 1885, at his own request he was honorably relieved from his office of Director of the cinchona cultivation. Soon after his return home he was charged by the Government with the analytical examination of the cinchona bark imported from Netherlands India. With great zeal and scientific conciencetiousness he acquited himself of this task up to the time of his death. His labors survive in the great work he wrote, entitled "Cinchona Cultivation in Asia," containing a full review of the cultivation from its introduction in 1851 up to 1882, illustrated by five photographic plates by Carl Lang. This work written in Dutch has obtained an international celebrity as well as his minor writings and numerous contributions to the *Indische Mercuur*, which were always republished in the English and German scientific and commercial periodicals. Notwithstanding that he was highly appreciated abroad, Moens remained always a warm patriot—he shewed this especially by the intense perseverance he displayed in protecting the Netherlands cinchona market from the overwhelming influence of London. By constant struggling for the Netherlands quinine manufacture and by conscientious valuation of the imported bark, he succeeded in preserving that market for Netherlands until now. During the most unfavourable crisis of the cinchona prices he frequently exclaimed "We can hold it no longer"—and only an expert can judge how painful such a regret must have been.

Moens was an honorary member of the Society for the Advancement of Medical Science in Netherlands India, and of the Netherlands Association of Industry ; corresponding member of the Royal Academy of Science, and member of many other learned Societies at home and abroad. He was made a Knight of the Netherlands Lion 1871. Married in India to Augusta Schenck. He leaves 5 children of whom the oldest is 19 years old, and the youngest barely one year of age. Moens was a quiet and retiring man, never coming uninvited to the front. He always sacrificed his personality to the great work for which he lived. But those who knew him intimately soon learned to appreciate his clear understanding and rich experience. There was something sombre in his appearance, but on his cherished subject he spoke with warmth and enthusiasm. He was far from being partial and

was quite at home on scientific, technical and social subjects.

For many years, I was in correspondence with Mr. Moens and became personally acquainted with him in 1883. To me in the Colonial Museum he was an invaluable oracle and counsellor. In him I lose more than I can now realize. And what is to become of our cinchona cultivation now that its great champion is stricken down? Shall that gigantic work at which so many of our best laborers have wrought now tend to its fall? Scarce ten days before his death, Moens paid me a visit, apparently recovered from a short but severe illness. We spoke of the Colonial Exhibition in London, which he would willingly have seen. He seemed worn out and sad, and in his voice there was a peaceful resignation. It was as though he misdoubted repose after a long and exciting labour. We parted and he promised to return soon . . . So pass all things away, but not the grateful remembrance of such a Netherlander as Bernelot Moens.—Haarlem, 5th Oct. 1886.

F. W. Van Eeden.

From the English *Chemist and Druggist* we quote as follows:—

Mr. Johan Carel Bernelot Moens, the celebrated Dutch quinologist, died at Haarlem on October 2nd after a short illness. Mr. Moens was born at Kralingen, near Rotterdam, in 1837, and studied pharmacy in Holland. At the age of twenty-one he left for Java having been appointed pharmacist of the third class in the Dutch-Indian army. Mr. Moens rapidly advanced to the position of military pharmacist of the first class, and showed special proficiency in chemical studies. Shortly before 1866 he made the acquaintance of Mr. K. W. Van Gorkom, then director of the Government cinchona plantations at Bandong, in Java, and soon found himself on terms of intimate friendship with that gentleman. About this time the discovery of *C. Ledgeriana* gave an extraordinary impetus to cinchona planting. The Ledgeriana bark, with its richness in alkaloids, gradually superseded most of the other cinchona varieties, the officinalis and the succirubra only being able to hold the field against it. It was found necessary to call in the aid of experienced chemists in order to perfect the cultivation of cinchona by showing how to obtain the largest possible percentage of alkaloids. Accordingly in 1872 Mr. Moens was appointed chemist to the Government cinchona plantations, and it was in this capacity that he created his reputation as a quinologist. The three principal discoveries in cinchona cultivation for which we are indebted to Mr. Moens are the propagation of cinchonas by grafting, the obtaining of bark by shaving, and stripping of part of the tree, covering the naked parts with moss, This latter process was first practised by Mr. Maciver at Madras. Mr. Moens's researches have shown that the disease to which cinchonas are subject is caused by an insect, and rendered it possible to successfully combat the disease. 1875 Mr. Moens was promoted to the directorship of the Government cinchona plantations, which post he filled unaided until 1879, when Mr. Van Romunde, the present director, was appointed as his assistant. In 1880 Mr. Moens visited Ceylon, Madras, and Bengal, in order to report to his Government upon the condition of cinchona culture in those countries, and in 1883, after a quarter of a century's residence in India, he obtained leave of absence for two years, his health having broken down He never returned to India, but was at his request relieved from his post under the Government and charged with the analysis of the Java barks imported into Holland. His work on "Cinchona Cultivation in Asia" contains a complete account of the introduction of the tree in the East Indies, and the progress of its cultivation. Mr. Moens's death is a severe loss to those interested in the Amsterdam cinchona market, for it was to a great extent owing to his talents and energy that that market has not long since succumbed to British competition.

PLANTING IN JAMAICA

(From an ex-Ceylon Haputale Planter.)

Jamaica, 12th Sept. 1886.

You may imagine with what pleasure I look forward to a regular perusal of your most valuable periodical. I have heard two or three persons here speak in the highest terms of your monthly gazette, the *Tropical Agriculturist*.

As you have expressed a desire to receive some news from this part of Jamaica, I will endeavour to give you from time to time a few notes of planting and general interest. Within the last four months the island has passed successively through an earthquake, a flood and a hurricane, all three visitations doing more or less damage to estates, houses, roads and railways. American intelligence would lead us to expect another hurricane in October, but I sincerely trust that we may be left in undisturbed security for many a long day.

Coffee.—Crops are over and the majority of estates have picked their estimates which although not large will leave a fair margin of profit to proprietors. This year prices in Liverpool are extremely good and but little inferior to those of last season. In the matter of value, I am glad to say that this estate's coffee came third in the last "account sales." The marks and prices are as follows:—Clifton Mount 136s, Radnor 131s, Chester Vale 127s, per cwt. At one time prospects for the coming year were good. But the Blue Mountain properties have suffered so often from wind and rain in the past twelve months, that the crops will be as small as those gathered in 1880 I am afraid. Last month when a good blossom was looked for we encountered the hurricane of which I have spoken elsewhere. During the last six years Jamaica has suffered from drought, but we are now supposed to be entering a wet cycle, and it is to be devoutly hoped that such is the case, for our planting of both cinchona and coffee has been more or less, a failure of late.

Cinchona.—The three or four plantations that hold land from the Government under certain "conditions" are gradually planting up the required acreage to qualify for a title, but otherwise no extension is being made in this direction. The present state of the market is anything but encouraging and indications are not wanting that the great mortality amongst trees of all sizes, is not alone peculiar to Ceylon.

Tea.—At the Government Cinchona Plantation some four acres, mostly Assam Hybrid, has recently been put in. They look healthy enough but appear to grow very slowly. I have not seen the Portland Gap clearing lately, but as the plants were exceptionally fine and the elevation more suitable, they should be showing up well by this time. No private individuals as yet have taken to the planting of tea in the island. Before closing my remarks on this industry, I cannot help giving praise to Mr. Hart of the Cinchona Plantation for the first class samples of hand-made leaf which he has produced. To one unaccustomed to drink anything but China tea its superiority is not always detected, or appreciated, but there is no doubt that this Jamaica sample, like Ceylon Tea is refreshing, strong and economical. Mr. Hart has manufactured several lots and I think I may say he goes on improving. But in the roll of the leaf there is yet room for great improvement. The above remarks I should not feel justified in making, had I not had some little experience in the "Lane," before coming out to Jamaica. In the early part of 1880 when I was established in a small way as a tea dealer, I submitted a splendid sample of Ceylon Tea to a broker. I tried to impress him with the special quality of this tea, but I am sorry to say he was not deeply enamored with it.

He admitted that the liquor was strong, but said that the leaf was badly made and the infusion rough to the tongue. How things are changed since then! He valued the sample at 1s 4d to 1s 6d and I know that the same tea was selling at 5s per 2lb packet.

Bananas.—Nearly the whole of the year the demand has been far above the supply of this fruit, The price for a long time remaining at £12 per 100

bunches. At this rate Bananas pay as well as anything cultivated in the island. Unfortunately, a vast amount of damage has been done to all the seaside properties by the wind in August.

CINNAMON CULTIVATION IN THE SOUTHERN PROVINCE.

(*From a Correspondent.*)

Of late years the cultivation of Cinnamon has greatly spread in the Southern Province, and it is interesting to note that Sinhalese capitalists are largely interested in the new plantations which have sprung up in Amblangoda, Wallahanduwe, Vowlagalla, Hapugalla, Matara, &c. The plantation spice from these estates is said to be of excellent quality, and the produce is readily taken up by the Galle merchants for export to Europe. The present market price all round is quoted at 36 cents per pound first cost. Our informant states that there are nearly 100 plantations and gardens now, whereas formerly there were scarcely half a dozen. To Mr. Simon Perera, the owner of the large estates in Galle, belongs the credit of having embarked so successfully in the cultivation and preparation of cinnamon in this province.

OUR CABINET WOODS.

We confess to a feeling of disappointment that the several reports appearing in the London *Times* and other home journals of the Conference lately held at the instance of Messrs. Ransome & Co. upon the Cabinet Woods exhibited at South Kensington this year, should make no reference to those of Ceylon. While the products of India, Australia, Borneo, &c., are the subject of remark, those of Ceylon are entirely left out of sight. This can scarcely have arisen from want of prominence given to the collection of Ceylon woods sent home. Indeed from various correspondents we have received the assurance that that collection is very complete and full; while we know that the magnificent calamander wood furniture sent to the Show by Mr. De Soysa has been made the subject on many occasions of highly eulogistic comment. It may be, however, that our exhibits in this particular have been somewhat deficient in the special form in which our many cabinet woods might have been shown to the best advantage. It is well-known that many of the most beautiful grained woods may be passed over as undeserving of notice if the proper treatment has not been applied to them to show off their graining. The colour of many of the timbers most in request for the making of furniture is due, it is well-known, to artificial treatment. The American walnut, now so extensively employed in England, and, perhaps, the most generally popular at the present time for Cabinet work, remained for many years a perfect drug in the London market, unused and even unenquired for. It was not until some expert either devised or learned from America the character of the dye or varnish required to develop the colour it is now made to assume that the trade commenced to use it. When once, however, this necessary process was attained to, the demand for the wood became almost excessive, beyond indeed what the export from the American forests could supply, and the result has been that it has risen enormously in price, nor is there we understand, any sign that its appreciation is decreasing.

Now a similiar result might have followed if many of our woods sent home to the Indian and Colonial Exhibition had had their qualities developed by some such treatment. It cannot be said that the wood of the *jak* in such common use among both natives and Europeans in this island is in its untreated condition very attractive looking. Indeed, its bright yellow colour when new may almost be said to be repulsive to the eye. As a rule, it is left to time, and to the effects of what is known as continued "elbow polish," to develop its really beautiful colouring. The beautifying effect can, however, be produced by artificial means. If the wood is washed over with a solution of lime,—which has the effect of at once deepening the colour,—and then treated with the common native wood varnish, an appearance of dark polished oak will result, and several intances are familiar where this treatment has been successfully adopted. Among our native woods, nadoon perhaps, comes the nearest in colour to the prized American Walnut in its virgin state. But its grain hardly possesses the variety and beauty to be found in some of the finer specimens of the transatlantic wood. Nevertheless we believe our local product might well rival the American, in the estimation of home wood-fanciers—to coin a term—if it were placed before them in an attractive form. The method which has become of late years so fashionable with English cabinet-makers of incising patterns in the dead unpolished wood, and relieving them in gold, seems to many judges, to be specially applicable to the nadoon, the natural colour of which would afford a striking contrast to the bright gold of such incised patterns. The roots of the suriya too possess a variety both in grain and colouring which probably only demands scientific treatment to be devoloped to suit the taste of home manufacturers.

Of Ceylon ebony and satinwood it is scarcely necessary that we should speak. They are too well-known, and too generally appreciated already, to call for special remark. Nor do they, indeed, come within the category of the woods which are the present subject of attention. They are widely grown in many other countries besides Ceylon, and although our island growths possess attributes which cause them to be largely in demand, the sources of general supply are, as we have said, too varied to cause us to feel disappointment that they should have been passed over without remark in the Conference to which we have alluded. But we think that that omission may have taught us a useful lesson. On future occasions which may occur, for exhibiting our island products in England,—such perhaps as may be one day afforded by the formation of a Museum for the proposed Imperial Institute,—we should endeavour to show furniture made after modern patterns from those of our woods which seem likely to be new and unknown to the trade at home. We feel that Ceylon has no reason to hide its head in this particular class of exhibit, and we feel that if our furniture-makers would bestir themselves, and if they were aided by some European advice as to the best means of developing the colour and grain of our native woods, very useful results might be attained. In our *Tropical Agriculturist*, we are republishing the full reports which have appeared on the Timber Exhibits, as the result of the Conference referred to, and although there is no direct mention of Ceylon woods, the information given is both instructive and locally interesting.

COFFEE PESTS—FUNGI.

Coffee planters are just now bewildered by an old disease in a new shape, which is likely, if not immediately checked, to cause much loss in crops, and some indeed look upon its destructive results as a graver calamity than bug, borer, &c. We allude to the disease known as leaf rot, of which there are several forms recognised—as black rot, mildew, &c., &c., caused undoubtedly by a superabundance of young wood (requiring handling off) and excessive moisture. These, however, are easily remedied by opening out the centres as soon as possible, and sickling the weeds which at this time of the year grow apace and shut out the light and air. But the disease is assuming quite another phase, and it is rather difficult to assign any reason for its appearance. We are inclined to the belief that it is a severe kind of *fungi* the spores of which enter the epidermis or bark, and cause disease in the first instance in the leaves which after, wards extends to the fruit-bearing portion of the tree as well as the fruit, all of which in course of time or near the close of the rainy season, drop off. The fungus acts by feeding on the juices of the plants, preventing the elaboration of the sap, obstructing the admission of air and the emission of transpired fluids. The limbs of the trees being thus overcharged with moisture, ultimately rot, while every source of nutriment is cut off from the half developed berries, which also rot and fall off.

There may, however, be another cause, which is necessary for the spread of *fungi*, occasioned by the roots, in which may be traced the want of correspondence between absorption and transpiration and a consequent stagnation and decomposition of the juices.

An estate which suffered considerably last season in this respect, was at once take in hand by the energetic Superintendent, by pruning back the trees to their primaries, removing all moss and lichens from their stems, renovating and manuring, which treatment within a month (September) directed the nutritive matters in the directions of the increase and development of subterraneous as well as aerial branches: the result is astonishing and shows that nothing but careful and high cultivation is necessary to bring the trees to a healthy state.

But in South Wynaad we learn that the disease is making great havoc, having assumed the form of an epidemic, and the planters scarcely know how to control it. We have adduced the above for their information, as we think it well worthy of imitation. Our opinion inclines us to the conviction that the sudden change their estates have undergone this year, from long and extreme drought and heat to sudden and excessive rainfall and moisture,—which we hear in Vythery alone has amounted to over 150 inches since May—has produced the phenomena. The drought must have brought the trees to such a low state of exhaustion, the spring showers having failed, or they might have gradually recovered with steady and moderate showers, and thus have regained strength and vigour for the monsoon. Thus when the rains did set in, they came on with a force and copiousness not known before; the trees being sickly were unable to benefit by it, and they became diseased in the manner described. The subject threatens to become one of very grave importance, so we trust planters will come forward with their views and opinions and see what can be done to put a stop to and evil which easily grows.—*Nilgiri Express.*—[This black rot has always been more prevalent in Southern India than in Ceylon, but it seems now to have appeared in a form of intense virulence. Alas poor coffee!—Ed.]

A Rival to Dr. Hewett.—The *Moniteur des Produits Chimiques* is informed that Professor Fischer, of Munich, after an extended research on the nature and properties of quinine, has discovered that a substance may be extracted from coal-tar which exercises on the human organism an action identical with that of quinine. The substance appears in the shape of a white crystalline powder. Administered in cases of fever it has the effect of rapidly lowering the temperature, and its efficacy in this respect is stated to be so remarkable as to permit the use of ice to be dispensed with; in the stomach the wonderful powder assimilates with even greater facility than does quinine.—*Chemist and Druggist.* [We wait for "more light."—Ed.]

Tea in Japan.—A dispute has arisen between Messrs. Mourilyan Heimann & Co. and the Mitsui Bussan Kaisha, as to the rejection of a quantity of tea which the former firm alleges is not up to sample. As the result of correspondence between the buyers of the tea in question and the Yokohama Tea Brokers' Association, a meeting of foreign tea buyers was held on Wednesday, at which it was resolved to appoint a committee to act with Japanese delegates in the arbitration of disputes between foreigners and Japanese. A committee of three was elected to bring the question before the Japanese brokers. A slight decrease has taken place in the volume of tea transactions, prices ruling firm all round. There must be heavy losses upon Japanese teas this year. Their selling price in New York was never before so low. It is strange that while the price of Chinese and Japanese teas shows a steady tendency to decline in Western markets, that of Indian and Ceylon teas goes slowly but surely upwards. This fact, taken in conjunction with the largely increased production of India and Ceylon, seems to indicate that Japan and China may one day or other be completely ousted from their monopoly of the fragrant staple. Perhaps we should limit the prediction to China, for Japan has the good fortune to possess the *entree* of the United States markets, where black tea is not popular.—*Japan Weekly Mail*, Oct. 2nd.

Artificial Quinine.—Messrs. Brookes and Green, of 25, Mincing Lane London, state in a recent Market Report:—"No sooner does the 'silly season' est in than the daily press astonishes its readers by announcements of 'remarkable discoveries' which are to 'revolutionise' either this or that particular industry. Last autumn a London journal published the startling intelligence that the present sugar industry—beet as well as cane—was to be annihilated by the wonderful returns of sugar which it claimed could be obtained from the *mahwa* or *mowra* tree of Hindostan. As was pointed out shortly afterwards, this was nothing but a Munchausen story, since the flowers in question contain only 1·04 of saccharine matter, and even that small quantity is fit for nothing but brewing and distilling purposes. We believe it was the same morning journal that reproduced the American hoax of the new species of cotton tree with pods weighing each from 2 to 3 lb., by which the cotton trade was to be 'revolutionised.' This year the same newspaper brings forward a 'remarkable discovery' of the artificial mode of making quinine, which will, we are seriously told, bring down the price of that drug to something like 3d per oz. We are also told that this important discovery 'was made by the accidental breaking of a medicine bottle.' But, as we are well aware that all great discoveries are usually the result of accident, this need not surprise any one. The really extraordinary part of the story is that good quinine 'can now be manufactured without limit by a very simple process from an article which can always be got in abundance in any part of the world.' In order to round off the story, it should have been stated that the artificially-made drug had been administered in cases of fever with the most satisfactory results; but to this extreme the inventor, doubtless with a discreet regard for his patients, appears not to have gone. We have the best authority for stating that the announcement that an eminent firm of manufacturing chemists has expressed itself favourably with regard to the alleged discovery is entirely false. It has yet to to be proved that anyone has really succeeded in producing so complex a body as quiniue synthetically; and it is extremely improbable that even if produced at all, it could be made at any very low price. Before such statements are accepted and published by any newspaper it would be strongly advisable to have certain evidence of their correctness."—*Madras Mail.*

A RUSSIAN PLAN to extract rusty screws is to heat a flat iron bar to a cherry red and press it in the head of the screw for a couple of minutes, after which the screw becomes loosened, and is easily extracted with a screw driver.—*Nilgiri Express.*

CINCHONA PLANTATIONS.—At the request of Mr. M. A Lawson, Government Botanist and Director of Cinchona Plantations, Government have sanctioned the abandonment of the Kalhatti Cinchona Gardens on the Nilgirris from the commencement of the next official year. The Collector has been instructed to dispose of the site in the manner most advantageous to Government.—*Madras Standard.*

PERFECT INSULATORS.—Some experiments lately brought before the Paris Academy by M. Luvini, combine with those of other observers (he considers) in warranting the conclusion that "gases and vapours, under any pressure, and at all temperatures, are perfect insulators, and cannot be electrified through friction, either with one another, or with solid or liquid substances."—*Nature.*

YOUNG BABOON.—Mr. H. H. Johnston informs us, (*The Kilima-Njaro Expedition*), that when in East Africa, he shot a baboon, young and tender, which he had cooked and ate. "I can only say that the succulence and quality of this creature's flesh were quite unexceptionable." He writes of having met elephants at the elevation of 13,000 feet, says they mount banks with the agility of goats, and is convinced that the elephant "can easily adapt himself to a mountain life."—*Nilgiri Express.*

COFFEE ROLLS.—Take twelve cups of flour, one of white sugar, one half of butter or lard, one of yeast, one grated nutmeg, and three eggs. Mix with three large cups of warm milk, and let it rise over night; if well risen in the morning, knead and set in a cool place until three o'clock in the afternoon, then shape into long rolls, and let them rise one hour and a half. Bake half an hour in a moderate oven. When done, glaze them with a little milk in which a little brown sugar has been dissolved and set them back in the oven for two minutes.—*Appledore Cook Book.*

NATAL TEA.—Our Tea Correspondent, the "Peripatetic Planter" was kind enough to send us two samples of Natal tea, which our Managing Agents, Messrs. Balmer Lawrie & Co., were good enough to have sampled and priced for us by a tea expert with the following result:—"*Natal Tea.* —The two samples of Natal tea, leafy broken Pekoe Souchong and rather open leaf Broken Pekoe, are not unlike Indian or Ceylon tea in appearance; in liquor they are softer, more like the China manufacture. I should describe the liquor as rather dark soft not strong; they want the strength and pungency of Assam teas, the outturn is dark, the quality generally not good: value in Calcutta today 6-3 annas broken Pekoe Souchong, 8 annas Broken Pekoe.—*Indian Planters Gazette.*

FLUID EXTRACT OF CINCHONA.—At the request of the Surgeon-General, her Majesty's Forces, Government have ordered a certain quantity of the new preparation of cinchona—the fluid extract by Mr. Hooper, the Government Quinologist—to be placed at his disposal, for trial in Upper Burmah, as there appears to be a large amount of inefficiency caused by fever in that country. To give publicity to the preparation, Government have approved of the suggestion of Dr. Bidie, to issue the drug gratuitously to certain charitable dispensaries, both for experimental trial in hospitals and for issue, free of charge, to outdoor sick in quantities not exceeding one ounce. This gratuitous issue is to be continued for one year, subject to a report at the end of that period. —*South India Observer.*

NORTH BORNEO, Oct. 7th.—His Excellency the Governor arrived from Sandakan, in the steam launch "Kimanis" on the evening of 31st August, on a visit to the West Coast Stations. The following day the Governor, accompanied by the Resident, rode to the Hakka Settlement. The gardens were looking fairly well but the men appeared to be planting up more land than they could look after properly. The Liberian coffee, tea, pepper, &c., were all growing luxuriantly. A visit was next paid to Limau Limawan, a small island lying five miles south of Kudat, and leased to the Imaum, Hadji Abdul Drahim, who first opened a settlement there towards the end of 1883. His village now contains a prosperous community of about three hundred souls. On September 3rd the Governor, the Resident, and Mr. Christian proceeded to the German Borneo Company's Estate at Limbuac, Banguey Island. His Excellency was much pleased with all he saw, and the party walked to Mitford covering the distance of a little over seven miles in a couple of hours. The road was found to be rather rough in some places. On the way to Kudat, in the launch the S. S. "Hong Ann" from Labuan was sighted off Muliangin, and Capt. Slaker kindly stopped her and delivered the mails, Owing to news received the Governor after a short stay in Kukad returned to Sandakan. Mr. Christian, a Ceylon planter, is opening an estate for Liberian coffee, cocoa, &c., three miles from Kudat on the road to the Hakka Settlement. The late Mr. T. Parry, examined this land at the request of the Resident, and thought there were five hundred acres of as good soil as that found on the Pangkalan River Banguey.—*British North Borneo Herald.*

NOXIOUS WEEDS.—On Tuesday evening the assembled wisdom of the colony collectively shirked the task of defining what is and what is not a noxious weed. Probably our legislators considered that the powers of Parliament are already sufficiently large without adding to them the function of making botanical classifications. But, impressed as they evidently were with the importance of constructing a correct definition, it was too bad of them to hand that duty over to the divisional boards. There is no saying what may be the consequences to posterity—who are our favourite clients nowadays—of arming these unscientific bodies with power to exterminate from the face of the land whatever they may choose to place under the category of weeds. Even if they should go no farther than sida retusa, prickly pears, and thistles, one may be pardoned for contemplating with somewhat of fear the extirpation of these fecund and hardy races. The secrets of Nature are nothing like half-explored yet, and who knows what potentialities of textile fabric may perish with sida retusa, what famine-defying ensilage with the prickly pear, what fortifying elixir with the thistle? What will posterity say if the virtues of these races, here exterminated, should be discovered in some other country, and the Government of the future be compelled to import them, like the American seed maize, and distribute them at so much a root? As the extirpation of these "noxious weeds," provisionally so-called, will cost a deal of money, it really becomes an important question whether it would not be as well to set aside a fair share of it as rewards for the successful interrogation of Nature as to what she had in her eye when she created them. Failing this—for the endowment of research is not likely to commend itself to the divisional board mind—by all means let us, in the interest of posterity, have sida retusa reserves, prickly pear reserves, thistle reserves; and, if even this simple suggestion should fail to find acceptance, we call upon all whose hearts yearn over their unbegotten descendants to put away privily a root or two of each of those doomed vegetables, where the divisional eye cannot see them, as centres of future propagation. There will be no difficulty about it. In fact, it ought to be quite an easy matter to elude the notice of such short-sighted legislation.—*Queenslander.*

Correspondence.

To the Editor of the "Ceylon Observer."

TRAVANCORE PLANTERS AND THE *T. A*

Central Travancore, Oct. 1886.

Sir,—I note in the *T. A.* for the current month a letter signed by the Chairman of the Travancore Planters' Association accusing you of "perversion of facts."* I have turned up the April number of the *T. A.*, pages 704 and 712 and find nothing there to warrant such language. The Chairman had not the authority of the Association (as he would lead the public to believe) to write to you, and he should have been more careful before assailing your good name and placing the members of the Association in a false position. I as a member of the Association, and I know many others never heard of this matter until I read the letter in the *T. A.* I only regret you let him off so easily in your foot-note, but I know it is from the fact that you have always taken a warm interest in everything that concerns planting in Travancore and I hope you will continue to do so, notwithstanding our Chairman's foolish production.—Yours, &c.

A MEMBER OF THE T. P. ASSOCIATION

ORANGES AND OTHER FRUITS FOR ENGLAND.

Dear Sir,—Can you or any of your correspondents inform me of the best mode of sending oranges home (in small quantities) and what other Ceylon fruits can be sent?—Yours truly, ENQUIRER.

[If care is taken that the oranges are neither over-ripe, nor in the smallest degree bruised, and the boxes in which the fruit is packed stowed in a cool part of the steamer, there is no reason why the fruit should not be transmitted in good condition. We do not see what advantage would be gained by wrapping the fruits in tissue paper, or adding any packing material, if the packing is so done that the oranges would not roll about. We fear pines and plantains would scarcely stand a voyage of nearly a month, but some of our readers may have suggestions—the result of actual experience—to offer.—Ed.]

COFFEE AND PEPPER EXPORTS FROM WEST COAST OF INDIA.

Tellicherry, 25th October 1886.

Dear Sir,—We have the pleasure to hand you our usual statement of exports of coffee and pepper from the West Coast for year ending 30th June 1886.

Coffee.—The export of this produce for the year exceeds that of any of the five preceeding years, the largest quantity being shipped from Mangalore. Estimates in Coorg and Mysore were realized and in many cases exceeded and the quality of the coffee generally maintained. From statistics compiled by the Commissioner of Coorg, we gather that 103,420 cwt. of plantation coffee alone were exported from that Province, 70,260 cwt. of which found its way to Mangalore and Tellicherry, the balance 33,160 cwt. going eastward for shipment in Madras.

A glance at our figures will show that comparatively small crops are obtained every alternate year, and the coming one will not be an exception to the rule, for we regret to say prospects as regards quantity are by no means good; but we anticipate this will be to a certain degree counterbalanced by the better prices that will be obtained, the market showing a decided upward tendency, which with exchange in favour of the planter we would fain hope is indicative of a return of prosperity to the coffee enterprize. A small crop too, invariably means better quality.

Pepper.—The export of this produce for the past year in quantity almost equals that of 1882-83, when as far as we are aware the largest quantity was shipped; and we have reason to believe that larger quantities still will be exported in the course of a year or two as a far larger acreage under pepper has still to come into bearing, and as prices are maintained, the cultivation is highly remunerative to natives in whose hands at present it rests.—We are, dear sir, yours faithfully,

ppro ALSTON LOW & Co.
Ralph Tatham.

[For the table appended see our Handbook and Directory.—Ed.]

* We showed that the Chairman referred to extracts from Indian papers with which we had nothing to do, and some of which positively praised Travancore.—Ed.

Planting in Honduras.—The following advertisement in the *Field* is of some interest to Ceylon colonists:—Colonial Opening.—A gentleman, resident for the last seven years in British Honduras, has during that time purchased 20,000 acres in that colony, the more fertile parts of which are suitable for growing bananas, coconuts, oranges, &c., for the American markets (with which there is regular communication by steamer), and the rest for cattle grazing. He has spent considerable sums in developing the property, and wishes to find a Partner or Partners, with about £,3000 capital (to be expended on the property), to take the active management in a year's time. The colony has been English for over a century; is twenty days' steam from England, and has a good climate. The estate is already working at a profit, and the coconut trees planted are gradually coming into full bearing

Notes from Agricultural Letter: Paris, Oct. 2.—Sulphuret of carbon has proved a valuable agent for the destruction of ants. First, batten down the hills, then make a hole, and pour in one ounce of the chemical. The vapours will soon penetrate into the interior and not an insect, but will be killed. The operator must be careful not to go too near the fumes himself. To render barrels, wooden troughs &c., inodorous and impermeable, paint them with a preparation of quick lime and alcohol. This will make fir-wood as hard as oak. The alcohol will dissolve the resin and the lime will replace it in the pores. Wash off any excess of the paint. Mr. Petermann, Director of Agronomic station of Gembloux, has been experimenting with bone dust since three years to test its nitrogenous value. He finds that a top-dressing of this manure, given to winter wheat in March,—the soil being sandy-clay and fair—will increase the yield of grain 13 per cent.

The Colonial and Indian Exhibition.—The Conferences under the direction of the Conference Committee of the Exhibition recommenced this week, a paper being read on Oct. 6th, on "The Pearl Fisheries of Ceylon," by G. Vane, C. M. G. On the 8th, a paper will be read on "Canada as a Flax-Growing and Linen-Manufacturing Region," by E. B. Biggar. Papers will also be read on dates to be hereafter announced, on "Stock-Raising in Canada," by Professor Smith; on "The Climate of Canada," by W. Hingston; on "The Canadian North-West," by Captain Clarke; on "The Coco-nut Palm of Ceylon: its Products and other Uses," by J. Capper; on "Ceylon Tea," by J. L. Shand; on 'St. Helena: its Past, Present, and Future," by Lieut.-Colonel Palmer; on "British North Borneo and its Resources," by W. B. Pryor; on "The Social Condition of Cape Colony," by Spencer Todd, C.M.G. It is also probable that a second conference will be held by the National Fish Culture Association. It has been arranged, moreover, to hold a meeting for the purpose of testing the qualities of the different colonial timbers exhibited at the Exhibition. The object of the meeting is to bring together the leading civil engineers, timber merchants, builders, and other users of wood, to meet experts from the various colonies. Samples of the woods will be converted by machinery into railway sleepers, joinery, casks, spokes for wheels, &c., so that practical men will have an opportunity of seeing what colonial woods can be most easily worked, and for what purpose they can be utilised in this country.—*London and China Express.*

VANILLA.

A lady-writer says:—But the most precious crop here (South Sea Islands) is vanilla, which is both pretty and lucrative, being worth about four dollars a pound. It is a luxuriant creeper, and grows so freely that a branch broken off and falling on the ground takes root of its own accord, and it climbs all over the tall coffee shrubs, the palms, avocado, pears, and orange trees, and everything that comes in its way, growing best on living wood, the tendrils thence deriving sustenance. It also flourishes best in unweeded grounds, the roots being thereby kept cool, so the steep wooded hill-side is densely matted with this fragrant spice, which scents the whole air; indeed, the atmosphere of the house is redolent of vanilla. It is like living in a spice box, as the pods are laid to dry in every available corner. They must be gathered unripe and dried in a moist warm place. Sometimes they are packed under layers of quilts to prevent them from bursting, and so lose their fragrant essence. All this sounds very pleasant, and only suggests light work. Yet in truth this cultivation involves most exhausting toil. The plant is an exotic; it lives in these isles by the will of the planter not by nature's law. In its native home exquisite humming birds hover over its blossoms therein darting their long bills in search of honey, and drawing them forth clogged with the golden pollen which they carry to the next flower, thus doing nature's work of fertilisation. Here the flowers have no such dainty wooers, and the vanilla bears no fruit unless fertilised by human hands. So M. and Madam Valles and their son divide the steep hill side into three sections, and each morning they patiently but wearily toil up and down, up and down again, again, and again in order to manipulate each blossom that has expanded during the night. "Faire le mariage des fleurs" as Madame Valle describes her daily task, is no sinecure; it must be done during the hottest hours of the day when any exertion is most exhausting. It needs a keen eye to detect each fresh blossom, and any neglected flower withers or drops. Each day the ripened pods must be gathered, and in dry weather the plants require frequent watering and indescribable toil.—*Planter and Farmer.*

NEW DEVELOPMENT OF THE WATTLE INDUSTRY.

Messrs. Borrow & Haycroft have established at Echunga, South Australia, a manufactory of tanage, which must be of great interest to all colonists, and from the methods employed is almost pharmaceutical. About 10,000 tons of wattle bark are sent annually from South Australia alone, and it is calculated that the waste in stripping is about four times this amount. The new factory converts the branches too small to pay for stripping into a strong fluid extract called *tanage*, which contains water 60 per cent, soluble tannin 38·2 per cent, according to an analysis by Mr. G. H. Hodgson of samples from the first 80 tons recently shipped to England. The wattle "trash" yields 12 to 16 per cent of tanage; two men can often cut and load 5 tons, and the waggons can bring in two loads a day, equal to 5 or 6 tons; and, at the price (1*l.* a ton) which the firm is paying for thinnings and tops and branches, so much is offering that the patentees are obliged to distribute their orders. The "trash" is tied up in large bundles and carted in to the factory. It is there weighed, close besides the machine which cuts it up into "chaff." This machine is very much like an ordinary steam-plane, the chisels revolving at a high speed, and cutting through 2½-inch saplings quite readily. The chips are shovelled into large wooden hoppers, into which steam is introduced from a large Cornish boiler. There are three steam-heated vats, and the liquor is transferred from one to the other, pumped into elevated tanks, and thence allowed to flow from a tap on to steam-heated evaporating pans about 30 or 40 feet in length. The evaporation is so rapid that in traversing the pans from one end to the other the liquid is converted into a thick, tenacious, treacly extract. At the end of the pans it flows into a cistern, and thence by a kind of treacle-gate into the casks, each of which will hold about 10 cwt. All that now remains to be done is paste on a label, put in a bung, weigh the cask, and send it off to market. In the process of evaporation a certain portion of the tannic acid is destroyed. The "plant" can be easily removed from place to place. It does not pay to cart the "trash" far, but a few square miles of wattle country will keep a factory going. The utilisation of thinnings allows the cultivation of the tree thickly on waste ground, and to begin cutting the third year. European tanners are quite accustomed to the use of such extracts, but it is said that it will be very hard to introduce it into colonial tanneries. The Chief Secretary (Hon. David Murray) and others were invited to make a visit of inspection on July 17, and seemed to have been highly gratified. While on this subject we may mention that Messrs. W. Mofflin & Co. have sent the *South Australian Register* a letter enclosing a cutting from a periodical called *Leather*, published in London, which seriously reflects on the credit of the Melbourne merchants, and it is likely to injure the bark trade. *Leather* states that a large proportion of the ground bark sold there as best Melbourne ground mimosa bark never grew on the continent of Australia, but in Tasmania, where the tree is plentiful, but the bark very inferior. Its value on the market at Melbourne is about 4*l.* per ton in the rind. "The superior quality of the bark grown in Melbourne and Adelaide has created a large and increasing demand for it on the London market. The shipments from Adelaide and Melbourne since January 14* have amounted to 3,874 tons. This is a large quantity, considerably more than the two districts can produce, so that it is certain that there has been a large admixture of inferior bark from the Tasmanian forests. Our correspondent informs us that the value of this second-rate bark in Melbourne is 4*l.* per ton; cost of grinding, 10*s.* do.; bagging, 10*s.*; freight, 1*l.* 10*s.* do. —6*l.* 10*s.* The best ground bark realises in London from 10*l.* to 12*l.* so that it will be seen it is a very lucrative business, and likely to continue so if the English buyers have no means of detecting the fraud."—*Chemist and Druggist.*

THE CULTIVATION OF CELERY AND STRAWBERRIES.

The close of the rains being the seed time for European vegetables, mallis are (or should be) very busy at the present season; and the following practical hints on the cultivation of celery one of the most highly prized of our home vegetables may prove opportune, especially as celery so often fails under the treatment of the native gardener. The seed imported should be sown in boxes of rich, light soil; it should be sown very thinly, and the best way to effect this is to mix a pinch of the seed with a little dry sand or earth, and then sprinkle it evenly over, the surface of the soil which should first be pressed down smoothly and somewhat firmly, by means of a flat board. After scattering the seed, cover it thinly with a little light soil and give a moderate watering. The boxes should be placed where they get plenty of light but no sun and the soil should be kept of uniform moisture. If the seed comes up very thick, thin out the weaker looking seedlings. When the seedlings show three leaves they must be planted out into a raised bed in the garden, to make which proceed as follows:—Select an open place on hard soil for the nursery and rise on it a bed four inches high of the richest thoroughly decayed stable litter or cow's manure a mixture of both is preferable. Press it down pretty firmly, and then transplant the seedlings on to it four inches apart. The plants should be shaded in the midday by means of a piece of matting suspended on sticks over the bed; the watering should be liberal both morning and evening.

* To what date is not stated.

It will now be found that the plants will grow very rapidly. Meanwhile the trenches should be prepared one foot deep and one foot wide. Place six inches of thoroughly decomposed manure at the bottom of the trench. When the seedlings have been a month or five weeks in the nursery bed, the largest of them should be removed carefully, taking special care not to disturb the roots, and planted in the trench, "two inches deeper in the soil than they were in the nursery bed," and nine inches apart. After transplanting give a good soaking of water (tank or river water is best where procurable). As the plants make growth, they should be earthed up by refilling the trenches by degrees with soil which was originally dug out. For an early crop, the trench should be out in the open; and for a later crop in a shady situation. If rivers are procurable, it is preferable to the garden soil for earthing the celery. It will be seen that the chief art of growing celery to perfection consists in rapid forcing by means of the richest manure.

Strawberries are well worth more attention than our native gardeners give them. At the beginning of the hot season this fruit very small and flavourless, finds its way to the Calcutta market in considerable quantities from the Patna district where it is grown by the native market gardeners; but none who have not tried the effects of cultivation can realise how vastly this favourite fruit can be improved. Firminger's plan, given in his "Manual of Gardening," is the one which should be followed; and for those who have not his work at hand to refer to the following brief abstract of his method is given:—Choose a piece of ground well exposed to the sun, and dig holes in it six inches deep, eight inches wide, and one foot apart. Fix the holes with a mixture of equal parts of old cow manure, leaf mould and garden soil; and in each put down a strawberry plant. Water at the time of planting and as often afterwards as the plant seem to require it. The plants should be put down early in October, and by February they will come into full blossom, and "when in blossom, the beds should be watered every day from a rose watering pot." Unless this is done, the fruit frequently does not set, and you get no crop. When the fruit is ripening, it should be protected from the ravages of birds by a net. The strawberry requires daily watering during its growth and bearing; and in the hot season the plants are sure to die unless regularly watered. The rains do not injure the plants. Care should be taken to plant out the young growth, *i.e.*, the new plants formed by runners from the old plants during the rains, as the old plants seldom bear fruit the second year. Strawberry plants are procurable from the North West Provinces, and doubtless, if good seed were procured from Home, superior varieties could be introduced. The seedlings would not, however, bear fruit the first year. The writer has by following the above method, grown strawberries as large a round as the top of a sherry glass, and of excellent flavour. —*Englishman.*

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON.

JAMAICA—*continued.*

Perfumery is represented by two or three exhibits, which do not, however, include such a variety as might have been expected from the number of plants in the island capable of yielding essential oils and perfumes. It is consequently interesting to learn from the official catalogue that Colonel Talbot, of Worthy Park Estate, is about to establish a flower farm, and to extract perfumes, this being the first attempt of the kind that has been made in the island. The essential oils exhibited by Mr. Schaarschmidt include those of lemon, sweet and bitter oranges, pimento berries and pimento leaf (oil of bay); also spirituous perfumes derived from *Bonplandia*, *Canella alba*, red muskwood and rosewood. Pomades made with tuberose and jasmine flowers are also shown by the same exhibitor. The essential oils prepared by Mr. J. J. Bowery, the Government analytical chemist, comprise, in addition to the above, the essential oils of *Eucalyptus globulus*, lemon grass, *Juniperus*, *Bermudiana*, *Critonea Dodea*, *Hedyosmum nutans* and *Micromeria obovata*. Ylang-ylang fruits are shown, but no specimen of the oil.

A specimen of aloes presenting the appearance of inferior Curacoa aloes, rather than of Barbadoes aloes, is shown by the Botanical Department. In this instance, and in many others throughout the Exhibition, it is evident that want of attention to appearance is one of the reasons that colonial products do not satisfy the requirements of commerce.

Large quills of cinchona bark are exhibited by the Botanical Department and Dr. Heaven, including *C. officinalis*, *C. Ledgeriana*, *C. succirubra*, a hybrid (*C. robusta?*), accompained by herbarium specimens of these trees and of *C. micrantha*, *Calisaya verde* and *Calisaya morada.*

The *C. succirubra* bark grown in Jamaica appears to have quite a different character to that cultivated in the East Indies, in not possessing the warty character of the latter, which is seen also in the South American *C. succirubra.* According to Mr. D. Morris, *C. Calisaya* was not rightly distinguished at the Government plantations in Jamacia until 1881, being included under *C. officinalis*, to which it bears some resemblance in the shape of the leaf.

Some very fine specimens of honey, both liquid and solid, are exhibited, the former by Mr. C. Gordon, and the latter by Mr. J. W. Aikman; both specimens are of good colour and fine flavour. This Court should not be left without noticing the beautiful ornamental articles exhibited by the Women's Self-Help Society, including baskets made of the luffa fruits, and of various seeds (*Leucæna glauca*, *Abrus precatorius*, *Adenanthera pavonina*, and *Coix lachryma*, etc.). The articles made of lace bark (*Lagetta lintearia*), and of the beautiful white tissue of the dagger plant (*Yucca aloifolia*), which is even more elegant than the celebrated rice paper of the Japanese, have been much admired, and would doubtless sell readily in this country. Probably the bright coloured seeds would also find a ready market in Roman Catholic countries for rosaries.

TRINIDAD.—The Botanical Gardens exhibit vegetable ivory nuts, mace, nutmegs, nux vomica seeds, and coca leaves. Nine varieties of tanning substances are shown by Mr. F. J. Hill. Of these the dividivi pods have been found to yield 65·08 per cent of tannin. A remarkable product, labelled "Cedar gum," is shown by the Rev. J. Morton in the form of long transparent tears. When dissolved in water it makes an enormous quantity of thick mucilage, deficient in adhesiveness, but forming an excellent size, like Japanese isinglass. It is probably obtained from the bastard cedar (*Guazuma tomentosa*), and seems worthy of further examination.

BARBADOES.—Several specimens of rock, recently discovered on Oxford Estate, St. Peter's Parish, and stated to contain nearly 70 per cent of phosphates, may be seen in this Court. A very interesting series of specimens, illustrating how these phosphates are formed in the coral rock, is shown by Mr. H. E. Thorne, of the Antilles Manure Works.

In the opinion of Mr. George Hughes,* the deposit of Aruba phosphate in the island of Barbadoes, which is estimated to contain not less than 500,000 tons, has been formed from a superincumbent layer of guano, the carbonate of lime of the coral reef having been changed into phosphate by the soluble phosphate washed out of the guano by the rain, etc. The guano has, however, now disappeared. The structure of the coral rock is seen to be perfectly retained, although the chemical change that has taken place is shown in the presence of phosphate of lime to the extent of 76 per cent. The Sombrero phosphate from Sombrero Island owes it origin to another cause, viz. the direct marine deposit of bone, and another deposit in the island of Barbuda to the excrement of bats in the bottom of caves. These deposits form a valuable

Quart. Journ. Geol. Soc., Feb., 1885, p. 8.

manure for the sugar estates. [Our readers will be reminded of poor Tytler's Sombreorum.—ED.]

MONTSERRAT.—The name of this island is perhaps best known in this country in connection with lime juice, although the principal produce, as in most of the West Indian Islands, is sugar. The Montserrat Company exhibits lime juice in various forms, such as cordial, bitters, sauce, etc., and also ecuelled oils of limes, bergamot and shaddock, as well as distilled oil of limes and distilled oil of basil (*Ocymum sp.*). The ecuelled oil of limes, judging from a specimen received some months since, is very superior to the distilled oil. Essential oils are also exhibited by Mr. J. S. Hollings, consisting, in addition to those mentioned above, of the ecuelled oil of orange (*Citrus Bigaradia*) and the distilled oils of *Canella alba*, cascarilla, lemon grass, bay (*Pimenta acris*) and wild basil; also the perfumed waters formed during their distillation

BRITISH HONDURAS.—The chief products of this colony are dyewood and timber, the amount of logwood annually exported reaching 17,000 tons. It is described as growing in immense thickets in marshy places, with a crooked trunk 16 to 21 feet high, and rarely thicker than a man's thigh in diameter. Two varieties of the tree appear to be recognized in this colony; one having broad leaves is considered the most valuable on account of its solidity, and of yielding a larger quantity of the dye, although the smaller-leaved variety is said to yield a better quality. Of fustic (*Maclura tinctoria*) about 100 tons are annually exported. The seeds of *Sesamum orientale* "used for flavouring cakes" are exhibited under the name of "wangla" seeds.

THE BAHAMAS.—To pharmacists these islands are best known as the geographical source of cascarilla and *Canella alba* barks and of sponges. The exports of sponge in 1885 were estimated at £60,000. Ambergris is also found on the shore and is exported to the value of £1,000 per annum. The most marked feature in this Court is the fine display of sponges, which will form the subject of a subsequent notice, and the many beautiful treasures of the great deep, including sea ferns, corals, sea feathers, sea stars, sea urchins and shells, etc.—*Pharmaceutical Journal*.

ROOTS,

(*Continued from p.* 372.)

A third case is conceivable—so much water might be supposed to find its way in, that no air remained in the interspaces between the particles of soil. Now it is true that such a state of affairs is not readily brought about in a normal soil; but I may indicate how the result is occasionally attained to a great extent. Suppose that a layer of clay or other impenetrable subsoil lies beneath the soil in question; then if water oozes into the soil in larger quantities than can be got rid of in the time, it is possible for nearly all the air to be displaced. Of course the object of good drainage is to prevent this; and it is often overlooked that drainage from below has the effect of drawing in air as well as of running off superfluous water—air is driven into the spaces as the water leaves them.

In speaking of the "bubbles of air" entangled in the interspaces between the particles of soil, each with its water-blanket, I have overlooked some details as to what the bubbles really are. As a matter of fact they will not remain of the same composition as ordinary air, and may soon differ considerably; besides the vapour of water, they may contain gases in quite different proportions from those in the air outside. In the type case, however, there will be some oxygen present in the bubbles.

ROOT-HAIRS.—It is not intended here to go very fully into a description of the roots of land-plants; enough if you are reminded how the smaller ramifications of a root are found to be more numerous and thinner as we approach the periphery of the mass of earth which they traverse. From the youngest rootlets are produced the root-hairs, in enormous quantities, new ones arising forwards—*i.e.*, near the tip of the rootlet—as the rootlet grows on, and thus, behind dying off after fulfilling their functions These functions are chiefly to apply themselves in the closest manner to the surfaces of the particles of soil, and in this way to place the water which they contain in direct continuity with the water which clings with such enormous force to the surfaces of the particles. Hence this water can pass from the soil to the plant and anything dissolved in the water can also pass into the root-hair, and thus up into the plant. I am not going to dwell on how the root-hairs themselves aid in dissolving mineral substances—corroding the surfaces of the particles of soil they cling to—nor shall I trouble you with the details of what substances will be dissolved in the water; for, of course, you will see that anything soluble will pass into solution and may be carried into the plant. The chief point to be insisted on just now is that this water in the soil will contain among other substances oxygen dissolved in it from the air-bubbles referred to above, and that this dissolved oxygen will pass into the root-hairs in solution together with the minerals and any other substances. This oxygen, moreover, is absolutely indispensable for the life of the root-hairs; it can be easily shown that if the supply of oxygen is stopped, or even diminished to any considerable extent, the roots begin to die, because the root-hairs cease to act. Let us look a little more closely into this point. Each root-hair is a tiny cell containing living protoplasm and certain other substances, all inclosed in a thin, elastic, porous membrane. Now it has been abundantly proved that if such a cell is deprived of oxygen, its protoplasm becomes dormant for a time, and slowly breaks up, as it were; subsequently it becomes decomposed into other and simpler materials. A sort of internal combustion and fermentation take place, and these processes result in the formation and liberation of bodies like carbondioxide, alcohol, acetic acid, and other acid matters—substances in the main not only incapable of supporting the life of the root-hairs, but actually destructive of it. Evidently, then, if we deprive all the root-hairs of oxygen, they will eventually die. Their death will entail that of the rootlets and roots to which they belong, and this for two obvious reasons:—first, it is the root-hairs, and the root-hairs alone which can absorb the necessary water and substances in solution from the soil to supply such a plant as we are concerned with; and, secondly, the noxious products resulting from their death accumulate in the soil and diffuse into the root, and so hasten similar decompositions in what were hitherto healthy cells. It must not be supposed that these disastrous consequences of the deprivation of oxygen always follow immediately. Not only are the roots of some trees, for instance, able to withstand ill-treatment longer than others, but, obviously, the kind and degree of ill-treatment may affect the problem of how long the plant shall survive. The number of rootlets and root-hairs, and the spread of the roots and other factors, will obviously affect the matter. Suppose the following case as an example. A young tree is growing and flourishing in an open, good soil, and, for some reason or other, more soil is heaped about the roots until the depth is increased considerably; the deeper situation has placed obstacles in the way of the roots obtaining oxygen so readily as before. Not only are the roots further from the atmosphere, but the water carried down has to percolate through more soil, and may part with much of its oxygen (or even all) on the way: of course the nature of the soil, the presence of organic matters, and other circumstances, decide this. It is not at all difficult to conceive of such a case where the supply of oxygen to the roots is thus diminished so far that the activity of the root-hairs as a whole is simply lowered, but not destroyed,—a stage or two further and they might become dormant, and their protoplasm undergo intra-molecular respiration for a time, and break up. It is clear that the diminished activity of the roots will affect the supply of water (and the substances dissolved in it) to the leaves; this will obviously react on the thickness of the annual rings, and this again on future supplies—since

the water passes up the alburnum, or young outer layers of woody tissue, moreover, a diminution of supplies from the leaves means less substance and power for replacing the root-hairs, and so on. In this way it may require some time to kill the tree, and all kinds of complications may arise meanwhile. This case is probably by no means uncommon. A more extreme case is where the soil becomes damp and clogged with excessive moisture; not only does no oxygen reach the roots, but noxious gases accumulate in solution in the soil, and will hurry matters by poisoning cells which might otherwise live a longer life of usefulness. It is extremely probable that such gases find their way into higher parts of the plant in the air-bubbles known to exist and to undergo alterations of pressure in the vessels of the wood: this being so, they would slowly retard the action of other living cells, and so affect the upper parts of the plant even more rapidly than would otherwise be the case. Damp soil may thus do injury according to its depth and nature; but it need not necessarily be deep to be injurious if much oxygen-consuming substance is present. I have seen excellent soil converted into damp, stinking, deadly stuff, from the action and accumulation of the larvæ of cockchafers: these "grubs" may, it is true, accelerate the devastation caused by the consumption of oxygen and the accumulation of poisonous waste matters in the soil by directly cutting off portions of the roots themselves, but the accumulation of oxygen-consuming substance, and the cutting off of supplies to the root-hairs evidently plays a chief part in the destruction.

There is another matter with regard to damp soils that cannot be left out of account. I have already told you that roots which are developed in water, or in very damp sandy soil—and which are perfectly healthy—have few or no root-hairs formed on their surfaces; whereas it may be readily shown that the roots of the same plant growing in a well aërated open soil, which is scarcely moist to all appearance, will be densely covered with a close set pile of hairs. Indeed it is by means of the millions of root-hairs on its rootlets that a Sunflower or a Bean, for instance, obtains the enormous quantities of water necessary for its needs from soil, which to our rough perception, seems to be dry. I cannot here go into all the proofs that such a soil is by no means so dry as it looks; but will simply remind you of what was said above as to the enormous force with which the minute particles of rock, &c., which form "soil" retain their hold on the thin films of water which constitute what have been termed their water-blankets. This is certain, that a healthy, well-rooted plan can take up water from a soil which is to all appearance air-dry; whereas a plant which has not yet had time to develope its root-hairs in sufficient numbers to take these firmly adherent water-films from numerous particles of soil would, droop and wither. Of course it must be borne in mind that we are speaking of land-plants such as we commonly meet with on ordinary dry land; in the case of plants which flourish in bogs or in water there are corresponding differences in the structures of their roots agreeing with the differences of environment. Even such plants need air at their roots, and an excellent illustration of this is afforded by some Willows. Our common Osier and Willows grow, as you are aware, in low-lying, damp, and even boggy places, often flooded; now it has been found that, if young Willows are planted too deep in the soil, they very soon send out new roots—adventitious roots they are often called—close to the surface of the soil, and these roots soon do all the work. There is no doubt that this power enables these Willows to live in places that would be fatal to them otherwise; and the same is true of some other plants.

Enough has now been said to show you how necessary it is that some care should be exercised in watering plants, or in exposing them to conditions different from those to which they are accustomed; and, it need scarcely be added, apparently mysterious diseases may sometimes be explained when it is shown that such precautions have been neglected. Any one can quote instances of plants which will grow in some soils and not in others, but no very satisfactory reason is afforded by simply saying that the one soil is suitable and the other not: however, all I have attempted to show you is that some soils are not suitable for some plants because the plants in question need more air at the roots than these particular soils can afford them under the circumstances.—H. Marshall Ward, M.A., F.L.S.—*Gardeners' Chronicle.*

(*To be continued.*)

QUINOLOGICAL WORK IN THE MADRAS CINCHONA PLANTATIONS.

BY DAVID HOOPER, F.C.S.,
Government Quinologist.

Last year I communicated to the Conference at Aberdeen the results of some experiments made in the cultivation of cinchona. A number of analyses were given of the different varieties of bark grown on the Government and other estates. It was shown how the alkaloids were distributed in old succirubra trees; and it was noticed how natural shade and the process of mossing promoted the increase of alkaloids in the bark. Some of these conclusions were perhaps not altogether unknown before, but I thought it desirable to confirm results which are liable to vary under different conditions of age. Another year's work shows some more extended investigations into the effect prdouced on alkaloids by the renewal of bark and by the manuring of trees, and tables are compiled from numerous analyses showing the rise of alkaloids in growth and their deterioration by age and other causes. I have again been permitted to quote extracts from my annual report, which has lately been forwarded to Government through Mr. Lawson, Director of the Cinchona Plantations.

Renewal by Shaving.—Shaving cinchona trees has been for some years a method of harvesting bark which in some districts works better than that of stripping and mossing. The cellular and richer portion of the bark is removed in this way, and the librous portion is left. The bark thus treated thickens again, and the shavings, taken from it are found to be richer still in alkaloids. The analyses of some succirubra shavings taken from trees grown in the Ouchterlony Valley will show to what an extent trees may be improved by this method. The renewals were taken after intervals of twelve months; the experiment therefore lasted over three years.

	Quinine.	Other Alkaloids.	Total.
Original bark ...	1·35	5·87	7·22
Once renewed ...	2·46	4·22	6·68
Twice renewed ...	3·60	3·99	7·59
Thrice renewed ...	3·87	3·71	7·58

The increase of quinine during the first and second year by renewing is most satisfactory; the increase is not so prominent in the third year, but the bark is good, and indicates that shaving for at least four years might be permitted. The trees upon which these experiments were made were six years old when the original bark was taken. If at this comparatively early age they are not injured by shaving, and renew their bark so well, it is not desirable to wait for the trees to become more matured.

When trees are allowed to grow until they are over twelve years of age, and then shaved, the renewal set in more slowly, and the resulting bark does not compare more favourably with the original bark than if the tree operated upon had been half the age. This may be instanced by quoting some more analyses. Last December some interesting samples were sent by the manager of the Glenrock Company, S.E. Wynaad, consisting of some natural and renewed shavings of succirubra taken from trees of six and twelve years of age. The following is the analysis of four of the samples:—

	Sulph. Quinine.	Total.
Red bark, 6 years, natural ...	1·34	5·00
„ „ renewed 2 years	2·54	6·95
„ 12 years, natural ...	2·43	7·41
„ „ renewed 2 years	2·71	7·01

Thus it is seen that by renewing a six year old tree, 90 per cent more of sulphate of quinine is obtained, and by working on a twelve year old tree only an increase of 12 per cent takes place during the same period of two years. With regard to the total alkaloids it should be also noticed that the shaving has made an increase of 39 per cent in the younger tree, while the older bark has somewhat deteriorated. One of the most important features in these results is that the renewed bark from the six year old tree is superior to the natural bark from trees of twice the age.

I have had very few opportunities of observing the effect of shaving on pure Ledger barks, containing little, if any, alkaloid, besides quinine; but it appears that hybrid Ledgers of the broad leaved variety, holding cinchonine, are capable of great improvement by the shaving process, as the following renewals of eleven months will show compared with the natural bark of six year old trees.

	Sulph. Quinine.	Total.
Ledger, narrow leaf, natural, 1885	4·09	5·97
„ „ renewed, 1886	6·62	8·49
Ledger, broad leaf, natural, 1885	2·90	6·61
„ „ renewed, 1886	5·19	8·51

The sulphate of quinine in the narrow-leaved Ledger had increased 62 per cent, and in the broad-leaved Ledger 79 per cent; the greater increase in the latter variety is due to the presence of other alkaloids which appear to develop quinine in the growth of the tree.

Shaving old trees has certainly not had a beneficial effect in some trials made on Government estates. Both officinalis and succirubra trees from sixteen to twenty-one years of age cannot well bear the removal of the bark in this way; the renewal takes place slowly, and is found to be impoverished instead of enriched. An officinalis on Dotabetta of twenty years' growth was shaved; the shavings gave 3·66 per cent sulphate of quinine. After six months some renewed shavings were taken and found to yield only 1·85 per cent; the bark was then commencing to decay, and the tree has since died.

Experiements in Manuring Cinchonas.—The effect of manuring cinchona trees in order to stimulate their growth and produce a greater yield of alkaloids has recently been tried at Naduvatam. The first experiment was made upon a succirubra of seven years' growth. Cattle manure, which had been previously kept for some time in closed pits, was applied some six months before the bark was taken for analysis. A sample of bark from a tree in the same plot, but which had not been manured, was collected at the same time for comparison. Two samples of magnifolia bark were taken from trees which had been manured in a similar manner to the succirubra; the first was seventeen years, the second twenty years old, and samples from unmanured trees were taken for comparative analysis at the same time. The results of the examinations are tabulated on the next page.

	Quinine.	Cinchonidine.	Cinchonine.	Amorphous Alkaloids.	Total.
Succirubra manured	2·29	3·78	1·94	·52	8·53
„ unmanured	1·51	4·13	2·03	·32	7·99
Mag'folia, manured	3·78	3·90	·28	·82	8·78
„ „ unm'red	3·13	4·39	·56	·39	8·47
„ 2 manured	2·59	3·49	1·21	·52	7·82
„ „ unm'red	2·62	2·67	·67	·56	6·52

It will be seen that the manuring has had the effect of increasing, in each instance, the amount of total alkaloids in the bark; and the quinine—the most important feature—has received a gain of 52½ per cent in the succirubra, and 20 per cent in the first magnifolia. In the older magnifolia bark the quinine remains about the same in quantity, and if no other influence is at work it might be inferred that older trees are not so sensitive to the action of manure as younger and more vigorous growing trees which have not reached maturity. The food of such plants as cinchonas, which yield alkaloids in large quantity, must of necessity contain some nitrogenous element, and as this must be taken from the ground it is only fitting that a manure of this kind, which contains some constituents that are similar in their nature to alkaloids, should be supplied periodically to the soil. Regarding the question from a commercial aspect, the higher value would cover the expense of the manure and the cost of its application to the land The succirubra bark mentioned in the first experiment, if the unit were 4*d.*, would realize in the market 8*d.*, per pound, whereas the bark of the manured tree would be worth more than 1*s.* per pound. I believe the effect of manuring would be more apparent in crown and Ledger barks, with large proportions of quinine in the total alkaloids; in such cases, the extra outlay on manurial agents, compared with the additional value of the bark, would be much more remunerative.

Increase of Alkaloids with the Age of trees.—A question of much importance in cinchona cultivation is the age to which trees should grow before the bark can be profitably taken. To settle such an inquiry a large number of analyses of barks taken from trees of all ages should be available. In the following tables I have made a selection of both Ledger and red barks, and have arranged them according to age. Some of the figures are averages of two or more analyses, and as the two lists represent some forty samples, I hope they will help to throw some light on the subject.

The first list comprises natural barks of the narrow leaved variety of *C. Ledgeriana*, and, with one exception, they all came from the Wynaad district.

The second list is made by taking from my laboratory journal all those red barks whose ages have been determined, whether they came from the Government Plantations at Naduvatam, or from private estates in Wynaad, Coorg or Travancore.

Ledger barks.	Quinine,	Cinchonidine,	Other Alkaloids.	Total.
20 months... ...	1·68	·66	2 77	5·11
2 years	2·18	·65	2·69	5·52
3 „	3·28	·55	2·90	6·82
3½ „	4·73	·93	1·81	7·46
4½ „	4·97	·79	1·78	7·54
5 „	4·57	1·02	1·46	7·05
5 „	5·09	1·06	·55	6·70
5½ „	7·54	·31	1·15	9·00
6 „	6·52	·76	·88	8 16
6½ „	5·97	1·18	1·00	8·15
8 „	7·59	1·16	1·45	10·20
20 „	5·58	1·24	·85	7·67

In the Ledger barks it will be noticed that there is a steady rise of quinine up to the age of between five and six years, after which there is no apparent increase.

In the second table of red barks the same fact is shown, that the bark has attained its maximum content of alkaloid when between five and six years of age. The quinine increases up to twelve years, but, as pointed out before, the renewed barks of the younger trees much exceed the slightly increased value of these older barks. The trees of sixteen and twenty years show a marked deterioration in alkaloids, although the bark is often in large thick fibrous pieces, similar to the drug that was originally exported from the South American forests.

Red barks.	Quinine.	Cinchonidine.	Cinchonine.	Amorphous Alkaloids.	Total.
2 years.	·55	·72	1·20	1 22	3·69
3 „	·85	1·75	1·67	·99	5·26
3½ „	1·08	1·65	1·15	·64	4·52
4 „	1·13	2·03	1·79	·58	5·53
4½ „	1·02	2·64	1·78	·50	5·94
5 „	1·23	2·72	2·36	·52	6·83
5½ „	1·32	2·15	3·11	·63	7·21
6½ „	1·31	3·22	2·18	·71	7·42
7 „	1·70	2·09	2·28	·93	7·60
7½ „	1·78	3·18	1·97	·53	7·46
12 „	1·81	2·62	2·08	·90	7·41
16 „	1·08	·94	1·04	1·57	4·63
20 „	·78	1·13	1·37	·97	4·25

Effect of Mould on Bark.—It has been stated that bark loses much of its virtue when allowed to get mouldy, or when kept in a damp atmosphere. I was asked more than a year ago to analyse some mouldy bark to obtain its value, but not knowing the composition of the freshly dried bark the results would not have been very useful. I have therefore made an experiment which shows that little, if any, effect is produced by prolonged contact with mould. A sample of powdered bark of known composition was taken in December, 1884, and kept in an open dish on the floor of a dark damp room; a fungus (*Penicillium*) set in in a fortnight, and spread itself over the surface of the powder, and slightly increased its weight. The bark was constantly stirred so that fresh bark from beneath might be influenced by the fungus. It was mixed occasionally for ten months, and as the mycelium had by then penetrated to every particle of the powder it was analysed in October, 1885, with the following results:—

	Original bark.	Mouldy bark.
Quinine	2·82	2·80
Cinchonidine ...	1·22	1·25
Quinidine	·18	·11
Cinchonine	·90	·87
Amorphous	·31	·45
	5·43	5·48

It is thus manifest that the analyses being almost identical, moulded bark of ten months is not necessarily deteriorated.

Octacamund, India, July 16, 1886.

CINCHONA CULTIVATION IN SOUTH AMERICA.

BY DAVID HOWARD, F.I.C., F.C.S.,

Although Ceylon has of late occupied in the bark market the most prominent position of all the countries where cinchonas have been cultivated, it is to other quarters that we should look for reliable information on the scientific points involved.

Vast as has been the scale of the cultivation in Ceylon, the soil of the island is by no means of the most favourable for the growth of the cinchonas, and, unfortunately, far too little care has been taken to avoid the danger of hybridization, which takes place with marvellous facility whenever more than one species is found in a district, unless the greatest care is taken to isolate the seed-bearing trees. We thus find that Madras and Java give far better opportunities of studying the effect of cultivation on pure strains of the more valuable species, and it is interesting to add to what we have learned from the plantations in those countries, some light from those in the natural home of cinchonas in South America.

The jealousy which made it so difficult to obtain cinchona plants in the first instance still remains to a great extent in Bolivia, and although we have valuable information as to the progress of the plantations in Schuhkrafft's consular reports, no scientific information can be obtained from that quarter, except what is derived from the bark which already reaches us from them in considerable quantity. This we find to be of very fine quality, far superior to the average of even selected parcels of the uncultivated bark; a yield of 6 to 7 per cent of sulphate of quinine is quite as commonly obtained from them as one of 4 to 5 per cent was from the importations of twenty or thirty years ago, and it is evident that the influence on the calisaya of cultivation is just as favourable in its natural home as in Java. Among them are two new species, the flowers of which are as yet unknown, but the habit of growth of which clearly marks them out as distinct from the hitherto described species. As plants of both are under cultivation, it is hoped that before long we shall be able to add botanical descriptions of them.

The first it is proposed to call *Cinchona Thomsoniana*, after Mr. Thomson, who discovered it in the Central Cordilleras of the Columbian Andes, in the districts which yield the well-known *Cinchona lancifolia*, the soft bark of commerce. It has very large leaves, and grows with a rapidity equal to that of succirubra.

The young bark analysed, which was from trees only two years old, gave already 3·3 per cent of sulphate of quinine=2·5 of quinine alkaloid, traces only of cinchonidine and ·55 of cinchonine. The purity of the quinine and rapid growth make this a promising species for cultivation.

The other was discovered by Señor Pombo in the forests of Ecuador; the mature bark presents marked points of difference from the species at present known and yielded.

The sample of cultivated bark of the species two years old, gave quinine sulphate 5·70=of quinine 4·28, cinchonidine 0·43, no cinchonine or quinidine. This test is a very high one, and, if the growth is not too slow, it ought to prove a valuable species.

For comparison, I would add the analysis of the typical sample of the finest lancifolia bark, the calisaya Santa Fè, brought over by Mr. R. Cross, from Columbia, which yielded of sulphate of quinine 4·2=of quinine alkaloid 3·15, cinchonidine 1·90 and cinchonine ·30.

Of even more interest are samples of bark grown from plants derived from the Government plantations in Jamaica. The history of these barks shows the great influence of successful cultivation and favourable habitat upon the yield of all alike. The first samples received from Jamaica in 1872 gave the following results:—

	Quinine.	Sulphate.	Cichonidine.	Cinchonine.
C. Calisaya ...	1·65=	2·2	·7	·2
C. officinalis ...	1·35	1·8	·1	·1
C. succirubra ...	1·05	1·4	2·5	·8
C. succirubra ...	1·12	1·5	1·6	2·0

The improvement brought about by careful cultivation is shown in a marked degree by the following samples received from the same plantations in 1881:—

Elevation.	Sulphate Quinine.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine.
— Calisaya	4·93	3·70	0·60	0·35	0·05
5500 ft. Officinalis	6·95	5·18	0·22	0·01	0·15
4800 ft. Officinalis (thirteen years old)	5·00	3·75	0·40	0·12	0·16
2400 ft. Succirubra	1·97	1·48	2·98	2·24	0·13
3400 ft. Succirubra (cold spring)	2·40	1·80	1·30	3·20	0·00

The descendants of these plants grown in Columbia give the following results:—

	Sulphate Quinine.	Quinine.	Cinchonidine.	Cinchonine.	Quinidine
C. Calisaya, 3 years old grown, at 8000 feet.	4·32=3·24		0·66	trace	0·00
C. Calisaya, 22 months old 7500 feet.	2·71	2·03	0·55	0·13	0·00
C. officinalis, 3½ years old. 8000 feet.	1·66	3·49	0·21	0·06	0·05
C. officinalis, renewed, 8 months under moss.	4·30	3·22	0·23	0·07	0·07
C. succirubra, 3 years old.	4·94	3·75	3·03	0·17	0·07
C. succirubra, renewed, 8 months without moss, grown at 7500.	7·00	5·25	1·90	0·67	0·00

All these samples are from very young trees and if we may judge from universal experience the more mature bark will give even finer results. The Jamaica calisaya is not of the finest type, the percentage of quinine is lower than in the best ledgeriana and the proportion of cinchonidine is much higher. I should have been inclined to suspect hybridization, but my late uncle, J. E. Howard, F.R.S., after a careful examination of the botanical specimens in 1881, reported of this bark: "It appears to me true to the

calisaya type; I should not think that it belongs either to the josephiana or ledgeriana form, but that the exact variety is perhaps not yet published. There is no appearance of hybridity." The succirubra is one of the finest specimens that I have tested. I have found very great variety in the tests of trees of this species growing alongside each other in Ceylon, the quinine varying even in the proportion of three to one and so it is possible that all the bark from the plantations will not be found of this admirable quality. Still we have here an additional proof that whether the result be due to favourable circumstances or to more or less permanent varieties, red bark can be grown of far richer quality than what we usually receive as such from the East Indian plantations.

Amid all the discouragements of excessive production and low prices that planters suffer from at the moment it cannot be too clearly borne in mind that the prospect of future profit in the cultivation of cinchona turns chiefly upon the cultivation of high testing bark. With favourable soil and climate the richer varieties grow at least as freely as the poorer and it is evident that, the cost of production being approximately the same, a bark of higher quality may yield a profit when an inferior quality may cause a serious loss. In Bolivia and Java these most important requisites are found, and the analyses I have given above show that the same favourable results may be obtained elsewhere. In the face of such competition it is evident that the profitable growing of inferior bark is impossible.—*Pharmaceutical Journal.*

TROPICAL GARDENING.

Hedges.—The best material for forming a hedge is the Barbadoes cherry, *Malpighia glabra.* Naturally it grows into a small tree, and as it yields abundance of fruit there is no difficulty in obtaining a supply of seeds from which to raise young plants. When the fruit is ripe it should be picked and thrown into a tub, to get the pulp removed and the seeds divided (these are from one to four in each fruit), by maceration and washing after which operation the seeds are ready for sowing. They are generally sown thickly in boxes, and require no attention beyond a little watering if the weather be dry. In sowing, the seeds should not be deeply buried, but should only be covered with a little more than their own thickness of soil. If the seeds are covered with much soil, they will probably not germinate at all, or if they do germinate many of the germs will perish before arriving at the surface. When the plants are a few inches high they are fit for transplanting. To form a stout hedge they should be planted in two rows, zigzag. After the plants have grown about a foot high, the hedge should be allowed to grow more than a few inches before being pruned again; by this means the bottom will be kept well furnished and strong. If left to grow two or three feet before being pruned, (and this is generally the case, as everyone is in a hurry to get the hedge up to a certain height,) the result will be a weak hedge and very few branches at the bottom where there should be plenty to form the foundation. When proper care is given to the pruning no other plant is so suitable for this purpose. At the present time it may be seen in many places in Demerara, showing how well it is suited for this work. This one kind of plant may be used for a hedge of any height, from an edging of six inches, to a screen of ten or twelve feet, and answers as well for one purpose as the other. Of course it cannot be kept as an edging all its life, as after a time with continual clipping when only a few inches high it becomes scrubby; it can then be taken up and replanted in a position where a medium sized hedge is required, and in due course can by the same method be utilised for a high hedge. Scarcely any other plant will bear transplanting better than this cherry, but it should be done in damp weather; with ordinary care plants of several feet high can be moved successfully.

Clerodendron aculeatun, commonly called wild coffee, or bitter fence, is a West Indian plant. It is very useful for forming a good strong hedge, and on account of the bitter taste in the young shoot and the short sharp thorns it bears at the base of the leaves, is not interfered with by goats; a strong recommendation for its use where it can be planted without setting up palings, or the protection needed by most plants against these animals. It is usually planted by cuttings, and so easy is its cultivation, that the shade and care generally afforded to cuttings is not needed. The branches may be cut up into pieces from six to nine inches long, and planted at once into the permanent position, by being pushed slantwise in the ground a few inches apart, leaving just the end of each cutting exposed, pressing the soil firmly as the planting proceeds. If the weather is damp, or case of drought if the cuttings are well watered, they will commence to grow at once and in a few days will have the appearance of an established hedge. Where failures occur fresh cuttings must be put in without loss of time, so that all may grow on together. When left to grow in its natural state, this *Clerodendron* is of a very straggling habit, so that to make a decent hedge it must be well and regularly clipped, and must be taken in hand as soon as a little growth is made, treating it in a similar manner to that advised for the *Malpighia*. It flowers freely and gives plenty of seed from which plants can be raised, but planting by cuttings is by far the quickest method of forming a hedge of this plant.

Croton variegatum, the commonest of the many Crotons now to be seen in gardens, and the only one which is used for the purpose, makes a very good hedge; but it must not be clipped, in pruning each branch must be cut separately with a knife. It is propagated by cuttings and scarcely any other plant is so easily grown. It is proof against goats, the sap being extremely bitter. The stain of the sap is indelible on linen.

Aralia Guilfoilei, is another variegated plant which can be used in the same manner of the *Croton*; it is propagated just as freely, and is as easily grown. It has compound leaves growing like small drooping branches, each leaf edged all round with white. It grows in an erect manner sending up long strait stems, which after being allowed to grow between one and two feet long, must be cut back to induce the plant to form a good bottom; for each stem cut several others will spring from below. Both this and the Croton are introductions to the West Indies.—*Indian Gardener.*

Sickly-looking plants may be taken out of their old pots, the roots washed, the weaker branches trimmed, and placed into as small pots as the roots can be placed into. Let such a plant remain there until by good growth it shows its healthy roots then it may have more earth in a little larger pot.—*Planter and Farmer.*

Liquorice Culture in Damascus.—A considerable amount of business, it seems, has recently been done in Damascus and Syria generally in the exportation of Liquorice root to the United States. About four years ago, one of the partners in an American firm in Philadelphia largely concerned in the commerce of this article, visited Damascus with the object of ascertaining the amount and quality of the Liquorice root grown in the country, and of making purchases. The result of his enquiries having proved satisfactory, he gave orders for somewhat large consignments to be shipped to the United States, and appointed an American gentleman in Beyrout, well acquainted with the language of the people and having a thorough knowledge of the country, to act as agent of the firm. The Liquorice root can be obtained in considerable quantities to the north of Damascus, and in the neighbourhood of Lattakia and Antioch, and a regular business is now being carried on in this article. The amount exported last year from Damascus and other parts of Syria was valued at £30,000.—*Gardeners' Chronicle.*

Increase of Fungus Diseases in the South.—President Berckmans in his recent address, notes that the three past seasons have been more rainy than usual, which he thinks may account for the remarkable prevalence of parasitic fungi among fruit trees.—*American Gardener's Monthly.*

Coconuts in Florida—G. T. Field, of Monmouth county, New Jersey, speaks in glowing terms of the prospects for success of coconut culture along the coast of Florida. All reports favor Mr. Field's enthusiasm. There can be no doubt, we think, that coconut culture is to be one of the profitable investments in this remarkable State. They bear in ten years, and yield from 100 to 200 nuts annually. *American Gardener's Monthly.* [They will do nothing of the kind.—Ed.]

Planting in Northern Australia.—Port Darwin, Oct. 10th.—The season's operations at the Shoal Bay Sugar Plantation have, owing to want of rain, saltness of soil, and of other causes, not been successful. The final result is about 5 tons each of sugar and molasses from about 40 acres. General sympathy is felt at Mr. Brandt's ill-luck. The general opinion is that the plantation is on an unsuitable locality. Different news has been received from the Beatrice Hills Plantation on the Adelaide River. Coffee and guttapercha are thriving splendidly. The plant exhibited here showed over 300 berries and buds.—*S. A. Register.*

Tea Planting in the South: Galle, 10th November.—The weather being very favorable, tea planting is being pushed on in the new clearings. At Gordon estate, near Baddegama, of which Mr. L. Christie is the experienced Superintendent, 50 acres have just been planted. Estate owners down South are waking to the necessity of having thoroughly experieneed tea-makers and the latest appliances for manufacture, in order to secure good quality. Citrus estate has now a European Superintendent. The tea in Monrovia estate, Ratgama, is said to be flushing vigorously and a further large acreage is being planted. Mr. R. Koch, who was lately in charge of this place has accepted an appointment on a coconut estate in Jaffna. I understand that the bug has made its appearance on a tea estate at Wallahanduwa, three miles from Galle. I hear that all the plants in a two acre field have been seriously injured by this pest, and that all the recognised remedies have proved ineffectual in removing it."

New Caledonia.—Coconut trees exist in the colony in different varieties, nearly all having been planted by the Kanakas. Most of the groves are on the eastern side, where the majority of the tribes are to be found. This precious tree produces yearly from 50 to 80 nuts. The kernels, dried in the sun, are readily sold under the name of *coprah*, at from 300 to 350 francs (£12 to £14) per ton. This is the chief means by which the natives obtain the goods and luxuries of civilization. A few important groves are, however, held by Europeans. The other principal fruit trees are orange, lemon, banana, canella apple, mango, guava, Shanghai peach. In spite of indigenous valuable timber, no important felling of trees exists in New Caledonia. The quantity cut is not even sufficient for the use of the colony since New Zeland and California imported timber amounts to the yearly value of 500,000 francs (£20,000).—*Journal of Forestry.*

The Lemon.—Few people know the value of lemon juice. A piece of lemon bound upon a corn will cure it in a few days; it should be renewed night and morning. A free use of lemon juice and sugar will always relieve a cough. Most people feel poorly in the spring, but if they would eat a lemon before breakfast everyday for a week, with or without sugar as they like, they would find it better than any medicine. Lemon juice, used according to this recipe will sometimes cure consumption. Put a dozen lemons into cold water and slowly bring to a boil; boil slowly until the lemons are soft, then squeeze until all the juice is exhausted; add sugar to your taste and drink. In this way use one dozen lemons a day. If they cause pain or loosen the bowels too much lessen the quantity and use only six a day until you are better, and then begin a dozen a day. After using five or six dozen the patient will begin to gain flesh and enjoy food. Hold on to the lemons and still use them freely for several weeks more. Another use for lemons is for refreshing drink in summer, or in sickness at any time. Prepare as above directed and add water and sugar. But in order to have this keep well, after boiling the lemons squeeze and strain carefully; then to every ½ pint of juice add 1 lb. of crushed sugar; boil and stir a few minutes more until the sugar is dissolved, skim carefully and bottle. You will get more juice from the lemons by boiling them, and the preparation keeps better.—*San Francisco Chronicle.*

The Artificial Manure Trade.—Of late a very large trade has sprung up in Germany in artificial manures, the chemical industry of this country having scored various successes over foreign products. In regard to Thomas phosphate, which is coming into extensive use, it is stated that when it is mixed with kainit in equal parts a manure admirably suited to barely ground is the result. A couple of years ago an agriculturist spread 1,600 kilog. (about 3,360 English lb.) of Thomas phosphate flour upon half a hectare of ground (5,980 square yards) in order to see if an excessive quantity acted injuriously and if the effect would last over several years. In the first year three excellent crops were obtained and this year a similar number, the quality of the hay being better than before.—*Kuhlow's German Trade Review and Exporter.*

How wood is made.—In many trees the annual layer is so regular, and seemed to be placed so nicely, that one not a botanist might be pardoned for believing that the sap was changed to woody matter in the leaves, and the new formed matter sent down, sliding over the old layer like the sections of a telescope; but though the food is prepared by the leaves in a great measure, the actual growth is made by the germination of some of the cells along the whole outside wall of last year's wood beneath the inner bark. The germination of the cells takes place about the middle of the June. He takes a healthy cherry tree and strips it of its bark to any length desired. At that season a viscid liquid will be found covering the woody surface in abundance. The stripped part is covered with a cloth to prevent evaporation, and in a few days numerous dots like needle points, will be seen about the sixteenth of an inch apart all over the surface. These are the young cells that have germinated from those of last year. They continue germinating, one from the other, until they meet, when they unite and form a complete surface. In the autumn a layer of wood will be found just as thick as in the part of the tree not disbarked, and a single layer of liber, with its outer coat of cellular matter—perfect bark—will have been formed over the whole. The entire formation of wood and bark can thus be seen by the ordinary observer, without the necessity of any nice microscopical work. Large apple trees have been seen that have had their bark peeled wholly off from their trunks, at the season named, make an entirely new layer of bark and wood, not only with no injury to the tree, but to its manifest enjoyment. By this experiment we learn that there is no difference primarily in any part of the annual covering. The same cell may become permanent tissue or generating tissue, and from the generative tissue may come before the season of growth closes every form of structure known to anatomists, from pure wood to the outermost cuticle of the bark. How these cells become differentiated may be passed over here. We know that cell-growth is not always uniform in its operations. The law that changes the outermost series of newly made cells into liber need not necessarily operate so exactly as to make them perfect to this end—a few may be thrown off into the liber as generative tissue—and granting this possibility we see how the woody granules in the apple bark are formed.—*Leader.*

FISH-CURING AND NATIVE INDUSTRY IN CEYLON.

Mr. C. J. A. Murray, A. G. A., Hambantota District.

FISH-CURING—FOOD SUPPLY—A NEW INDUSTRY.

Fish-curing.—Annexed is a copy of my report on the Fish-curing industry in this district:—

It was decided by Government, on the recommendation of the Auditor-General (Mr. Ravenscroft), to give some encouragement to the fish-curing industry in this country by the sale of salt at as low a rate as possible. Early in May the Auditor-General visited the District, and after inspecting some of the principal fishing stations along the coast, and making inquiries from the headmen about the quantity of fish caught and the number of canoes engaged in fishing, it was arranged to make a start at Hambantota. A yard was accordingly opened on the 15th October, in which the salt was retailed to curers at the reduced price of 80 cents per cwt., instead of at the Government price of R2·36, on the condition that the curing was to be carried on inside the enclosure. The dimensions of the yard were 200 feet by 100 feet wide. Three sheds were built for the carers to work in and store their fish, and also an office and a store for the salt, the whole being placed in charge of a Government Officer, with a salary of R30 a month, and two watchers at R12·50 each.

Unfavourable winds continued for a longer time than usual, preventing many of the larger boats from coming down from other stations along the coast; and this, combined with adverse currents, accounted for the small quantity of fish caught at first. About the end of January, however, things took a favourable turn: more boats began to arrive, and fishing commenced in earnest. The number of canoes of all kinds engaged in fishing amounted to twenty-seven. The annexed statement (marked A 1) gives the result of work in the yard up to the 15th of April, 1,207 cwt. of fresh fish were admitted, which turned out 835 cwt. of cured fish. A detailed statement of expenses, amounting to R514·93, connected with the yard during the same period is given in return B 1. 280 cwt. of salt realised R224, at 80 cents a cwt.; but as this sum only covers the cost of collection and transport, it cannot be counted as profit.

Encouraged by favourable reports from another fishing station, called Patanangalla, thirty-eight miles up the coast towards Batticaloa, I was induced to open another yard there on the 16th March, with the sanction of Government, and up to the present it has worked most satisfactorily: boats continued to arrive day after day until they numbered about nineteen. The amount of fresh fish admitted into the yard up to the 15th April was 360 cwt., turning out 120 cwt. of cured fish. The amount of salt sold at R1 per cwt. realised R65·20, and the cost of establishment, which is the same as at Hambantota, amounted with incidental charges to R132·50. Fishermen resort there for two months in the year, taking with them as much food as will last for that time. It is an isolated spot with no population, and nothing but jungle for miles around. A small bay affords some protection to the boats from the N.E. wind, and the sloping beach enables the canoes to be easily pulled up. Two small subsidiary stations were opened at Potana and Amadua to the right and left of Patanangalla, and were placed under the same officers. There were four boats at each place.

An English company started curing in this District on their own account in December, and sent down a manager to supervise all arrangements. It was thought advisable not to launch out into heavy expenditure at first, until some practical knowledge of the work was gained, and the quantity of fish that could be caught ascertained. The manager therefore confined himself simply to buying all fish at a paying rate, and salting and drying it according to the native method. The profits were not great, but the experience gained this year will no doubt be turned to good account next season, and produce some more tangible results.

The fishermen were the class who benefited most; for they sold their fish at once, and the competition among the curers raised the prices appreciably. Next come the native curers, who also derived a good profit, and this is proved by the large number (over 300) down in the register. They got their salt at a minimum price, the cost of watching was saved to them from the protection afforded by the yard, and the improved means used in salting and drying brought them a better price. They also took their cured fish to villages in the interior and to bazaars along the road to Badulla, getting a far higher price for it there than they would have obtained if it had been sent to Colombo. As far as I can ascertain, the cost of curing fish is R11·31 a cwt.

One cwt. of fish when dried is reduced to one-third its former weight, and the result must therefore be multiplied by three, making R11·33 as the prime cost of one cwt. of dried fish. All native curers send their fish to the markets along the Badulla road, such as Wellawaya, Koslanda, &c., where the prices range from R15 to R20 per cwt., and often as high as R30. After deducting one rupee per cwt. for cost of transport, the curer reaps a profit of from R3 to R4 a cwt. and where the fisherman is his own curer, the profits to him are double. Colombo is not a good maket at present, as it has to compete with foreign importations, which tend to keep down prices.

Food-Supply.—Annexed is a memorandum showing the yield of paddy and fine grain in this District, which, according to the last census, would give ten bushels per family. This is small compared with the supply of previous years, and is accounted for by the fact that a severe drought in Giruwa Pattu destroyed a good deal of paddy before it matured. The large yield of paddy at Tissa in Magam Pattu has produced a most marked change for the better in the condition of the villages lying near it; the inhabitants of which, intead of subsisting entirely on kurakkan and jungle produce, as formerly, have now a large proportion of rice for their food. Each village contributes a certain number of cultivators, who, after the harvest is over, bring back their labourers' share of the crop for themselves and their families. The paddy of this place even found its way to the Tangalla market, forty-seven miles off, in consequence of the supply there running short. The crop of jak-fruit in the gardens of Upper Giruwa Pattu was fair, and formed an important article of food among the poorer classes. Large quantities of the fruit are plucked when green, cut up and dried, and exchanged for paddy.

Miscellaneous. A new industry—that of making pith-hats—has been started in the jail. The plant which furnishes the pith grows in abundance in the tanks. It is cut into broad strips, and pasted over a mould of the required shape. The hats have been made, though not as neat as one could wish, have all been bought. I hope to induce the Malays in the town to take this industry up, as they show a peculiar aptitude for fancy work of this kind.

Sand Hills. A good deal of attention has been bestowed on the planting up of the sand hills during the year. There has been no further advance towards the town owing to the spike grass planted a year ago having taken root, and spreading so thickly as to prevent the sand from being blown along the surface. I speak only of the hill which threatened to overwhelm and bury the town; but for two miles down the road, towards Ambalantota, much has yet to be done in the way of planting spike grass. The parallel rows of live fences planted last year have been either killed by the intense heat or covered with sand. They have, however, undoubtedly been the means of checking the onward movement of the hills, and I have this year erected cadjan barriers to answer the same purpose until the grass spreads and renders them unnecessary. To give some idea of the rapidity with which everything is covered, I may state that the outermost barrier, fifteen feet high, was completely buried in a month. A sharp-pointed ridge of sand now marks its site. But I have to chronicle a more successful experiment in covering these hills with vegetation, and that is, the planting of palmirahs. This palm flourishes in similar soil in the Northern Province, and I saw no

reason why it should not thrive here. The dry climate is suited to its growth, and as the plant is tough and hardy it is able to withstand the strong wind that sweeps over the sand. The 500 nuts planted last year are all growing well, with healthy leaves, two feet and a half above ground. The success attending this attempt induced me to apply for 4,000 more, and these were planted in October and November last. They have all struck roof, and will no doubt appear above ground in another month or two. The successful growth of these palms is a subject for congratulation, as no one would have imagined in looking over the large expanse of sand that it was capable of producing anything. I have now applied to Government to assist me in procuring a fourth supply of 20,000 nuts. These will be planted out in thick belts, 100 yards wide by 200 long. The spike grass planted between the belts will be rooted out as more nuts are put in every year. The tops of palms will in time relieve the barren appearance of the place. Other experiments have been tried with the screwpine and warâ, both of which are growing well, specially the former, which will for a pretty fringe along the base of the hills.

JAVANESE FOR QUEENSLAND.

The following report from the British Consul at Batavia has been received by the Chief Secretary, under date 1st September:—

Sir,—I have the honour to acknowledge receipt of your despatch, No. 862,307, of the 9th July last, asking for information regarding the new class of Asiatic labour which is being introduced into your colony from Java, and in reply beg to inform you:

The natives who have been engaged here lately for employment on the sugar estates of Queensland belong almost entirely to the Bantam and Sunda districts of this island, and have the reputation of being hardy, strong, and well adapted for agricultural and other purposes; they are willing workmen at any trade, and are always ready to learn and set their hands to anything they are taught, although rather slow at picking up anything new. Their hours of work here are from 6 in the morning till 6 at night, with an interval in the middle of the day of about two to three hours. They cannot be said to be quick workers, but are very steady, and have wonderful powers of endurance. Their food is very plain, consisting chiefly of rice, fresh or dried meat or fish, and salt, With very few exceptions, hardly any of them have ever tasted alcohol, expressing a dislike for spirits of any kind.

They are accustomed to work in gangs under the direction of their native overseers, whom they look to as their masters, and whose word they attend to more than to that of a European; what they would consider as bullying from a European and resent as such, they would take without the slightest demur from their native headmen.

I am informed that the only provisions required by the Netherlands Indian Government to secure the welfare and return of the emigrants, after their terms of engagement has expired, is a bond, given by the firm here engaging them, certifying that they shall be well treated whilst in Queensland and guaranteeing their passage back to Java.

I am not at present in a position to venture an opinion regarding the probability of the natives remaining abroad after the expiration of their term of engagement, but I should think the difficulty experienced in obtaining women to accompany them would be a strong reason for their returning here when they can do so.

I have reason to believe that the Netherlands Indian Government is not in favour of this kind of emigration, and should it assume larger proportions, will probably prohibit it altogether, or place such obstacle in the way as to prevent it.

Enclosed I beg to hand you copy of a contract made between a firm here and some natives, who proceeded lately to your colony, which will doubtless be of interest to.—I am, sir, &c.,

N. M'Neill, H.B.M's Consul.

The contract referred to provides that the labourers shall "hold themselves in readiness to embark for Queensland, there to work for three years after arrival, certain of them as mandoors, the others as field labourers for and in accordance with the instructions of the other parties to the contract, on one or more of their sugar estates in Queensland." They are obliged to work ten hours a day, Sundays and other general holidays excepted. A salary of twenty-five guilders for every mandoor and seventeen guilders fifty cents to every field labourer will be paid per mensem from the date of their arrival in Queensland. Besides, they will be entitled to free board and lodging and free medical attendance. The food is to consist of rice, fresh or dried meat or fish, and salt. Their right to wages and food is immediately forfeited in case of their refusal to do the work assigned to them, only the case of sickness excepted, And an advance on his wages every appearer on the other part at the date of his going on board ship at——is paid an amount equal to three months' wages, to be paid back by monthly instalments to be retained on the said wages at the rate of four guilders for every mandoor and two guilders fiftycents for every field labourer. The passage from ——to Queensland, and at the expiration of the present covenant the passage home to——of the appearers on the other part is to be paid for by the appearer on the one part. The appearers on the other part, in so far as they have not appeared attended by their wives, may be accompanied by their wives. Only free passage out and home and free board will be allowed to these wives. On their performing any work wages are to be paid them, the amount of which is to be settled hereafter. Immediately after their arrival in Queensland the appearers on the other part are considered as having submitted to the ordinance enacted in 1861, regulating the connection between masters and workmen, the contents of which they declare to have well understood.—*Queenslander*

THE PURE PRODUCE COMPANY, LIMITED.

The Future of Ceylon Tea.

From "Stocks and Shares," October 16th, 1886.

"As an illustration of the position which Ceylon Tea is occupying in the London market, it may be interesting to note that only so far back as 1880, when attention was being practically drawn to this new industry of Tea cultivation in Ceylon, the production that year was about 115,000 lb, and this has gone on rapidly increasing to 7,000,000 of lb. in 1885-6; and the estimates for the next twelve months promise to reach 13,000,000 of lb., and so on till in 1889 90 the prospects indicate some 35,000,000.

"The imports of Chiua Tea into London during the past five years have uniformly averaged about 140,000,000 of lb, and from India there have been about 60 to 70,000,000, thus showing that while these two sources of supply exhibit no further development, that of Ceylon stands conspicuously forward as the channel whence we may derive the extra supplies to provide for the increased consumption going on in this country, and which at present averages 5 lb. per head.

"From all accounts, too, Ceylon Teas seem to possess qualities specially attractive, and if they could be placed before consumers at prices free from the heavy burden of excessive retail profits, which, from what we read and hear, amount to something like 8d. and 1s. per lb., they will no doubt enter largely into consumption, unmixed with Chinese and Indian.

"Profits like these of about £300,000 on 7,000,000 lb. of Tea, the value of which duty paid at, say 2s 6d. per lb. is £875,000, seems a large percentage. There can be no question, therefore, that any commercial enterprise having for its object the systematic development of the Ceylon trade cannot fail to prove highly remunerative. We commend this idea to Mincing Lane."

The above article, which appears in "Stocks and Shares," contains in its remarks so clearly the nature of the business which the "Ceylon Pure Produce Company" intend to carry out, that they take the

opportunity to reprint the paragraph in its entirity. The Company draw attention to the fact that they are making Ceylon Tea their speciality, as will be found in the accompanying Prospectus. The practical knowledge which will be brought to bear on the business they undertake, and their close connection with the Mincing Lane Markets, place the Company in a position to make their selections most advantageously from the entire importations brought into London; and by using all the extensive means at their command for publicity, the widest scope will be afforded to participate largely in distributing their Ceylon Tea at prices which will show an appreciable gain to the public, and in quantities to suit the most moderate orders.

Without indulging in any extravagant ideas, there seems no reason why the Company's sales should be limited to the moderately estimated amount of a quarter of a million lb annually, and if the profits be calculated, even at a considerable reduction, on the basis of those stated by "Stocks and Shares," they would still yield dividends which may be variously estimated from 20 to 30 per cent.

CEYLON TEAS.—"BULKED UNASSORTED."

In *I. A. Rucker & Bencraft's* Weekly Tea Circular October 21st, we read:—

Last week we referred to this subject, taking as an example of what we consider its importance the case of an estate, which shall be nameless, the produce of which we pointed out had apparently been experimented upon with a view to satisfying the planters as to whether or no our advice on this head was sound. We say our advice, as we have been hammering at it for a year, and have got some of our friends to adopt the method, while we are informed that in other quarters our recommendations are discountenanced, and the advantages we claim for the planter are denied by some who perhaps may not have had the time or inclination to go as thoroughly into the matter of blended Teas as we have in the last fifteen years. The proof in the pudding is in the eating, and we should have thought a clear loss of £300 on the assorted portion of the estate in question, even though only shown by our estimate, would have been enough to set people to work for themselves to see if there was "anything in it." For the satisfaction of those friends in Ceylon, who have acted upon our suggestions, we have determined to go a step further, and we now invite attention to the following facts which may confirm them in adhering to the decision to which we had led them, and which may benefit those who have not yet had a lengthened practical experience. It will be remembered that the "unassorted break"—which, we may explain to the uninitiated, was the portion of the yield, or picking, in which the Broken Pekoe, Two Pekoes, Pekoe fannings, and Pekoe Souchong were blended together and sold in one break—fetched one shilling and five pence farthing per pound. The remainder of the invoice sold in six separate breaks, averaged only one shilling and one penny farthing. We first heard it doubted whether the Teas were from the same garden. To this we can only say they are all marked with the estate name, and all comprised in one invoice. There is a slight discrepancy between the two lots which we shall allude to further on. The proportions in which the Teas came from the machine may be expressed thus:—Broken Pekoe 1·4; 1st Pekoe 5·8; Fannings 1·9; 2nd Pekoe 0·6; Dust 0·6; Pekoe Souchong 0·3. The dust, we take it, represents the entire quantity of dust from the whole invoice, whether assorted or unassorted, for we cannot find the proper proportion of dust in the 1s 5¼d parcel. We have taken the trouble to procure one of each of these particular six Teas, and have had them carefully blended in the same proportions as above, and with this result, our blend of the six Teas which when sold separately only averaged 1s 1½d, is worth a full *half-penny per lb. more* than the "unassorted" which realized 1s 5¼d. We account for this by the simple fact that the dust which of course sold by itself for a low figure—but has a grand pungent Pekoe flavoured liquor—assists to thicken and "fetch up" the bulk when added to it. Being, as we take it, removed from the entire parcel, the "unassorted," minus the dust, was in our opinion depreciated to the extent of ¼d per lb. Readers may recollect that in a less sprightly market on March 4th, 1885, we called attention to the sale of an entire invoice "unassorted" at 1s 6d per lb. "Certain buyers want fine broken Pekoes and give long prices for them, and we have to take that into consideration." To this we can only say, why should you take out the Pekoes, Fannings, and dust, to sell at a low figure in order that some one may buy the broken Pekoes at a long price and mix them again? "But then if everybody bulks his Teas 'unassorted,' we shall soon arrive at one dead level of price for Ceylons, and there will be no range from 7d to 3s 6d as formerly." John Chinaman has from the year 1840 adopted this plan, and a glance at a China Tea Broker's Circular will show there is no dead level for China Teas yet. Quotations for Congous still range from 5½d to 2s 6d in an average year, and this is for millions of pounds where Ceylons are still thousands. There is no doubt quality will tell in the price obtained for the "unassorted" Ceylons just as it does in the "unassorted" Chinas. Reflections will bring to mind several recent sales of unassorted parcels from different gardens selling same day and side by side at 11d and 1s 5d per lb. Besides we do not advocate treating the entire Tea crop of Ceylon in this way, it is quite open to the expert to decide how much of his broken Pekoe he will ship as it is, and how much return to the bulk, to assist in giving tip and appearance to the remainder of the parcel. It would be obviously absurd to lay down any hard and fast rule about it. Experience and judgment must guide the planter after all said and done, as to how he is to get the best return in money, and we trust we have indicated one direction in which he may look for a reward for thought and skill. There is no reason to be disheartened and discouraged if first efforts do not bring out a much higher result. The secret of the success of blending is that the finer Teas, owing to their greater strength and flavour, which over-master a much larger quantity of somewhat inferior Teas, and raise the quality of the bulk, but the exact limits to which to go without making the fine Tea resemble the proverbial needle in a bottle of hay, can only be arrived at by experiment and practice. It is perhaps worth while to point out once more that when there are ten millions of pounds of fine broken Pekoe the price is scarcely likely to be the same as now there is one million. In nine cases out of ten this fine broken Pekoe is blended—smothered we should perhaps call it—with vastly inferior Teas, for the drinkers of pure finest Ceylon broken Pekoes selling in the Rooms at 2s to 3s are few and far between. The description "unassorted" though perfectly well understood by the trade is somewhat misleading, and we are inclined to advocate boldly marking such Teas "Factory Blended." The planter may be sure of one thing, he is far more likely to send forward even quality by blending than by assorting. What planter would contract under penalty to ship from an estate a broken Pekoe of exactly the same quality six times running? yet by blending, contracts here can be taken for a year at a time with no fear of having goods declind as not up to muster.

The Ceylon Cinchona Syndicate proposal is discussed in the *Madras Mail*, in an article which will be found on our last page. Although a formal organisation is not likely to result now, yet the discussion will probably lead to a good many individual proprietors doing the work of a Syndicate, by holding their bark in quantities under warrant, rather than rushing it on the market. Advances can be got on such stocks within a safe margin.

THE CEYLON CINCHONA BARK RING SCHEME.

The low prices which have been realised for cinchona bark, owing to the enormous exports from Ceylon during the past two seasons, have led growers to cast about for some means of improving them, and a proposal, made by Mr. Sinclair, inthe Colombo papers, to form a bark "Ring," or Syndicate, has attracted a good deal of attention. Combinations of large holders of any article in general demand, who have agreed not to sell under a certain price, have occasionally resulted in large profits, and though the conditions existing in the present instance are very different, the idea must possess considerable fascination for the planter, with the unit of quinine down to 3d. The mode of procedure suggested is, that every producer in the "spicy island" should send his bark, after baling and analysis, to a store in Colombo, and agree only to ship in such quantity, and at such time, as the directors of the scheme should decide. Mr. Sinclair takes as his text the dictum of Messrs. Brooks and Green, wellknown London brokers, that "the price of cinchona depends entirely on the shipments from Ceylon,"—which may be accepted as a truth, though not an eternal one—and argues that, if growers could limit their supplies, the unit would rise from 3d to 6d A receipt specifying the variety and quantity of bark stored would be handed to the owner, and the Syndicate, by keeping itself well informed of the state of the market, could, it is thought, so regulate supplies, as to keep the price at paying level.

Mr. Sinclair himself mentions some of the difficulties to be encountered, but declares that none of them are insurmountable; for instance, that mortgagees would be unwilling to wait for their money; that most planters require the full value of their harvesting at once; "that the making a selection of bark for shipment would probably give rise to more discontent than any other difficulty;" and, lastly, that Java, India, or South America might step in and upset his plans. This last objection he cheerfully intends to combat by flooding the market on the first sign of aggressiveness on the part of any of these countries, and for our own part, we are disposed to think that "the selection of bark for shipment," on the occasion of one of these patriotic sacrifices being deemed necessary, would give rise to even greater discontent on the part of the devoted Syndics than the refusal of priority at other times. This could only be obviated by all growers agreeing to "pool" their bark; but such a suggestion is merely chimerical. The first and third difficulties might, perhaps, be overcome; as to the second, it is gravely suggested that the Banks would advance half the enhanced value (*i. e.*, the full present value) against the storekeeper's receipt. Perhaps Colombo Banks are fonder of dabbling in cinchona than Indian ones, but it would be a sanguine planter who, in this country, went to a Manager with such a 'heads I win, tails you lose" proposal; for, supposing the speculation failed, and prices did not rise, the Syndicate might simply hand over the key of the store to the Bank, and tell it to make the best it could of the business. Added to which—such are the peculiarities of the Ceylon law—if the store was found to be empty, it is more than doubtful if any remedy would exist. Another difficulty not noticed in the letter we are considering, is the fact that it is not so much the quantity of any articles that is actually up for auction in London, or Amsterdam, that fixes its price, as the quantity available, or soon expected to be available, in the export towns of the producing countries. The Brazilian planters used annually, when raising money for working expenses, to depress the coffee market with apocryphal tales of the magnificence of their blossom, and of the enormous crop they would be shipping in a few months. If rumours of this kind were believed, what might be expected to happen in the face of 10 million lb. or so, being actually stored in Colombo? Nor must the expenditure on rent, staff, and insurance be forgotten, all of which would have to be incurred for a very problematical advantage. The Syndicate is, apparently, to be worked without capital, excepting, we suppose, the monthly contributions of members for current expenses. The scheme is, however, one that essentially requires capital, and is not likely to succeed in the hands of men largely dependent for a livelihood on the article they are speculating with, and who are anxious to raise every anna they can to put into next season's tea extensions. For, after all, few Ceylon planters look upon their cinchona just now as anything but a means to that end. The price of bark is likely to rise in the near future, but it will be from the exhaustion of the supplies in Ceylon, and not from any artificial limitation thereof. Were it not for canker, it might be found more practicable to agree not to harvest more than a certain quantity of bark, whereby all storage expenses would be saved; but canker is ever present in the island, and the bark must be gathered from dying trees. The *Ceylon Observer* sensibly suggests that steps should be taken to ascertain what cinchona may be expected from India, and other countries; but such an enquiry would take time, and this the promoters of the Syndicate are anxious to save.

In conclusion, two facts may be borne in mind by any one desirous of meddling with a speculation of this kind, first, that though stocks of bark are not abnormally high, there does not seem to be any great competition amongst the buyers; all the bark is absorbed, but only on account of its low price. Enormously as the consumption of quinine has increased, there has been no exceptional demand—such as would be caused by a great war,—and it is very likely that a great deal of capital is looked up in quinine. Should, then, the supply of bark be limited, and the price be raised, manufacturers might be able to hold out, and refuse to buy for a longer time than would suit the Syndicate. The second point is that, when Ceylon planters boast of the possibility of driving all other bark than their own off the market, they forget that, in India certainly, and perhaps also in Java, bark can be harvested just as cheaply as in Ceylon. They have been talking so loudly of their "unrivalled labour supply"—which, by the way, seems to be rather short just now—that they have at last persuaded themselves that they work cheaper than any one else. As a matter of fact, a cooly on an estate in Cochin, Wynaad, Coorg, or the Nilgiris, often gets only half, and never more than two-thirds of the pay of his brother in Ceylon. It may be admitted that a 3d unit does not pay in either country, in the sense of giving a return on capital; but for one in the position of His Excellency's "enterprising citizen," with his cinchona ready to hand, it pays well enough for the mere harvesting and, as the Indian planters work more economically, it pays them better than the Ceylon one; so, as long as bark is saleable at all, no amount of Ceylon competition can drive out the Indian article. South American uncultivated bark can simply not be put on the market while prices remain at their present level; there is no question of capital involved there, but simply one of collection. It is usually said that a 6d unit admits this bark, and once the unit goes up to that figure it must be reckoned with. The Dimbula Planters Association has set to work to discover how much cinchona is actually left in Ceylon, and when the information has been published growers in Ceylon and elsewhere will know better what to expect.—*Madras Mail.*

COLIND EXHIBITION AND PLANTERS' ASSOCIATION.

Planters' Association of Ceylon, Kandy,
13th Nov. 1886.

To the Editors "Ceylon Observer."

Sirs,—I beg to enclose for publication copy of a letter from Mr. J. L. Shand on the subject of the Colonial and Indian Exhibition.—I am, sirs, yours faithfully, A. PHILIP, Secretary.

Ceylon Commission, Colonial and Indian Exhibition
South Kensington, S. W., 22nd October 1886.

Alex. Philip, Esq., Planters' Association of Ceylon, Kandy,

Dear Sir,—Your letters of the 14th and 24th have come to hand this week upon following days. The letter of the former date encloses addresses to which eight pamphlets have been sent and the latter a list of sixty-four. On receipt I have written to Messrs. P. O. Don & Co. but have not yet received their reply as to the 2,000 copies. I have not yet heard in reply to my formal application as to the registration of a trade mark, but as I was promised an answer within ten days, I am daily expecting it.

I have packed for you a box containing the Official publications connected with the Exhibition as per list enclosed. The box will also contain samples of the very best Trinidad cocoas which may be interesting for purposes of comparison, and a sample of Jamaica cardamoms. I conclude there is no use sending out samples of teas, though I shall be glad to do so at any time if it should be desired. We can draw no profitable comparison except from the finer Indian teas and I know many planters get regular supplies of these from home.

Referring to Mr. A. M. White's letter from which you send me extract, it is impossible to follow the course of markets by comparison drawn from specially prepared Exhibition samples, but the connection I have been able to form in the city among brokers in various products will enable me when I am released from my duties here to obtain information which may be of value, and such information will always be at the disposal of the Association. As regards improvement in cultivation or manufacture of our various products, we are so constantly taunted on this side with extolling our own wares, that it is gratifying to find there is still a school of disciples in Ceylon, but with the exception of cocoa about the mode of preparation of which there is much uncertainty, I am afraid I can offer no suggestions. When I asked Mr. Pasteur who is reporting upon the coffees in the Exhibition, if he could suggest any improvement in the preparation of coffee, his answer was that though much Ceylon coffee, now contained many defective beans, he believed it to be impossible to improve upon the system of curing in Colombo. I may mention that there is a strong and a growing feeling in favour of bringing coffee home in parchment and it is said that Java coffee sold in parchment in Amsterdam brings 6s per cwt. more than when cured in Java. Mr. Pasteur does not expect there would be anything like so much difference between Colombo and London cured coffee, but so many large dealers have spoken to me on the subject, that I have arranged to give it a trial. When I asked Dr. Paul if he could suggest any improvement in our systems of harvesting cinchona barks, he replied in the negative, but, he added, if you cease the shipment of twig and inferior barks your markets will improve. He is, as I mentioned before, strongly in favour of the cultivation of *C. robusta* in Ceylon. The same with tea, though Mr. Stanton tells us as we all well know that much Ceylon tea, leaves *much* to be desired in preparation. He will also tell you that the better marks from Ceylon leave *nothing* to be desired. Brokers have so long been pointing out the advantage of large breaks and of not sorting into too many grades that I need not enlarge upon it. I hope the few analyses Mr. Hughes is going to supply us with, may throw some light on the questions as to how much inferiority is due to faulty manufacture and how much to defective soil. It is hard, but I am convinced it often happens that Superintendents are blamed for bad prices when the fault lies really in the soil and this is a matter easy of proof. I hope the Association may see its way to a regular extended series of analyses. While on the subject of tea, I am sorry to hear that the result of Mr. Walker's enquiries as to the price at which crude petroleum can be put down in Colombo is by no means satisfactory, but as has just been pointed out to me by Mr. Hervey, the gentleman who first drew my attention to *Tarbutts Patent* we do not want crude petroleum, but the residue after the volatileilos have been extracted and he is sanguine that the result of further enquiries which have been set on foot will prove that the patent is practicable and will be economical in Ceylon.

I am sorry to be able to write in a different strain about the Japan tea chests to what I expressed formerly. My firm bought a shipment of Ceylon tea packed in half-chests of the momewood I think and several of them arrived with their sides stove in. The wood of which they are made is extremely brittle and shows that care must be exercised in purchasing these chests. I notice that some of the Indian chests have a small upright stick in each of the four corners of the chest from top to bottom which must tend materially to strengthen the chest. These Japan chests are so very neat and especially for sending to the country so much more attractive, that it will be a pity if the standard should be lowered.

The only Cardamoms in the Exhibition besides those from Ceylon, are a bottle from Jamaica a few from which I enclose as a curiosity: a sample of racemes (?) and fruit preserved in spirit from Grenada and two small boxes from India one from Merkara and one from Bangalore so there is but little opportunity of drawing comparisons, but ours are shown much better and look much better than any others. There is mention of cardamoms in the Straits Settlements' catalogue, but I have not yet been able to find them.

The Reports now being drawn up, on all those subjects will be interesting and though they are I believe in no way to draw attention to competitive merit, they will contain much valuable information. Mr. Stanton has, I am glad to say, had instructions to include Indian teas in his report. I will of course send you copies of these reports as soon as they are published. I have this moment had a letter from Mr. Pasteur asking me to go and see the samples of cocoa arranged in order of merit and I hope to do so. He showed me the other day a sample of cocoa which, guided by outward appearance only, would have been pronounced of great value, but which was almost worthless because it was mildewed inside.

Mr. White asks if I can not suggest any new products for Ceylon. I believe fibres on our wastelands and sericulture among natives will yet become large enterprises. Fibre machinery is rapidly being improved upon and if the proper machine for aloe manipulation can be found, it will yet be a large industry. If a chance of sending a few dried aloe leaves should arise, I think we might work out some practical good with them, but the market for the disposal of all the minor products which have been brought to my notice is so fickle and fanciful, that I hesitate to suggest, much less to recommend.

I enclose you rough copy of figures connected with the Tea Trade of the Colonies; there is nothing new in it, but it shews the extent of the various local markets.

There are few articles of food supply being pushed as Ceylon tea is; it is advertized everywhere, even on the programmes of theatres and new Companies are springing up all round us to push its sale. We have opened several foreign connections, which may I trust develope.

The fate and the future of the Exhibition is to be decided the day-after-tomorrow and you will probably know of it by telegram before you get this.

We had a Ceylon Dinner on Wednesday which the newspapers will probably have an account of. I need only mention that Sir Arthur Birch, Dr. Trimen and Mr. Saunders all referred to the excellence of the P. A. Arrangement and Show, and to how much this was attributable to Mr. Christie's personal exertion.

I lecture on Ceylon Tea here on Wednesday. I will send you by next mail an account of my receipts and disbursements. Meanwhile, to soothe the feelings of the anxious, I may remark that I hope to get a grant towards my incidental expenses from Sir A. Birch, which will leave the £50 you sent me untouched You will have heard of Mr. de Soyza's generosity.

Faithfully yours, Signed, J. L. SHAND.

List of Books Referred to.

India.—Hand-book collection wild silks, Indian silk culture, Empire of India Catalogue, Hand-book of Jeypore Court 4.

Canada.—Canada Guide-book, Report on Agriculture,

Province of New Brunswick, Province of New Brunswick 5.

New South Wales.—Official Catalogue, Progress and Resources, Progress and Resources, the Year Book 4.

Victoria.—Year-book, Catalogue, Illustrated Handbook, Royal Commission on Vegetable Products 4.

South Australia.—South Australia 1.

Queensland.—Queensland, Queensland Catalogue 2.

West Australia.—West Australia, West Aborigines, West Geology, West Catalogue 4.

New Zealand.—Catalogue, Hand-book, Geological Catalogue, Field for Emigration, Colonization Circular 5.

Fiji.—Hand-book 1.

Cape of Good Hope.—Catalogue, Hand-book 2.

Natal.—Hand-book, Catalogue 2.

Straits Settlements.—Notes on, Notes on Perak 2.

British Guiana.—Catalogue 1.

West Indies.—Hand-book 1.

West Africa.—Hand-book 1.

Malta.—Hand-book 1.

Cyprus.—Catalogue 1.

B. N. Borneo.—Hand-book 1.

West Australia.—Timbers 1.

Messrs. Ramsome Sons and Jeffries Catalogue 1.

TABLE OF COLONIAL TEAS:

AUSTRALASIA.

Victoria.

	lb.	Value
Import 1884-85 ..	11,524,205 ..	£667,800

Duty 3d per lb. Price 1s 6d to 2s 6d per lb.
Imported ½, ¼, and whole chests of about 45 lb.
Chiefly imported from Assam, China and parts of India, principally Calcutta.

Queensland.

	lb.	value.	
Imports from U. K.	15,550	£ 738	Duty 6d per lb.
,, N. S. Wales	1,077,263	60,946	£65,004 8s 3d.
,, Victoria	387,467	21,222	
,, N. Zealand	410	28	Export 88,715 lb.
,, Hongkong	528,306	20,063	
,, China	744,503	35,099	£4,683.
,, India	3,690	219	
,, New Guinea	45	1	Average retail per 2s 4d.
,, S. S. Islands	43	2	
	2,757,277	£138,318	

Imported in chests, ½-chests and boxes.

New South Wales.

Import lb.	
1881.....7,439,541	Customs value 1s 9d per lb.
1882....8,276,930	Duty 3d per lb.
1883.....7,588,709	Retail price same as England
1884.....5,732,011	Chiefly ½, ¼ and ⅛ chests

Customs Revenue in 1884—£99,954
Chiefly from China ; hardly any from India.

West Australia.

Import in 1885—330,990 lb., Customs value £22,066
Duty levied four pence per lb. average retail prices, 1s 9d to 2s 6d
Size of packages from 10lb. upwards.

	lb.
Imports United Kingdom ...	1,247
,, Victoria	88,455
,, South Australia ...	56,189
,, New South Wales ...	600
,, Queensland	180
,, Hongkong	49,714
,, Singapore	54,476
,, China	77,742
,, Ceylon	2,357
Total ...	330,990

South Australia.

Imports of Tea		lb.	£
in 1881 from	U. K. ..	523	41
,, ,,	Victoria ..	794,791	44,524
,, ,,	N. S. Wales ..	49,356	2,130
,, ,,	India	51,715	2,238
,, ,,	Ceylon ..	3,119	242
,, ,,	Hongkong ..	232,469	12,227
,, ,,	China	1,098,020	53,967
		2,229,993	115,369

Entered for home consumption 2,220,099 lb. Gross amount received £27,750 15s 3d. Duty 3d per lb.

New Zealand.

Imports in 1884, U. K.		9,525
,, ,,	N. S. Wales ..	125,081
,, ,,	Victoria ..	1,112,345
,, ,,	Queensland ..	51
,, ,,	Fiji..	942
,, ,,	Hongkong ..	189,240
,, ,,	Bengal	38,355
,, ,,	China	1,704,803
,, ,,	South Seas ..	248
		3 180,590

Duty 4d per lb. Entered for home consumption 4,391,809 lb. Value £180,301 lb. Custom receipts £73,196 16s 5d Retail price 1s 4d to 3s.

West Indies.

	Quantity. lb.	Value. £	Duty.
Jamaica	23,077	2,307	1s per lb.
Barbadoes	35,961	2,697	3d ,,
Trinidad	27,151	1,723	6d ,,
Dominica	488	59	6d ,,
St. Kitts and Nevis	4,500	326	0
Montserrat ..	225	14 10s	4d ,,
Antegua	6,785	452	0
St. Lucia	913	55	6d ,,
Tobago	1,698	121	6d ,,
Grenada	2,701	216	6d ,,
St. Vincent ..	3,168	246	6d ,,
British Guiana	31,170	1,462	6d ,,
British Honduras ..	7,220	434	1s ,,
Bahamas	4,493	374	1s ,,

Practically all imported from the U. K. Retailed from 3s to 5s per lb.

Imports from United States subject to *ad valorem* duty of 10 per cent.

Canada.

	Import.	Value.	Entered home consumption.	Value.	Duty.
	$	lb.	$	$	
Black teas	174,537	41,667	187,371	43,168	4,349 80
Green and Japan	1,642,494	257,755	1,837,52	290,358	29,086·09

	lb.	$
Green and Japan		
from U. Kingdom	2,765,329	632,845
,, China	1,424,335	299,741
,, Japan	4,859,857	857,704
,, British East Indies	640	153
	9,050,161	1,790,443
Black from U. Kingdom	6,260,602	1,210,667
,, China	1,072,430	228,186
,, Japan	31,326	5,330
,, British East Indies	23,438	4,258
St. Pierre	380	90
	7,388,176	1,448,531

Mauritius.

	lb.	Value. R
Import in 1880...	16,428	17,281
,, 1881...	39,748	42,971
,, 1882...	26,732	36,803
,, 1883...	24,846	31,624

Duty R0·04 cents of rupee per lb. Average retail price R2 per lb. Packages of 1 and 2 lb. Usually imported from India, Ceylon and Hongkong.

Straits Settlements.

	Cases.	Value. $.
Import in 1884...	69,944*	563,408

No Customs Duty. Indian tea is dearer than Chinese
The bulk of the tea consuming population is Chinese.

Cases.	Value. $	
92	2,906	from India.
1,926	10,991	from British Burma.
67,926	549,511	from China.
69,944	563,408	

CINCHONA BARK.

(From I. A. Rucker and Bencroft's Weekly Price Current.)

The last Bark sales went again in favour of sellers, and the unit may now be quoted at 3¼d to 3½d. Only 1,470 bales of Ceylon were offered, of which the bulk sold. 156 bales Java, direct import also all sold. Some of our readers may remember that in a recent circular we implied that at the September Dutch Bark sale, Barks were sold far and away cheaper than anything done in our London market, and we suggested that such a result must be additionally aggravating to the owners of the Java shipments, considering that the tone of our market was firm: the London sale shortly after the Dutch sale having given results slightly better than those of the London sale shortly before the Duch sale. We believe our facts to be correct, and the deductions drawn from them to be reasonable. Mr. Wischerhoff, a Rotterdam Drug broker, disagrees with us, and has written a rather lengthy pamphlet, which has reached us through the post, the receipt of which we take this opportunity of acknowledging with thanks. The basis of Mr. Wischerhoff's argument seems to be the following table, giving the results of the sale of 283 bales of Ledgeriana, on the 29th of September:—

Lots.	Sulphate of Quinine.	Price per ½ kilo. cents.			cents.
1 to 8	4.06	61	therefore per	unit	15.00
9 to 12	2.99	40	„	„	13.37
13 to 17	0.40	14	„	„	35.00
18 to 22	3.82	66	„	„	17.27
23 to 30	3.61	68	„	„	18.83
31 to 38	4.03	73	„	„	18.10
39 to 42	3.20	46	„	„	14.37
43 to 47	0.48	19	„	„	39.58
48 to 51	3.78	66	„	„	17.46
52 to 58	3.95	66	„	„	16.70

or on an average fully 20½ cents per unit. Of course, we may conclude that all these Barks were of a manufacturing quality, as, if Druggist's Barks were amongst them, Mr. Wischerhoff would not have felt justified in including them in his average. But the deductions drawn from such tests are of no commercial value. In Holland, either through erroneous testing, or through bad sampling, they appear to sell manufacturing Barks on one and the same day at 13 cents, and at 39 cents per unit. Mr. Wischerhoff, however, honourably acknowledges that the prices of Lots 13 to 17 and 43 to 47, are not comprehensible on the surface, and as, in a commercial argument, we prefer dealing with the comprehensible, not with the incomprehensible we have figured out the above table leaving out these two acknowledged doubtful lots, the result being that the unit value was 16¼ cents, not 20½ cents. All this, however, to our mind, goes for nothing. The question as to whether London or Amsterdam is the better Bark market, a question which some interests attempt to wrap up in obscurity, is really a remarkably simple one, and is solved by the large buyers whenever sales take place in Holland. Planters have and can again solve the question for themselves, but even they cannot know the rights of the whole question as easily and as completely as those who buy freely in both places. We should hardly have ventured to assert that the nett results of the last Dutch Bark sale were so very unsatisfactory, unless we had had high and unbiassed authority behind us. Growers and shippers of Bark in Java are no doubt fully aware that a Dutch Drug Broker would like to see Java shipments setting towards Holland, and that an English Bark Broker, on the contrary, would prefer to see his market getting the preference. As men of the world, therefore, we know that our opinion on this matter would carry but little weight, first, because we are biassed; second, because we ourselves have no means of getting properly drawn Dutch samples, if we had we could satisfy our own minds, by employing our own chemists, but Dutch firms would think the trial a doubtful one. Buyers, however, we think are to all intents and purposes unbiassed, indeed, if biassed at all, it would be towards the cheaper market. All Barks offered and sold during the year in London and Holland are analysed by the buyer who is the authority for our statement. The same chemists in the same laboratory work out the results for him, and as he is one of the largest, at the present date we believe the largest buyer of Bark in the world, we imagine his opinion will carry weight and practically decide this vexed question. He endorses every word we have said as to the superiority of this market. In addition to this we know that another large buyer interviewed him on this subject, in order to compare results, and that it was mutually agreed between them that far and away the cheapest Bark sold this year was at the last sale in Holland. Again, we have put the question to another large buyer, a gentleman whose firm's name is a household word in the Bark trade, and he assures us that there is no doubt about the matter, and that the causes are not far to seek. We believe we are correct when we state that the representatives of the two former gentlemen bought between them about three-fourths of the whole Dutch sale. We, therefore, with every apology to Mr. Wischerhoff, must perist in dogmatically asserting that his question is answered as far as results go, Java. Cinchona, Holland or London? London. Only a short time ago, as Java planters must by this time be fully aware, a consignment of 200 bales of Java Bark was most carefully bulked and divided, half going to Holland, half to London. The shippers made a bona fide attempt to solve the question of markets for themselves, the result being that their experiment cost them £120, the 100 bales sold in Holland, realizing £120 less money than the 100 bales sold in London. It is on the opinions of high class merchants, and on facts such as the latter, that we venture, to use Mr. Wischerhoff's own words, to offer our persevering, benevolent, and sympathizing counsels to those shippers who still doubt which is the better market. As we are short of time, we will only add that we disagree altogether with Mr. Wischerhoff's remarks about sampling: according to him, the more faulty the samples, the more they vary one with another, the more unrepresentative they are of the bulks, the better the competition and the more satisfactory the result. We, on our part, like to know that what a buyer thinks he has bought, he has really got, and such is the result of London sampling.

CINCHONA BARK ANALYSES.

We have been favoured with a copy of a Circular-report by Mr. T. R. Visey of the Analytical Laboratory, Ilford, which contains certain curious information worthy of the attention of our Ceylon planters. The correspondent who is good enough to send the circular, says, "the charges made against analysts generally are severe"; but unfortunately there is so much that smacks of self-advertising about some paragraphs that we can scarcely give so much weight as we otherwise should to all that is said. However, our readers can judge for themselves; here is the report:—

CINCHONA BARK.

Analytical Laboratory High Street, Ilford, Essex, October, 1886.—The Ceylon Crop for 1885-8, having just closed, and New Season commenced affords a fitting opportunity to glance at the general position Concerning the future it is a certain fact that the Crop of Java Bark will be heavier and probably include a larger quantity of fine quality. The export from East India will also show increase, but to what extent, depends materially upon the decision of the owners whether they will cut their Bark at preent rates; from a private source I hear there is an inclination on the part of some owners not to Harvest at present, but wait a little in hope of better

values. What will Ceylon Ship in the coming Season? This is the special question affecting everyone interested in Bark, whether Buyer or Seller. Although estimates ranging from 12 millions upwards have been mentioned, I do not think at this date it is possible to form any definite conclusion. The quantity that may be harvested (under any circumstances) to make room for Tea or other produce. Amount likely to be cut for financial reasons, and still more important the course of market, all these uncertainties render an estimate at present moment of little value. But unquestionably the principal point that will guide the bulk of the merchants, will be the price likely to be obtained, and it is to this I desire to direct especial attention. All interested in Bark are anxious to see the Ceylon export as moderate as possible and yet the same mistake made in previous years of quoting values too high is actually being made at the present moment, when the error can only be of disadvantage to owners. From the various analyses I have made, compared with the Manufacturers Tests, I state positively that the bulk of the Bark sold in Public Auction during the past month has been quitted at 2¼d. to 2¾d. per Unit, and for very low grades occasionally 2d per Unit. I heartily wish the rates were doubled, but there is no good in disguising facts, indeed at the present moment it is especially a mistaken policy to quote the Unit value above what is obtainable, and Manufacturers know that they have purchased on this (and very Fine Barks) at other Markets at the above prices.

The explanation of the principal cause of the Unit value being quoted too high is the most unpleasant duty I feel thrust upon me, but in the interest of owners I cannot avoid it, although the knowledge came to me during the first month I was established, I have deferred any reference to the fact, until my business was thoroughly successful, to avoid any reference.

For some considerable time past certain Analyses of Cinchona Bark have shown a failure to obtain the FULL and proper per centage of Quinine contained in the Bark Analyzed and as a necessitous result the price realized has worked out 3d to 3½d and in some cases even more per Unit. This failure to obtain a proper result or in other words an under estimate, is to me inexplicable with a thoroughly practical test; I have Analysed samples of Bark and seen the Parcel manufactured confirming my Tests and cannot give way to anybody in the question of accuracy and therefore feel confident in repeating that where Analyses during the past month have repeatedly shown a unit value of over 3d such results have not found the proper and full contents of the Bark, or in other words the Analyses were incorrect. But beyond the statement already made I would point out that German Quinine has been sold in large quantities recently at not over 2/- per oz. and manufacturers are now making fairly satisfactory profits :—

	£	s.	d.	
Now @ 3d per Unit = 100 Units = 1 lb.				
=100 Units @ 3d	1	5	0	per lb.
Manufacturers' charges, Buying Commissions, Clearing, Making, &c., say about	0	7	6	"
	1	12	6	
1 lb. = 16 oz. Quinine @ 2/- ..	1	12	0	

This I think is conclusive proof that buyers cannot affort to pay regularly even 3d per Unit at the present price of Quinine, as a matter of fact they have often purchased lately at nearer 2d per Unit as reckoned by the proper and full Analysis of the Bark.

Before closing my letter, there is one small matter I would refer to—Several Samples sent me the owners have desired an Analysis made giving all the Sulphates and Alkaloids (charge 17/6) and of course I am pleased to comply with the request, but as the Sulphate of Quinidine and Cinchona and Amorphous Alkaloids are not now of any particular value to Manufacturers and consequently the proportions do not affect the value of the Bark in the least, and it is no advantage to know the quantities contained therein, with the present low value of Cinchona Bark I would point out that an Analysis showing—

Sulphate of Quinine .. .. per cent
Sulphate of Cinchonidine .. do.

for which my charge is 12/6 is really all that Importers require, to determine the value of their Consignments.

The variation in prices of Ceylon Bark, I recently announced by Circular, continues; Parcels containing a heavy quantity of Cinchonidine, realizing less per Unit than pure Barks with little Cinchonidine.

I recently Analyzed some Ceylon shavings giving about 2 per cent of Quinine and about 3½ per cent of Cinchonidine, a most unsatisfactory Bark for manufacturers to have to work.—Yours truly,

T. R. Visey.

Ceylon Tea.—On the 27th instant, in the Conference-hall of the Colonial and Indian Exhibition, a lecture was delivered by Mr. J. L. Shand, representative of the Planters' Association of Ceylon, on the subject of "Ceylon Tea." In the course of his lecture Mr. Shand said that at the time when the prospects of coffee growing in Ceylon were brightest the whole industry was checked and finally blighted by the appearance of an ineradicable disease in the coffee leaf. Industrial attention in the country was then directed to the cultivation of various other products, but it soon became apparent that if the large area of hill property in European hands were to retain its value it must be by the agency of tea. The coffee plantations were gradually converted into tea plantations; and as the first specimens of Ceylon-grown tea sent to test the London market were very favourably received the industry developed rapidly. It was not, however, till 1880 that the Ceylon planters began to send tea to the English market in any quantity. In that year 115,000 lb. of tea were shipped to the United Kingdom, while the year 1885 this amount had increased to no less than 4,353,000 lb. There were now about 120,000 acres in Ceylon planted with tea, and it had been proved that the country was capable of producing a greater yield of leaf per acre than any other country in the world, and that its tea could command higher prices than any other tea in the market. In the very near future the tea export from Ceylon would amount to 40,000,000lb., and, indeed, the only danger which the industry had to apprehend was lest it should overflood the markets of the world, scientific authority having declared that the fatal disease which had attacked and ruined the Ceylon coffee plantations was incapable of injuring the tea plants. Did the British people thoroughly understand the difference between the pure, clean, machine-prepared leaf which was turned out from the Ceylon planter's factory, they would never touch the far from pure article prepared by the hands and feet of the natives in China or Japan. Ceylon offered advantages for tea growing which no other country could afford. The climate was favourable and thoroughly congenial to European life, there was an abundant supply of labour at hand, the facilities for transport over the country by road and rail were exceptionally great, and the soil was very favourable. The Ceylon planters had suffered considerably by the action of dishonest tradesmen in passing off cheap China teas as genuine Ceylon tea, which cost them nearly twice as much. The Ceylon tea was pre-eminent for purity, wholesomeness, and economy; and though nominally it could not be purchased so cheaply as some of the worthless China tea, yet it would be found to go much further than its low-priced competitor. In regard to openings in Ceylon for young men from England, he would advise that no young man should go out unless he had a certain prospect of employment or had enough capital to embark in tea industry and enough caution to control the capital. The field of employment was limited, only 146 European planters being at work, while vacancies were chiefly in the patronage of London firms. Moreover, there were no other directions in which a young man who had failed to find an opening in the tea industry could turn his energies.

CEYLON UPCOUNTRY PLANTING REPORT.

JACKSON'S AND LAW'S T ROLLERS COMBINED—TEA UNDER CINCHONA.

8th Nov. 1886.

I hear that if the table of Messrs. Law and Davidson's Simplex Roller is supplied to any of Jackson's rollers, it has the effect of getting about twice as much work out of the machine as it would otherwise accomplish. There is an arrangement of battens which brings about this result, assisted by the peculiar shape of the table. I fancy we will be hearing more of this combination by-and-bye, as there are several trials being made.

Tea grown under cinchona, is as we all know, not a happy combination: but it is being observed that although cinchona does not suit tea, the tea suits the cinchona giving it a more vigorous growth, and benefiting it all round. If this really be so, there is some comfort, and one will be able to regard the slow progress of the tea plant when shaded with cinchona with less fitfulness than before. The time will not be altogether lost.

The weather still keeps very suitable for planting and cacao—but we would all willingly take a little more sunshine just to brighten up things. But the dark skies are pretty persistent, and almost daily there is rain. There are very general complaints of the effects of this dull weather in retarding the flushing of tea, and the returns of quantity up to date are considerably below what were anticipated, and might have been got had there been more of our usual genial warmth.

The rise in the price of coffee is bringing round more than the ordinary number of Moormen who are all anxious to buy refuse. Evidently there is a little excitement among these keen traders, and they are not afraid to speculate. But their means of doing so are now very limited as compared to what obtained in the happy past, and one bad shot generally closes up the unfortunate for that season anyhow.

Still it is wonderful how they return to the charge, season after season, and are willing to try again so as to turn "the honest penny" if by any means possible. To deal with them, however, one wants to have a good temper for they will haggle for an hour over a few cents, and hang about for a day if half a rupee can be saved.

PEPPERCORN.

NEW INDIGO COUNTRIES:

TROPICAL CEYLON.

When youngsters, long before we even dreamt that our life should be spent in the East, we often pictured to ourselves paddling longrafts or rough canoes shaped from tree trunks through interminable forests, or inhabiting a cottage of wicker or hut made from the unbarked logs of some gigantic tree on every side surrounded by luxuriant vegetation, and jungles infested by wild beasts and poisonous reptiles. The reality of the picture is the plains of Hindustan, with their dry, arid landscape, where four months in the year we are roasted, four stewed, leaving four months to revivify the remains of vitality left by the two preceding operations. This reality was a sore blow to our youthful imaginations but years of labour and toil have tutored us to find some beauties even in the uncongenial clime of India. Nor do we admire the native, but long intercourse with him, his ways and his conditions of life make us sympathise, and in some cases have a sneaking fondness for the Hindoo. He is not a bad fellow if you have a touch of autocratic dignity added to the fellow feeling of man to man; but he is never grateful and never will be so. Let us take him as he is. He was made so and cannot help himself.

Ceylon realized the vague dreams of our youth. Here we found the vegetation of the tropics; on every side some new palm or gorgeous flowering shrub, while the elephantine polonga and the cobra proved by their presence that there were big beasts and reptiles to be found in the spicy Isle. The natives there, probably like all Orientals, were to the youngest child open and smiling. The young girl turned not away her head, as though we intended to eat her up, but though not understanding our particular language gave us a sunny smile and jabbered in her own tongue sonorous syllables of Sanscrit-like sound and merrily passed on to her work. The terraced ricefields peculiar to Ceylon attracted our attention when travelling by rail, and miles and miles of terraced ranges, from one to many yards wide, rose up and up till thousands of feet still saw these wonderful terraces rising one over the other to the mountain top. Rice is the staple crop of the Cingalese and the rice season varies, there are two sowings and reapings according to locality and elevation. The country in some places seemed suitable for the growth of indigo and in some parts of the island Mr. Falkner, a Bengal planter who visited it, found the indigo plant growing spontaneously and in considerable quantity.

The following notes are from one of the many useful books published in Ceylon by the *Observer* Office. The cultivation of indigo in the seven Korales begun by the Dutch in 1646 was unsuccessful, and Governor Barnes in 1826 lost money over this article. Mr. Henley, a Bengal planter tried indigo also in the Southern Provinces, but failed in his attempt to grow it properly. An attempt has more recently been made to grow it in the Northern Provinces. Bennett considered the Tangalla district the best adapted for the culture and manufacture of indigo, and he thinks it almost incredible that no export of the dye has taken place since the Dutch Rule in 1794, though the plant (Indigofera tinctoria) in both the varieties, sativa and agrestis grows in most prolific abundance. He adds that in 1817 an extensive Bengal planter, Mr. Falkner, who visited Ceylon, was delighted to see indigo growing wild and made a proposal to commence the industry, but it fell through.

A Swedish gentleman, a Mr. John Tranchell, next proposed the formation of an indigo factory to Sir Edward Barnes, but Mr. Tranchell's death in 1828 knocked the scheme on the head. From the above it seems that indigo has never been properly tried in Ceylon. The drawbacks are labour and getting land. Though the land in the low countries is very cheap, if the Government were anxious to help the introduction of a new industry, Crown land might be had on very favourable terms. There is no doubt that the climate of Ceylon would prove just the thing for indigo, and that indigo made in Ceylon would equal the finest marks of Bengal, Java, San Salvador or Guatemala. The difficulty of labour is every year becoming less, as large quantities of the Tamil coolie class, are really settling in the island, and the increase of steam implements to the indigo industry in all its branches, such a steam ploughs, steam diggers, tramways, pumping water—heating boilers—all by steam, only leave the pressing operations for hand labour and the necessary fine work such as hoeing, weeding and ploughing for manual labour.—*Indian Planters' Gazette.*

ARTIFICIAL QUININE.

The paragraph declaring that an English doctor had discovered a process for manufacturing artificial quinine is still on its travels round the globe. This week an East Indian merchant sent to our office to ascertain where he could buy some. Customers of his in Calcutta and Bombay had decided to try it. A cable message from us to our Australasian subsidiary journal anticipated any possible scare there on the subject, and we may also claim to have saved America to some extent from a reign of terror in the quinine market. The representative of the largest New York daily paper called on us immediately after the discovery had been announced, and intimated his intention of including the item in his daily mes-

sage. The correspondent had his own doubts as to the accuracy of the *Morning Post's* chemistry, and these doubts were confirmed after some conversation in this office, a conversation which left its impress on the message ultimately sent. Still, as we said, there are quarters where, naturally enough, the reports find credence. Within the past few days we notice that a well-known pharmacist of the Hague, Mr. J. Th. Mouton, who has interested himself in the Amsterdam Quinine Works, writes to the Dutch papers, begging them to point out that there is no truth in the discovery, or he says the efforts to raise fresh capital for the Amsterdam Quinine Works will fail, owing to the fear that the discovery is genuine.

Lastly, there have been gentlemen of the company promoting persuasion, who, neither believing nor disbelieving the assertions made; thought there might be enough faith on the earth to get a limited enterprise floated on the strength thereof. We have heard several times that preliminary steps had been taken, that some more samples were in course of analysis, that a prospectus was nearly ready, and so on; but hitherto no company has been actually registered.

The most definite report stated that everything was now ready, and that Messrs. Burroughs, Wellcome & Co., having satisfied themselves of the genuineness of the discovery, were taking it up, and that the manufacture was to be carried on at their factory at Wandsworth. To ascertain how much truth this statement contained we called on Mr. Burroughs, whose information was given somewhat as follows:—

"Mr. Cresswell Hewett was introduced to us by another medical man with samples of quinine, which it was professed he had made. We understood that he asked 20,000*l.* for his secret. This sum we told him we were willing to pay. He said he could make a ton a week. We told him a pound would be sufficient, but that we stipulated we should see him make it. Then he wanted 1,000*l.* a year salary. We told him he should have that too, and we offered to deposit 21,000*l.*, payable to his order as soon as he had satisfied us that his process was a genuine one. He went to see our factory and agreed that the arrangements were suitable, but he said he would have to go to the Continent to get some apparatus. We reminded him that he had declared he had made his samples in his own rooms, and declined to advance money for Continental apparatus. Ultimately he came on to our solicitors, and wanted to make other stipulations. We were willing to agree to most of his conditions, but we firmly declined to advance him any money for expenses or salary till he had shown us his process at work. He left us, I suppose to find some one more pliable."—*Chemist and Druggist*, Oct. 23rd.

AMERICAN OPINION ON THE QUININE MARKET.

A representative of the *American Drug Reporter* called last week upon Mr. L. Engelhorn, the manager of the New York branch of C. F. Bohringer & Sons, the quinine manufacturers of Mannheim, Germany, to ascertain if he found any new developments in the quinine market during his two months stay abroad which would give encouragement to operators here. After speaking about the exposure of the London chemist's tactics in the artificial quinine fraud, mention of which is made in our editorial columns, Mr. Engelhorn proceeded to discuss the subject in hand as follows:—

"The bark shipments were somewhat reduced during the past three months, and the trade thought that it was the beginning of a new era in prices, but the large shipments for the last auction rather dispelled this idea and made future calculations uncertain; they were too heavy to expect in the near future such a decrease in barks as to justify any considerable advance in the price of quinine. The principal argument for higher prices lies in the fact that a very large percentage of the receipts at London are root barks, thus showing a desire on the part of the planters to substitute more remunerative products, such as tea and coffee for the profitless cinchona barks, The time is certainly approaching when a shortage of barks will cause an important change in the quinine market, but that event is yet too distant for any reliable opinion to be expressed on the probabilities. Considering the present cost of making quinine, based upon ruling prices for bark, I must consider the present prices for quinine as cheap, and it is to be presumed that those who purchase now and can afford to carry their stocks will ultimately make some money on them. As to the profits of manufacturers, I would say that after striking an average for the year they will find themselves behind. The bark shipments have been a surprise to the manufacturers; they increase when least expected and the price of quinine is consequently forced down while that of bark is not, as the latter has never gone below 3d to 3½d per unit; since last October the shipments of bark have increased 25 per cent over the similar period of last year. Owing to the cheapness of quinine, the consumption of cinchonidia has decreased somewhat, but its production as a by-product of the Ceylon barks has increased largely, and is estimated at five times greater than the consumption, which caused prices to drop very low. For instance there was a sale of 20,000 ounces of cinchonidia in this city last Wednesday at 4c per ounce; one year ago we sold cinchonidia at 30c and today our price is 10c. About ten years ago that article was scarcely known as manufacturers of quinine did not know how to make cinchonidia, but now it is a by-product with all of them. Returning to the question of profit in making quinine it may interest to you learn that, as we are informed, some manufacturers are so thoroughly disgusted with the business that they would willingly receive proposals from some one to buy them out. The Amsterdam factory is closed for good after entailing heavy losses on account of small capacity, as it costs considerably more to operate a small work. But one more fact remains to be told and that is concerning the production of quinine, which has not increased to the proportion of increase in consumption which is gaining every year."—*Drug Reporter*, Sept. 15th.

ANOTHER OPINION ON THE QUININE MARKET.

Mr. J. Hasslacher, of the firm of Roessler & Hasslacher, agents for the Gold and Silver brand of quinine, is not inclined to entertain the opinion so generally expressed about cinchona bark and quinine prospects. As he has been spending some time abroad looking over the field, and arrived home last week, are presentative of the "Reporter" monopolized a portion of his time since then to inquire about the situation from his standpoint. He did not believe that quinine would ever reach the prices of former times; but it was more than probable that prices would continue to fluctuate on a low basis; competition is too close for manufacturers to realize any large margin on their product, and the price of barks is not likely to be much higher, for the reason that a plentiful supply may always be expected, except in case of war or some other unforseen circumstance. Mr. Hasslacher was asked:

"Are you not a believer in the reports about discouraged planters substituting tea and coffee for cinchona barks, on account of the low price of the latter?

"No, decidedly no; ever since the cultivation of barks commenced we have heard the same story repeated each year, and still they go on growing more barks than ever. The production of barks will keep on increasing, instead of decreasing, notwithstanding reports to the contrary, and the alleged fact that large shipments of roots are made to the London market. Planters have never been satisfied and never will, but there must be money in the business or they would not continue it. Whenever shipments of bark are light then we are informed as the cause that an important shortage exists and that other crops are taking its place; but the trade is surprised in the following few days or weeks by a deluge of barks, evidently held to await the result of the preconcerted arrangements to bull the market by unreliable rumors. No, the trade in quinine will not soon be benefited by any radical change in the bark situation, and I would advise speculators to let it alone—I mean those capitalists who buy and hold for a rise in the market, not the

legitimate traders in the article who contract ahead for supplies to meet regular wants, in anticipation of prices being against them in the future. Speculation, in the true sense of the term, is damaging to legitimate business and should be discouraged. The position of quinine today is not what it was several years ago, and manufacturers have to confront a change which is against their interests and to the benefit of the consumers. Instead of bark shipments being periodical and uncertain, made so by the crude method of gathering, the devastating wars, floods, &c., we can now rely on weekly shipments and a stock in London from which to draw upon, besides having no disturbance to trade or transportation.

"There is little money in the quinine business to manufacturers, but it can be produced cheaper abroad than here. We have enlarged our factory, as the increased consumption caused principally by the low market, makes it necessary to increase our capacity. During the fiscal year closed last June, our quinine factory created a sinking fund and declared a dividend of five per cent. This is a good showing for an off-year when prices never ruled so low. There is one important fact which has not yet appeared in print; in Germany the retail price of quinine is fixed by law, and consumers have been compelled to pay the same price established several years ago against their strong protest. Physicians state that the consumption of quinine in Germany would be much larger if the price was lower, and they are now agitating a change in the law to have the retail price fluctuate with the wholesale rate and allow the public to reap the benefit instead of the pharmacists, who realize a large margin of profit at present The feeling is so strong on this question that a change is looked for, and quinine manufacturers are of course helping the movement along. The so-called substitutes for quinine are not injuring the sale of the article abroad, as the substitutes are only used for reducing the temperature and not for destroying the germs of the fever, like quinine does."—*Drug Reporter*, Sept, 30th.

ARTIFICIAL QUININE.

It happened rather curiously last week that just as our editorial note, dealing with the somewhat unfortunate observations of the *Oil, Paint, and Drug Reporter*, was passing through the press, we should receive a communication upon one of the very subjects our contemporary appears to be so anxious about. Even yet, however, the *denouement* longed for by the *Reporter* has not—as its readers would probably say—eventuated. Mr. Cresswell Hewett's artificial quinine has, up to the present time, neither demonstrated its own veracity by being turned out by hundredweights per diem at a cost of 3d per ounce, nor has the entire scheme resolved itself into thin air, or something even thinner still, by exploding altogether as so many company concerns of the "limited" class did in the beginning, are doing at the present moment, and probably ever will do to the end of our national existence. Although we cannot oblige our transatlantic critic with the percussional sensation so ardently desired, we publish today an important narrative which he may probably regard as a small instalment of that *denouement* which our contemporary appears to consider as the only fit and proper solution of the whole mystery.

The salient points of this quinine story are capable of being summed up in a very few words, although, the last of such words—by a good many—has not yet been spoken. Let us state the chief facts of the case and see how we stand:—Observing an announcement in several papers nearly two months ago to the effect that a certain Mr. Cresswell Hewett had discovered a method of preparing quinine by synthesis, at a cost of less than 3d per ounce, Dr. Burton, of Bucklersbury, at once caused negotiations to be opened with the alleged discoverer, through the intermediary of a friend, in the first instance, as is usual in such cases. On his offers being accepted, Dr. Burton declared himself, and, according to the account furnished to our representative as given in another column, he has all along been desirous of pushing the matter forward to a satisfactory issue, and of fulfilling his part of the arrangement said to have been concluded as between vendor and purchaser. Representing not only himself, but several other gentlemen, including Mr. Bland, Messrs. Burroughs, Wellcome and Co., &c., it has been stated to us by Dr. Burton that, not only were the general, but also the financial, arrangements absolutely completed and the sum of £21,000 could have been handed to Mr. Hewett within seven days after he had really produced a couple of pounds of sulphate of quinine which should stand all reasonable tests, chemical and therapeutical.

That the latter proviso is fully as important as the former, cannot be doubted when we consider the large number of substances known to modern chemists whose composition is absolutely identical, but whose properties are widely different in one or more respects. Thus, for example, there appear to be a whole host of bodies with the common formula of $C_{10}H_{16}$ but perhaps in no two instances do even the physical characteristics of these substances agree. Their specific gravity, boiling-point, index of refraction, &c., are all unlike, to say nothing of the variations apparent in their odour, taste, and pharmacology. Sometimes these differences may be reconciled by a study of the particular way in which the elements they contain are grouped together; in other instances, the bodies split up precisely the same manner, and no light is afforded from this direction. Quite recently the readers of our "Science Notes" may have noticed that an Italian enquirer has ascertained that there are two distinct modifications of the vegetable principle known as Asparagine. Both kinds agree in most respects; in appearance, in composition, and in general properties they may be deemed absolutely indentical, but it is possible that they differ therapeutically to some extent, and it is certain that their optical properties are diametrically opposed. Hence we can only fall back upon an old and crude method of distinguishing them and say that a solution of *a*-Asparagine rotates a ray of polarized light one way, and *B*-Asparagine twists it just as much, but in precisely the opposite direction.

It may therefore be the same with quinine, and in our readiness to welcome the "Queen of Specifics," produced—if this can really be done—artificially, at a nominal cost, for the benefit of suffering humanity, there can be no more important clause in any agreement pertaining to what we consider as $C_{20}H_{24}N_2O_2$ than that which, as in the draft we publish today, provides that the substance must be *medically*, as well as chemically and physically, indistinguishable from "Howard's Quinine."

To return to our narrative; so confident does the inventor appear to have been of his success that he actually accompanied the intending purchasers of this secret to a factory at Wandsworth—the very same by the way, that was described and illustrated in these pages some time ago—where he selected the room and some part of the appliances needed for the production of the test sample. After this there was practically no progress made, or information obtained until the publication of our supplement of last week and the determination of Dr. Burton and his coadjutors to leave no stone unturned to discover the truth, and to bring the question to a climax of one sort or another, by applying for an injunction in defence of their alleged rights. Meanwhile a Mr. J. F. Bunting, described as a surveyor, of Ponders End, speaks with calm confidence of the prospects of the Atlas Quinine Company and of what his "principal" is going to do. In the interests of either or both parties to this curious *embroglio*, of the public, and of truth, we shall be happy to do anything in our power which may facilitate the investigation.

We shall next week publish a special analytical report upon an authentic sample of the "Hewett Quinine," and it is not improbable that our observations thereon may tend slightly to illuminate some points which today appear to be more or less obscure. —*British and Colonial Druggist.*

MR. HEWETT'S ALLEGED DISCOVERY.

HISTORY OF THE NEGOTIATIONS: LEGAL PROCEEDINGS THREATENED.

We published last week, as a supplement to this journal, the information, verified only while the issue for the 16th instant was actually being printed off, that Mr. Cresswell Hewett was out of London, but that his secretary, signing as for "Cresswell Hewett & Co." announced that orders for "artificial quinine," in quantities of 100 ounces and upwards, would be received and booked, although such orders could not be executed for a few weeks yet.

THE ATLAS QUININE COMPANY.

We were further given to understand that a company had been formed under the title of "The Atlas Quinine Company," for the due carrying out of Mr. Hewett's discovery upon a commercial scale; that offices had been taken for the said Company at Mary's Chambers, St. Mary Axe, E. C., and that the factory for the manufacture of artificial quinine would "probably be in Germany." As to price, little or no information was vouchsafed beyond the bare statement that the quinine would be sold at something under the market price ruling for the alkaloid derived from cinchona bark.

A great number of orders for the quinine, it is alleged, have been received from all parts of the world, as also applications for agencies, and offers of capital, one firm in particular being referred to as having tendered a considerable sum of money for the entire secret and the sole right of manufacture, but nothing could be gleaned from "Cresswell Hewett & Co." respecting the constitution of the embryo company in question, or the sources from whence its future output of quinine is to be drawn. We ascertained, as a matter of fact, that, up to a very few days ago, no patent for the preparation of quinine had been applied for at the English Patent Office, and no company, whose avowed objects resemble those of such an undertaking as has been sketched out in the foregoing paragraphs, has, as yet, been registered under the Companies' Acts.

Mr. Cresswell Hewett's chambers remain at the address given in our previous account, published Aug. 28th last,* viz., 50A, Lincoln's Inn Fields; but offices have been taken for the Atlas Quinine Company at 3A, St. Mary's Chambers, St. Mary Axe, E. C., although the name of the company had not been painted upon the doors at the date of our last visit and no clerk or other *employé* has been found in occupation of the offices when our representatives have called there. This narrative, meagre as it is, taken in conjunction with our previous accounts, gives practically the whole history of the matter so far as this can be obtained from what might be called the Lincoln's Inn brief.

A somewhat different complexion is, however, put upon the affair by the facts and statements we are about to record, "Cresswell Hewett & Co." and "The Atlas Quinine Company" having apparently, in the absence of their principal, written up "No thoroughfare."

INTERVIEW WITH DR. WILLIAM BURTON.

At this point we directed our enquiries into a different channel, and as a first result a member of our editorial staff called upon Dr. William Burton, of 20 Bucklersbury, E. C., and was fortunate enough to find that gentleman disengaged, and willing to afford us all the information in his power.

Dr. Burton received our representative with the utmost courtesy, and frankly explained his connection with this strange and eventful history from first to last, or rather from the date of our original announcement to the present, the "last" stage of the enquiry being by no means attained as yet. Omitting some points of minor detail, which, in view of certain proceedings to be elaborated a little later on, it may not be advisable to publish to-day, the sum and substance of what has taken place in relation to "artificial quinine" during the past few weeks is included in the following paragraphs:

£20,000 FOR THE SECRET.

On the first commencement of Mr. C. Hewett's alleged discovery, Dr. Burton, through the intermediary of a third party, put himself into communication with Mr. Hewett, with the view of making some business arrangements, or of buying the entire concern outright. After certain negotiations had been exchanged, the amended terms offered by Mr. Cresswell Hewett were accepted, and the name, &c., of the purchaser—Dr. Burton—revealed to Mr. Hewett. These terms, in brief, consisted of an agreement to pay the sum of £20,000 to the discoverer of "artificial quinine," and to retain his personal services and those of an assistant, in connection with the manufacture, for a period of not less than 12 months, at the salaries of £800 and £200 per annum respectively, in return for a full disclosure of the secret of the discovery to Dr. Burton, and those associated with him, the investiture of these parties with the sole and complete rights to manufacture and sell the article, and the actual production, in presence of the purchasers, of a sufficient quantity of the alkaloid for testing and trial, of a quality not inferior to "Howard's."

BURROUGHS, WELCOME & CO. AS PURCHASERS.

Mr. Hewett, however, Dr. Burton informed our representative, after himself proposing and agreeing to these terms was so constantly seeking to amend or enlarge them, that some of those who acted as Dr. Burton's colleagues in the matter, particularly Messrs. Burroughs, Welcome, & Co. and Mr. Bland, began to show some impatience at the new demands. These, however, were eventually agreed to all round at the instance of Dr. Burton, who considered that in a matter of such superlative importance, neither one or two thousand pounds, nor any individual peculiarities, should be deemed of great moment.

Mr. Hewett so frequently insisted upon the necessity of his visiting the Continent, in order to arrange for the starting and due carrying on of the new industry, and also of the inconvenience his withdrawal from his private connection for a year or more would entail, that, with the view of avoiding these objections and of facilitating the negotiations, Dr. Burton wrote a letter somewhat modifying the conditions previously laid down; the following is a verbatim copy or the communication in question.

LETTER FROM DR. W. BURTON TO MR. CRESSWELL HEWETT.

20, Bucklersbury, Sept. 9th, 1886.

Dear Sir,—In order to expedite this business, and, if possible, save you the trouble of a journey to the Continent, and the loss of your present connection, which would naturally follow the devotion of your entire time for the next 12 months to the manufacture of quinine synthetically, Messrs. Burroughs and Welcome join me in making the following proposal:—"That we undertake to make all necessary and satisfactory arrangements to pay you £21,000 promptly, on your demonstrating to us your ability to produce quinine at the price named by you, and your transferring to us the secret of its manufacture, and of the sole and exclusive rights to manufacture, under your process, and your undertaking to patent such process, at our expense, if we do desire. For this purpose the production of only a small quantity will be necessary to satisfy us, say 2 pounds. A laboratory shall be placed at your disposal, and we will leave the details of arrangements greatly in your hands. After you have manufactured the 2 pounds of quinine a sample of it is to be submitted to two analysts, one to be nominated by yourself and one by Messrs. Burroughs and Welcome. On receipt of reports from the selected analysts, certifying that the quinine manufactured by your process is veritable marketable quinine, possessing the medicinal properties of the present sulphate of quinine, the payment is to be made to you cash down. The advantage of your accepting the present offer is very clear: the £1,000 offered for your services for one year is added to the purchase price of £20,000 already agreed upon, and the actual cash will be placed in your hands within a very few days if you carry out your part of the bargain.—Yours faithfully,

(Signed) W. Burton.

Mr. Cresswell Hewett.

* "Artificial Quinine; Mr. Cresswell Hewett Interviewed," *B. & C. D.*, Vol. x, page 212.

These terms being, of course, more favourable for the vendor, were duly accepted, and a few days later the agreement, of which the full text is quoted hereafter was also acceded to :—

DRAFT OF AGREEMENT BETWEEN CRESSWELL HEWETT AND WILLIAM BURTON AND OTHERS.

40, Chancery Lane, W.C., 13th Sept., 1886.

RADFORD AND FRANKLIN.

Terms of proposed Agreement between Creswell and Hewett and Doctor William Burton.

Dr. Burton to deposit £21,000 with a banker to be approved by C. Hewett.

C. Hewett to manufacture within a week, in the presence of Dr. Burton and two persons to be named by him, a sufficient quantity of quinine, by a synthetical, or artificial process, at a cost of not more than 4d per ounce. The quinine so to be manufactured to be equal in quality to the ordinary quinine, and identical in its medical properties.

On the manufacture being completed to the satisfaction of Dr. Burton, C. Hewett shall be entitled to the said sum of £21,000, and also to shares in a company (with the capital of £250,000) intended to be formed, to the amount of £29,000, as the consideration for the disclosure to the said Dr. Burton of the secret process of so manufacturing quinine. Such £29,000 shares not to pay dividends until the ordinary share of the company shall pay dividends at the rate of 10 per cent per annum.

C. Hewett to communicate all information necessary to the manufacture of quinine by the process aforesaid, and to assist Dr. Burton in protecting the said invention by letters patent in the United Kingdom and all other countries. Such letters patent to be taken out in the names of the said Dr. Burton, or the said intended company, or other, the nominees of the said Dr. Burton.

VISIT TO THE FACTORY AT WANDSWORTH.

On the 4th ult. Dr. Burton, Messrs. Bland, Cresswell Hewett, J. F. Bunting, and S. M. Burroughs (Burroughs, Wellcome & Co.), visited the chemical works of the last-named firm at Bell Lane, Wandsworth, where Mr. Cresswell Hewett selected a room and certain machinery and appliances, to be supplemented by other apparatus of his own, and made various general agreements for the proposed demonstration of the actual process of quinine manufacture. Such process is stated to involve the admixture or manipulation of three ingredients only and the time occupied by the treatment of such ingredients, from the first handling of the raw material to the completion of the finished products, does not exceed 24 hours. Besides the "quinine," it is alleged that a "bye-product" is also formed.

After the incidents just mentioned, Dr. Burton informed our representative nothing particular occurred except that Mr. C. Hewett appeared to hang back a little, and could not be induced to fulfil or go on with his part of the compact, and neither Dr. Burton nor Messrs. Burroughs and Wellcome seem to have known much more about him except that he left England, presumably for the purpose of forwarding the business in view. It is thought by some that he has gone to Liége; another report has it that he is not a great way off Darmstadt at the present moment.

"BURTON AND OTHERS *v.* CRESSWELL HEWETT AND CO."

The announcement made in these columns on Saturday last, therefore, seems to have been the first intimation received of the existence of "The Atlas Quinine Company," and accordingly it fell with all the force of a wet blanket upon Messrs. Burton, Bland, Burroughs and Wellcome, &c. These gentlemen have nothing to do with, and have no cognizance of, "The Atlas Quinine Company," and they not unnaturally contend that its very existence is in direct contravention of their previous arrangements with Mr. Cresswell Hewett. It has, therefore, Dr. Burton informs us been determined, in the absence of any explanation from Mr. Hewett, to apply for an injunction restraining the "Atlas" Company and "Cresswell Hewett & Co." from selling, dealing in, or manufacturing the said artificial quinine, and should this come off shortly the whole matter will probably be well ventilated. "Having gone so far," said Dr. Burton to our representative, "we cannot stop where we are. Whatever it may cost now, I must sift this matter to the very bottom." Small samples of the "artificial quinine" and the "bye-product" are in Burton's possession; the former he retains for the present unopened, the last we are informed has been examined by Mr. Clayton, F.C.S., of Holborn Viaduct, who reports that he can make nothing of it.

It may be remembered that a sample of the "quinine," &c., was entrusted to us by Mr. Hewett. We have analytically examined this sample, and also the "bye-product," and we shall have some observations to make respecting them in our next issue.—*British and Colonial Druggist.*

INDIAN TEA COMPANIES' DIVIDENDS.

Statement showing the actual amount of dividends distributed by 24 of the principal Indian tea Companies, in respect of 1885 crop :—

	Capital paid up. £	Amount of dividend distributed. £	Rate per cent
Assam ...	187,160	37,432	20
Brahmapootra	114,500	18,320	16
Borokai ...	43,560	6,970	16
Jorehaut ...	100,000	15,000	15
Doom Dooma ...	116 100	15,383	13¼
Mookhamcherra ...	47,500	6,175	13
Jokai ...	56,037	5,604	10
Jhanzie ...	55,000	5,355	10
Tiphook ...	26,060	2,600	10
Panitola ...	58,810	5,881	10
Chargola ...	65,500	6,550	10
Lebong ...	82,070	7,386	9
Darjeeling ...	135,420	10,834	8
Dooars ...	106,000	*749	8
Hingajea ...	36,000	2,880	8
Borelli ..	78,170	4,690	6
Indian (of Cachar) ...	94,060	5,644	6
Dejoo ..	43,580	2,615	6
Scottish Assam ...	79,590	3,980	5
Moabund ...	35,007	1,750	5
Balijan ...	31,000	1,395	4½
Nassau ...	36,000	1,440	4
Luckimpore ...	76,852	3,074	4
British Indian ...	243,300	3,041	1¼
	£1,947,216	£174,748	

Average dividend 9 per cent.
—*Home and Colonial Mail*, October, 1886.

FIBRE CO.—In the case of Mr. C. E. Collyer, described as of Fenchurch-street, hemp, fibre, and China produce broker, trading under the firm of Collyer and Co., who filed his petition in August last, Mr. S. Woolf applied in the Bankruptcy Court for the approval of an arrangement come to by the creditors, whereby it was agreed that the property should vest in, and be administered by a trustee for the benefit of creditors in like manner as if the debtor had been adjudged bankrupt. The official receiver, for whom Mr. Aldridge appeared, reported that the debtor had traded after knowing himself to be insolvent, but the Court did not think that anything had been shown to disentitle the debtor to his discharge, except perhaps with a nominal suspension, and therefore would not withhold approval of the scheme. The application was accordingly granted.—*L. & C. Express.*

* Working part of year.

MANURES.

The character of the soil is, as is well known, an important element to be taken into account in the choice and application of manures. The general difference between strong and light soils may be taken to be that the former contains a larger store of the natural elements of fertility, though for the most part in an undeveloped state, while from an excess of clay the physicial property of retentiveness and its consequent drawbacks are too prominent; while light soils, on the other hand, are comparatively deficient in natural resources, and by season of a deficiency of clay possess the property of porosity in a too great degree, and hence afford a too ready passage for water, and other bodies necessary to vegetable growth.

Clay soils.—On stiff clay soils we have all the defects arising from the tenacious and plastic properties of this substance, and its consequent imperviousness to water, hence the first necessity towards the improvement of such soils must be drainage, in order to remove the excess of water, and without which the best manures will have but a meagre effect. All means of adding to the porosity of stiff clay soils are to be recommended—one of the best of which is burning in heaps with vegetable refuse, or small coal, in the mann r "ballast" is burnt, and which spread over the surface before digging, has an excellent effect in lightening the soil.

It is on these descriptions of soil that a thorough breaking up and stirring at favourable times is so beneficial, particularly before frost, which does more for strong clays than almost anything else. In fact, cultivation on these classes of soil must always be the primary resource for advancing their fertility—but supplemented of course by a judicious selection and application of manures.

Sandy Soils.—In sandy soils we find all the defects arising from an extreme porosity, or, in other words, an absence of retentiveness consequent on the paucity or absence of clay, which is the chief storehouse, so to speak, not only of the moisture of the soil, but also of plant-food, either artificially added or derived from natural sources, and from which the root-fibrils of plants draw their supplies as required.

The retentiveness of such soils may be enchanced by the addition of clayey composts, and by green manuring.

Green Manuring.—Is often an excellent source of plant-food in the lighter description of soil, and deserves to be more extensively adopted, as we thereby obtain a clear gain of nitrogen from natural sources, and at the same time gather up and preserve any nitrates present in the soil in a staple and efficient form; while the humus compounds arising from the decay of the vegetable matter affords absorbent for moisture, &c., in the same manner as clay. That vegetable matter in a readily decomposable state is a valuable form of manure is shown by the character of the Wheat crop following a Clover lea. Where the Clover has been successful, the Wheat plant, as well known to the agriculturist generally, corresponds, and *vice versâ*. Dead leaves and garden refuse of all crops not consumed as food should therefore be carefully returned to the land, as they are rich in manurial elements in the best possible state for future plant-life when prepared by decay in soil.

We may take it as a general rule not to burn any refuse that will rot in the soil, except in the case of foul turf infested with insects or seeding weeds, &c., since by so doing we lose the nitrogen and organic matter, besides rendering the ash constituents less available by mineralising them Sir J. B. Lawes and Professor Gilbert have subjected this theory to a most rigid investigation at Rothamsted.

The ashes of 14 tons of farmyard manure were applied to an experimental crop of Wheat, and gave no increase of produce whatever over an adjoining plot that was left entirely unmanured, and in succeeding years the ash constituents were found to be but very slowly available as plant food.

Besides all this, able chemists have demonstrated by growing plants in distilled water, that to produce a good crop there must be nitrogen in the soil or in the water. They have dissolved the ashes of plants in pure water, and then, by adding a few grains of nitrogen in the form of a nitrate, have produced a luxuriant vegetation; but without nitrogen only a very feeble growth could be obtained.

Weeds.—The field experiments at Rothamsted and also at Woburn conclusively prove that crops of every description grown upon ordinary cultivated land are greatly reduced by weeds. It is true that weeds, if again returned to the land, do not exhaust a soil, as, in their decay, the fertility which they have taken up becomes again available; but weeds take up nitric acid, which during their growth reverts to the form of organic nitrogen. When this occurs in regard to soluble plant food it is merely so much nitric acid employed in growing weeds instead of useful garden produce, and this nitric acid does not again become available as food of plants until the weeds have undergone decay in the soil and become nitrified.—J. J. W. —*Gardeners' Chronicle.*

AJI-AJI, THE PEPPER OF PEPPERS.

Our contemporary the *Saturday Review*, in its issue for September 18, had an article under the mysterious heading of "Aji-Aji," which the writer at once proceeded to explain was a "compound Quichuan word" for Pepper of Peppers, and further informed his readers that "both word and thing are largely distributed over South America," that "it is the finest of all Peppers. No other Pepper in either hemisphere competes with it, neither the Piper nigrum, nor the Capsicum baccatum, nor the C. fruticosum, the C. annuum, nor yet the Eugenia pimenta. All these are varied merely in pungency, some being sharp and fiery, others, caustic and stimulating, and some pricking and penetrating. But the refined and delicate Aji is persuasive and enticing, of not one flavour but many flavours; it never conceals, but, on the contrary, increases whatever of fragrance and sweetness of taste or smell it comes in contact with." The writer then proceeds to give a long list of its extraordinary virtues, and an enumeration of the articles of food it may be used to improve, from a new-laid egg to a Strawberry or a jug of mulled claret. It is said to prevent evil effects in a malarian atmosphere, and on this accouut we are told that "the War Department of the United States has secured a monopoly of all the Aji which is exported from South America," and further that "no Aji in these days finds its way to London, and that which we once enjoyed in the belief that it would never fail us has become nothing but a sigh and a regret. It remains to be seen," the writer continues, "whether the people who have acclimatised the Cinchona trees in the Neilgherries, in Ceylon, in Jamacia, and in Fiji will allow themselves to be deprived of their delicious and inspiriting Aji."

Perhaps the most interesting part of the *Saturday Review's* article is that which treats of the preparation of Aji, which is as follows:—"There are two kinds of Aji, but there is only one way of preparing it. The best is that which is made from the greatest variety of Peppers. The pods of these are taken when fresh, stripped of their seeds, and ground into a paste of the consistence of fresh spring butter. The paste is put into a small, well dried Gourd, prepared on purpose, of the size and shape of a well grown Orange. The Gourd, when thus charged, is then coated with a layer of well tempered clay, and placed in the sun to dry, or to ripen, as the simple people who prepare it say in their own tongue. By the time the clay is well baked the pulp or paste within has been dried into a fine yellow powder, and it is then fit for use. Many people, ignorant of this fine art of the Incas, have supposed quite naturally that these Aji-laden Gourds, with their exquisite flavour and refined taste, were some uncommon and little known natural fruits. The other method of preparing Aji is to grind the seeds with the pods, which simply adds great pungency to the Pepper, and is always used in the preparation of Maize or Indian Corn

which is boiled in its own husk with so much Aji' and surpass in flavour and pleasantness any vegetable curry of the East. The Gourds of Aji when thoroughly ripe are cleansed of their coating of clay, tied up in suitable leaves, well secured by the fibre of the Aloe, and which much resembles when ready for market reeves of large onions, a dozen Gourds making up one reeve of Aji. The cost of these in the good old times was 15*d.* for a dozen Gourds; what the price may be now is only known on the Exchange." From the references made in the preceding passage to the pods and seeds being ground to constitute the Pepper, it will be readily guessed that it is the produce of a species of Capsicum, notwithstanding that the writer of the article says it is "not the Capsicum baccatum, nor the C. fruticosum, nor the C. annum." In the Kew Museum are numerous varieties of the fruits of Capsicum annum, all bearing the name of Aji, and the museum also contains specimens of the small Gourds filled with Capsicum Pepper as described by our contemporary; so that the "Aji-Aji" of the *Saturday Review* is clearly the produce of Capsicum annum.—JOHN R. JACKSON, Curator, Museum, Royal Gardens, Kew.—*Gardeners' Chronicle.*

ROOTS.

(*Concluded from p.* 388.)

Many plants flourish in an open soil with plenty of sand in it, but will not grow in a stiff wet soil. This is not necessarily because the heavier soil does not contain the right food materials, but because its particles are so small, so closely packed, and so retentive of moisture, that the root-hairs do not obtain sufficient oxygen: moreover, the very damp state of the soil does not favour the development of the numerous root-hairs necessary, as we have seen. Nor is this all—though I cannot here enter at length into this point—root-hairs and roots cannot grow or act unless the temperature is favourable, and we have plenty of evidence to show that a close wet soil may be too cold for the roots at a time when an open drier soil (exposed to similar conditions as regards sunshine, &c.), would be of a temperature favourable to their growth. Many a pot-plant receives an overdose of water because it is drooping from the roots, being too cold to act properly. The opening up of stiffer soils by means of the spade or plough, or by the addition of other kinds of soil, such as sand, burnt lime, &c., or by means of drainage of various kinds, is thus to be regarded as a means of letting in air, and therefore oxygen, to the roots. "Sweetening the soil" is an expression one hears used by planters and others; this is often no doubt their way of expressing the fact that the air thus let in does so much to turn the noxious substances which have accumulated into other substances which the root-hairs of the plant can take up with profit. The exposure of certain soils to sharp winter frosts in part benefits the plants subsequently grown in it, because air can make its way into the cracks produced as the particles crumble: there are other advantages also due to the "weathering" of soils, of course, as also to the addition of lime, &c., but I am purposely abstaining from referring to points concerning the nutrition of plants as generally understood.

Let me shortly call your attention to a few other practical applications of the knowledge briefly summed up above. It is well known that a good deal of experience has been brought to bear on the question of what trees are the best to plant in or near large towns: there are very many facts to be considered. It is not sufficient to find a tree which will accommodate itself to the possibilities of the annual rainfall, or a diminished supply of sunlight throughout the year, and so on; nor is the problem solved when a tree is found that will put up with traces of acid gases in the atmosphere, and, as may follow, the accumulation of acids in the soil, and consequent alterations in its chemical composition. In many cases trees have been found to die as they grew older because the pavement or asphalt over their spreading root-system prevented proper aeration and a proper supply of aerated water to their root-hairs; imagine the effect of a few days' hot summer sunshine on roots just beneath the pavement of an exposed street! It is true the cover may prevent rapid evaporation, but it also shelters the soil from the well aerated raindrops; moreover, such sheltered roots will at certain seasons grow up to the surface of the soil and in contact with the lower surface of the pavement. Then there is the question of drainage. If the water which does find its way in slowly accumulates and becomes stagnant, the results are as disastrous or even more so; yet it is obviously a difficult matter so to arrange things that the accumulated surplus water of certain seasons shall pass away below, acting like a suction-pump and drawing in air after it, and still fulfil the other requirements hinted at above. I leave out the question of exhaustion of the soil—the dead leaves, &c., being carefully removed. Can we wonder that there are so few trees to choose from that will stand such treatment? The fact that there are some only accords with what has been already stated—that plants vary in their requirements and powers; and no one doubts that the variations have been influenced by variations in the environment.

We have now seen to a certain extent how variations of a particular kind may affect a plant. The plant responds to a certain extent—it is, as some people say, "plastic"—but if the limits are reached and slightly overstepped, the variations on the part of the plant become dangerous to its existence, and the plant becomes diseased and may die.

Not to dwell upon hypothetical matters, I will content myself with saying, in conclusion, suppose a variety of a given plant grows in damp places and has roots which form few or no root-hairs, and suppose an individual of that plant to become transferred to a more open soil; I have shown you reasons for regarding it as probable that the latter individual might produce more root-hairs and thus adapt itself to the altered conditions. If such a case happened, it is by no means improbable, but the contrary, that other circumstances co-operating or adverse would decide certain problems of importance to the existence of that particular individual.

But the main object of this lecture has been to show you how very complex the conditions may be which bring about a "diseased" condition of the roots. It is no uncommon event to see a tree flourish for years and then die slowly off from "something at the roots;" examination shows that the soil still contains the necessary foods, the water-supply is constant and good, the tree is exposed to no obvious adverse influences, and yet with steps so low that they are scarcely noticeable, the tree begins to die off before its time. In some cases this is probably because the root-hairs are not receiving their proper supply of atmospheric oxygen, and this may be due to very slight changes in this structure (not the chemical composition) of the soil: a very slight diminution in the activity of the root-hairs may cause a diminution in the supply of water to the leaves at seasons when they require much, and this means lessening their supply of food-materials. If the leaves are placed on short commons they cannot form wood, and so the next season's supply of nutritive solutions may be cut short; moreover, fewer root-hairs will be formed. No doubt differences will appear in different years or seasons; but if the tendency on the whole is in the above direction, the life of the tree is already limited—it may drag on for years as an object, which can scarcely be termed a tree, however, but its doom is sealed.

The difficulty of placing one's hand on an exactly illustrative case is due to the fact that other causes are usually at work after a short time. I have purposely avoided any reference to the changes brought about in the chemical nature of a soil by the addition or cutting off of air, &c.; and for the same reason—to keep your attention directed to the root-hairs as living cells exposed to the influence of a definite environment—I have left out of account some

questions of food supply. These matters do not invalidate anything said above, but they do profoundly affect the problems of the diseases of plants, and especially those diseases which start from the roots. H. Marshall Ward, M. A., F. L. S.—*Gardeners' Chronicle.*

TEA HAIR.

Tea-makers will agree with us that hair, of all substances in nature, is least likely and least desirable as a component of the fragrant leaf. But all Indian and Ceylon tea planters are familiar with a substance, somewhat resembling the pollen of flowers, which collects on the machinery in the process of manufacture and which we have heard generally described as "orange" or "golden pekoe dust." The general impression, we think, has been that the dust in question was specially derived from and was about the richest portion of the pekoe buds. Our attention has, however, been attracted to a paper in the "Year Book of Pharmacy for 1877," in which it is shewn that the main constituents of the substance, are hair-like processes which are separated from the leaves in the act of rolling. In taking over the extract we invite communications as to the proportion of this substance formed in extensive manufacture; whether it is generally collected for exportation and what its commercial value may be?

FURTHER RESEARCHES ON TEA HAIR.

By Thomas Greenish, F.C.S.

Under the name of Pekoe Flower, or Flower of Tea, this substance was brought before the Conference at Glasgow last year by Mr. Groves, and on that occasion I gave the result of its examination, mainly microscopical, which I had previously undertaken. At that time but little was known either by Mr. Groves or myself of its history, the position it occupied in commerce, or its ultimate destination. I followed up the subject with the view of supplying for this meeting that more complete information which was wanting on these several points, as the tea hair may probably crop up again as a natural curiosity for a lover of science, or to supply a sensational paragraph for a public analyst. The tea hair was said to have emanated from a house in the city, but the city is a large place in which to look for tea hair, and I found it so. For many months I worried with my inquiries tea brokers and tea merchants, but without result, until at last a friendly hint directed me to a tea broker's office, where I found a member of the firm who, in addition to a very discriminating palate as regards the strength and flavour of tea, had also acquired a vast deal of collateral information about teas imported from India and China.

It appears that tea hair finds its way into this country as an article of legitimate commerce, at tolerably regular intervals; its commercial name is "Pekoe Flower," and sometimes the "Bloom of the Pekoe Flower." It is a product of India teas, not of those of China. It is purchased somewhat as a curiosity, but there are those who buy it pretty regularly. Pekoe flower is never sold as tea simple or for mixing with tea. It is almost a necessity that it should be sold alone. If it be mixed with ordinary tea there is such a tendency to the separation of the tea hair and its agglomeration into lumps, that any attempt of this kind would probably result in the whole being returned as an adulterated tea.

In an essay on the cultivation and manufacture of Indian teas by Lieut.-Col. Money, and published in Calcutta, the whole process of the manufacture of the Indian teas is given, and it is not difficult to trace the condition in which this tea hair is found, to its origin. One part of the process consists in what is called "rolling" the leaves, when the juice is given out freely; and as to its results on the leaf, he says, "If the leaves which give Pekoe tips are separated from the other leaves and rolled *very little* and *very lightly* there will come out Pekoe tips of a whitish colour; if *not* separated from the other leaves, but manufactured with them, the sap from the other leaves, expressed in the rolling, stains these said leaves, which are covered with a fine silky down, and makes them look like the rest of the tea." This is evidently the part of the process in the manufacture of Indian teas which gives to the otherwise greyish-white hair its brown colour, and also that extractive matter which is found adhering to it.

Mr. Wigner, in his analysis of the tea hair, gives theine 1·5 per cent as compared with 3·5 per cent for Pekoe tea, and Mr. Groves remarks in reference to this, that "it is interesting to find theine present in the tea hair." I doubted the correctness of this conclusion. The hair of the leaf is an extension of the epidermal cells covered by the cuticle; there is an absence of chlorophyll, the cells being empty; this layer prevents too rapid evaporation from the parenchyma of the leaf, but plays no part in the plant's economy. I have no doubt but that the theine obtained by Mr. Wigner was derived from extractive and parenchymatous tissue adherent to the base of some of the hairs. To determine this point, I took 100 grs. of tea hair, exhausted it with cold water and evaporated the liquid to dryness. It yielded 15 grs. of extract; this closely agrees with the result obtained by Mr. Wigner. My object was now qualitative, to determine the presence of theine in the extract, and for this I adopted the micro-sublimation process. A little of the extract was dissolved in water, to which was added some calcined magnesia; the solution was boiled and evaporated to dryness; part of it was then placed in a cell on one glass slide covered by another, and at a temperature of about 120° C. I obtained successive crops of theine in acicular crystals. I then subjected the hair from which the extract had been obtained to the same process, but there was no indication in the hair freed from extractive of the presence of theine. It is evident that this experiment on the exhausted hair could not be considered conclusive as to the absence of theine in the normal hair of the tea leaf. I further picked carefully clean hairs from young Pekoe leaves, treated them in the same manner by gently boiling with a little calcined magnesia, and employed the same micro-sublimation process, but failed to get the slightest indication of the presence of theine in the hair itself when free from extractive matter and parenchymatous tissue. These experiments are to my mind conclusive that the theine was obtained from the extractive matter and parenchyma of the plant, and that there exists no theine in the normal hair of the tea leaf, and I believe that there is no known instance of a simple hair, such as that on the tea leaf, containing the active principle of the plant. A further careful examination of the tea hair, besides calcareous matter, shows the presence of minute particles of the elytra of beetles, the markings on which bear a close resemblance to the venation of a leaf, and which may easily be mistaken for fragments of some leaf other than tea. I may add that the tea hair has created considerable interest, and I have been applied to from the continent for museum samples, which until lately I was quite unable to supply.

Thanks having been voted to Mr. Greenish for his paper.

Mr. Groves said he could have saved Mr. Greenish a great deal of trouble if he had known that he was in search of the importers of the tea hair. It was no mystery—he had known all about it from the first. The general impression was that this tea hair was worked up into the compressed tea, as the only way of getting rid of it. As to the presence of theine, the presumption was in favour of Mr. Greenish's theory that it was not present.—*Year Book of Pharmacy and Transactions of the British Pharmaceutical Conference for 1877.*

Correspondence.

To the Editor of the "Ceylon Observer."

PADDY AND CATERPILLARS.

School of Agriculture, Colombo, 22nd Oct. 1886.

DEAR SIR,—I am sending you two kinds of caterpillars found in a crop of paddy growing in the Agricultural School compound: please ask your Entomological referee to what kind of moth or butterfly we are indebted to for this pest. The green-coloured caterpillar feeds upon the leaves of the paddy plant, but the other feeds in the culm, a little above the root and is by far the more destructive of the two. These insects cause serious damage to paddy crops, but if there is an abundant supply of irrigation water available, they need not give any cause for anxiety, for by flooding the field these depredators could be drowned and washed off the crop. In a season like this when no rain falls, the destruction of these caterpillars would be a serious difficulty.—Yours faithfully,

A. W. JAYEWARDENE.

[The specimens sent have turned into chrysales before they were fully recognized by our entomological referee; but they are probably only common visitors. Now-a-days every "poochie" seems to be pitched on as a new and formidable pest. If Mr. Jayewardene will send further specimens they will be fully identified.—ED.]

PINE-APPLE PLANTS FOR FIBRE AND FRUIT.

Kirimetia, 10th Nov. 1886.

DEAR SIR,—I enclose a sample of pine-apple fibre and will thank you for your opinion of it. It could be made much longer if required. In one acre of land there are ten thousand plants the first year, twenty thousand the second and thirty thousand the third year. Each plant has twenty leaves and each leaf gives thirty grains of fibre and with steam or water-power with proper machinery could be made in *any* quantity according to the force employed.

The plant will also give ten thousand pine-apples the first year, twenty thousand the second, and thirty thousand the third, which could be made into wine or brandy. Three full-sized pines will give a bottle of juice.—Yours truly,

J. HAWKE.

[The specimen of fibre looks very nice. There is no question as to the value of pine-apple fibre, but in this and in all other cases of the kind the question is will it pay to grow the plant largely and to use the requisite machinery. Pine-apples grown in the shade yield abundance of long leaves, but if regularly cropped, we suppose the application of manure would be necessary. Of all the fibre plants in Ceylon we have always regarded the pine-apple as the most likely to give good results. But an extensive experiment can alone settle the question of profitable returns. There is such a large and increasing demand for the fruit,—what with hotels and steamers,—that conversion into alcoholic drinks need not be contemplated. —ED.]

FRUIT FROM CEYLON FOR ENGLAND.

Catton, 12th November 1886.

DEAR SIR,—For the information of "Enquirer," in yours of 6th inst., I have sent oranges home on two occasions, through Mr. E. B. Creasy's Agency office, and they reached home in good order, and I must say were very promptly delivered, a great point with fruit of course. I may add that in my last package I sent home one of the largest sized fragile chatties used by natives for carrying and storing water in, just as a curiosity for my friends to see. I filled it with oranges, wrapping each fruit in paper, and put a straw envelope in centre for ventilation; the corners of the case I filled up with oranges in bottle-envelopes, the chatty also arrived in good order. S. B.

N. B.—The oranges were carefully gathered, and about a week or so before I expected them to get quite *yellow*.

"UNASSORTED" *Vs.* "ASSORTED" TEAS;—PER CONTRA—FOR THE BENEFIT OF MESSRS. RUCKER & BENCRAFT.

St. Leys, Dikoya, Nov. 15th 1886.

DEAR SIR,—Regarding Messrs. Rucker and Bencraft's Tea Circulars and their advice to us to ship "unassorted," I will give you my experience. In August last, I had two lots sold in Mincing Lane: one "assorted" 1,500 lb. and the other "unassorted," 1,000 lb. They were sent as a test, one against the other, and the teas were from the same bulk. The "assorted" was in five grades: Orange Pekoe, Broken Pekoe, Pekoe, Pekoe Souchong and Dust, and fetched an average of 1/5¼—the "unassorted" fetching 1/1. Messrs. Rucker's figures reversed. A leading Mincing Lane Broker expressed the opinion that, "it was a pity the latter had not been assorted, as there was a large proportion of fine tea in it."

"Who shall decide, when Doctors disagree"? *
Yours truly, JAS. W. HOLT.

CEYLON CULTIVATION AND MANUFACTURE OF TEA: CHANGE OF SYSTEM PROPOSED AS A REMEDY FOR OVER-PRODUCTION.

DEAR SIR,—The "Tea Planter's Manual" contains much information, which will be extremely useful to the young, and inexperienced planter, but there is almost a certainty that the progress of invention, and knowledge will at no distant date render valueless more than half of the contents of the volume you were good enough to present to me.†

The present ideas regarding manuring, plucking, withering, fermenting, and the necessity for large tea-houses, will; I think, undergo a change, and new systems will not only be forced upon us, but accelerated by the rapidity of our progress in cultivation.

In a few years hence, when Ceylon produces sixty millions of pounds, India eighty or more, Java thirty, on the top of two hundred millions from China, and fifty from Japan; we may find too much tea is produced, even for the increased consumption, which may naturally be calculated upon in every consuming country; and the inevitable result of producing a commodity, which at present can be successfully, and profitably grown over so large an area as tea will follow, namely, over-production and a decline in prices thereupon, to a killing point.

If this should happen, the important question will be: whether anything can be done to avert the consequences which a forced curtailment of production entails?

I think it is possible by changing the present system of cropping, not only to largely diminish production without reduction, or abandonment of cultivation, which, in the case of nearly every other

* Hear, hear!—It is evidently ridiculous to lay down any hard and fast rule.—ED.

† In which case a new and revised edition will be published, with all information brought up to date. But we don't think present systems will be so entirely and so rapidly superseded as our correspondent anticipates. —ED.

product, is the only way of attaining that object; but to render it possible to profitably continue cultivation undiminished, under almost the most adverse circumstances which are likely to occur. The compiler of the "Tea Planter's Manual," has in the last three paragraphs of his introduction, set forth the peculiar advantages Ceylon possesses for the profitable cultivation of tea, but I cannot recall that either he or any other authority, has ever pointed out, though the fact is well-known, that there is scarcely any product but tea, from which if he wishes it, the cultivator can harvest the finest and highest priced grades of quality, and leave the inferior and lowest priced on the plants, without detriment to them.*

When you reflect on what would follow if European tea-planters in India, Ceylon and Java, could at once, WHEN NECESSITY ARISES, curtail the production of their estates by fifty per cent, and still be able to keep up their full acreage cultivation, not only without loss, but at some profit, you will recognize the almost unique advantage a tea-planter enjoys over the producer of almost every other commodity.

That this can be done, I will endeavour to prove, although in the method I suggest, which can be gathered from what I have said above, I shall not be communicating anything new, for, I believe some of the planting cognoscenti adopt it now, not because they are forced to do so, but because they think it more profitable.

As long as the cultivation of tea is as remunerative as it is now, it is more than probable that the safest course to adopt in harvesting, is to continue the system now generally practised, that is, to take from the plants all the pekoes, and pekoe-souchongs they will yield, whether by doing so the planter obtains four, five, six or more hundreds of pounds per acre, but, if the time comes when over-production has to be killed, a different system must, I think, be carried out to avert abandonment, and that change is to pluck fine, and produce nothing but orange and broken pekoes.

We now know that by careful manipulation, planters can turn out on the present system of plucking, fifty per cent of orange and broken pekoes, which average at present in London, at least eighteen-pence per pound. If in the distant future prices decline fifty per cent below what they now are, orange and broken pekoes would be worth only ninepence. The question, therefore is, whether fine teas only, can be produced profitably, to sell in London at this average? My answer is, that planters whose estates now yield 400 lb. per acre at a cost of 30 cents per lb. in Colombo, could reduce their yield to 200 lb. per acre and lay it down in Colombo at a cost of about 36 cents per pound; this at present rates of freight and exchange is equivalent to 8d per lb. in London, leaving for interest or profit, a margin of a penny per pound.

In support of this statement, I offer the following calculation based on the figures given in the "Tea Planter's Manual," making such slight alterations as an entirely different set of circumstances would warrant. For instance, I have reduced the cost of management a little, because in times of great depression it is necessary to economize in every possible direction. I have omitted the cost of nurseries, as there is no need to provide for increased production, when reduction is the order of the day; and I have omitted the charge for machinery and buildings as not belonging to the cultivation expenditure on an estate in full bearing.

The working expenses of a 200 acres garden in full bearing would be:—

Superintendents and Tea-house Conductor	R3,500
Weeding R1 per acre: 200 acres at R12 ..	2,400
Pruning R6 per acre	1,200
Upkeep of roads and drains	500
Tools; contingencies, general transport and repairs	1,000
Total fixed charges on 200 acres ...	R8,600

which on 40,000 lb. of made tea, comes to per pound cents.. .. .. .. 21·50

The cost of plucking, manufacturing, packages, transport, are the same rateably, whether the yield is large or small, I, therefore, take the cost of these from the "Manual" .. 15·00

Total cost per pound in Colombo cents.. 36·50

It may be urged that the cost of plucking 200 lb. per acre will be greater than that of 400 lb., if this is so, then the 400 lb. may be plucked; the leaf passed through a green-leaf sifter, and the coarse leaf put into the manure-pit.

I need scarcely point out, that many charges fall more lightly on high priced tea than on low, and that the fixed charges on cultivation compare more unfavourably than they would do if worked out. There is no use of arguing, that as Ceylon planters can produce tea to sell without loss, even if prices decline fifty per cent below the present average of thirteen-pence-half-penny there is no necessity to reduce production; because as overproduction must be put an end to, prices will fall not fifty per cent, but sixty or seventy until that end is attained.

A falling-off of 50 per cent in supplies from India, Ceylon and Java, would not only enhance the prices of fine teas, but those of all descriptions; moreover the masses, would, whilst fine teas were selling at 9d per pound, be educated into appreciation of good tea, and would not easily be again induced to consume the low teas which form so large a portion of what is exported from China. The Chinese have hitherto exported very largely, descriptions not averaging as much as 8d per pound, a decline of fifty per cent would compel these accommodating people to consume their own rubbish. No doubt, they would adapt themselves to circumstances, and ship more of their fine teas, but it would take a considerable time to induce them to abandon old customs, we need not, therefore, dread an over-supply of fine qualities, when low sorts are not procurable. It is fortunate, that it would require no united action to carry my suggestion into effect, because if prices from over-production are brought down to a ruinous point every planter will be compelled to do something if he can, to avert ruin; each can "paddle his own canoe," without consulting his neighbour.

I may be asked, why I trouble myself to write a letter so long in advance, which, if not based on a fallacy, would do much to encourage that increase of cultivation, which those like myself who are already interested in it up to the hilt, would like to see stopped short. My answer is that so far as Ceylon is concerned, the mischief —if there is mischief in it—has been done already or is in the course of being done. There is every probability that the colony will, in the course of five or six years, export 60 millions of pounds or more without any encouragement, but the prospects of the immediate future—but there is no disguising the fact, that there is a strong undercurrent of opinion that the Ceylon tea planter in his eagerness to retrieve past losses, has already overshot the mark and has gone, and is going too far ahead

* Mr. Armstrong and other experts have characterized fine plucking as more trying to tea plants than medium gathering of leaf.—ED.

as he did in the case of cinchona, and in a small way with cardamoms.

It does not suit my book, nor I think the book of any one interested in tea planting to have doubts thrown on the permanency of an industry to which we are irretrievably committed: and I do not think I am cutting my own throat in doing what I can to disperse doubts, which many people make use of to suit their own views. I commenced this letter with the intention of criticizing the article in the Manual on Manuring, as it appeared to me that the compiler, Col. Money, and Mr. Carter, had fallen into the mistake of calculatiug the gross value of the whole of the increased yield from the application of costly manures as profit without deducting the cost of manufacture, chests and transport, in fact all rateable charges on the extra output, but as this letter has spun out to an inordinate length, I must postpone my remarks on the subject *sine die*, no doubt, to the great satisfaction of your readers. This letter will, however, only be read by the few who recognize the signature as that of the writer of one you published in August 1883, in which, for reasons given in it, the conversion of coffee estates into tea gardens was strongly advocated and this is a sequence to it.—Yours truly, C. S. as

---

The Artificial Quinine Scare.—A very complete and amusing exposure of the Cresswell-Hewett deception will be found on our back page taken from the "British and Colonial Druggist." It seems clear to us that Mr. C. Hewett bolted to the Continent to escape being put to the test by Dr. Burton and Messrs. Burroughs, Wellcome & Co., in doing what he promised, namely, to turn out 2 lb. of marketable medical quinine,—satisfactory to two competent referees—at a rate not to exceed 4d an ounce, besides a bye-product of some value! Cresswell-Hewett is evidently either a madman or a rogue.

Fruit to England.—In reference to "Enquirer" 's letter of 28th October, a correspondent reminds us that in *Tropical Agriculturist* 1885-86, page 445, we published a letter on the subject of sending oranges to England—a box of these to Norwich, sent through the London and Colombo Forwarding Agency, arriving in capital condition. We learn that another lot of oranges went forward by the same agency a short time ago, and we hope to hear the result very shortly. We are told the object of wrapping such fruit in tissue, or blotting paper is in the first place to prevent them from touching each other, as almost all fleshy fruits are apt to decay at the point of contact, though they may not actually be bruised; in the second place to absorb any moisture that may exude from the skin. All fruit confined in boxes sweats to a certain degree and it is important to get rid of the moisture, if possible.

Water Power and Tea Machinery.—With reference no doubt to our remark on the suitableness of electric motors for connecting machinery in factories placed at suitable centres with water-power at a distance, a correspondent sends us some interesting information respecting a Darjiling factory. He refers to the gardens of the Tukvar Tea Company and states that the power for driving ample machinery for a large tea factory is provided by a turbine situated at the level of the river nearly 1,500 feet below the level of the factory, the power is carried up the hill by wire-ropes running round pulleys about a chain apart. The factory is a large one and is one of the Show places in Darjiling. Mr. Curtis is a practical Engineer. The machinery works well, as several Ceylon residents who have seen the place can testify.

The Lungla Tea Company, Limited, is registered with a capital of £40,000 divided into 4,000 shares of £10 each, with power to increase. The object is to acquire and take over as from January 1st, 1886, from the present proprietors, the tea gardens, plantations, factories, land and property, situate in the district of Sylhet, in British India, known as the Lungla Tea Estate, and all the manufactured tea and all the tea-leaf and other produce thereof respectively, and all the houses, erections, buildings, machinery, implements, utensils, elephants, live and dead stock, and all other property of whatever kind thereunto belonging at the price of £36,000 to be paid to the said proprietors in 3,000 shares in this company, on which the sum of £10 shall be credited on each share as paid; and also to acquire such other tea gardens, plantations and property as shall be convenient for the purposes of the company, and to carry on the business of planting and cultivating the tea plant and the manufacture and sale of tea. The first subscribers are:—M. Fox, railway contractor, of Catherine Place, Bath; Major-General T. B. Harrison, Blackheath Park, S. E.; H. A. Harrison, Judge, B. C. S., Blackheath Park, S. E.; C. A. Goodrich, tea merchant, Dashwood House, E. C.; A. R. McIntosh, merchant, 47, Queensboro' Terrace, Bayswater; G. Seton, merchant, 34, Old Broad Street; J. Sanderson, solicitor, 46 Queen Victoria Street, E. C. The number of directors shall not exceed five, and shall not be less than two, and the qualification of each shall be the holding of £1,000 of the nominal share capital of the company. The following are to be the first directors, *viz*:—Michael Fox, Beanfill Harrison, Frederick Bailey, Edmund Theodore Roberts, and Charles Alfred Goodrich, Mr. Fox being chairman.—*Times of India, Cor.*—London, October 21st.

Cinchona Culture in Brazil.—The *Rio News* states:—During the Senate session of the 20th instant Senator Tannay took occasion to call attention to the question of cinchona cultivation, and asked the government for information regarding the Berreira cinchona plantation. He referred to the efforts employed by the British and Dutch governments to encourage this industry, and the advantages which the state might derive from its cultivation. Senator Dantas took up the same subject and stated that the cultivation of cinchona was begun in the country in 1868, and that the experiment had given good results. In entire accord with the preceding speaker, he thought that the Government ought to encourage its cultivation on a large scale. There can be no doubt whatever as to the good results of such an industry provided it is intelligently carried on and it is not handicapped by export taxes. So far as it can legitimately do so the government will certainly do wisely to encourage this and all other new industries, for the country needs a greater diversity of productions. But how is this to be done? And is it not a sad commentary on the state of affairs that no industry can be started without government aid and encouragement? Must we believe that the Brazilian people have come to that pass where no industry can be initiated and no enterprise carried on without such help? And what future is there for a country so helpless as this? Instead of trying to secure aid and encouragement for this or that special industry, however advantageous it may be, we are inclined to think that the first duty of the government is that of arousing the people to think and act for themselves. Industry should be made less dependent upon the public treasury, and more upon individual enterprise. Instead of confining their whole attention to coffee and sugar cultivation, why should not the planters exercise their own good judgment and undertake the production of other staples? The state may very properly obtain information for them, and may even carry on experimental farms, like this cinchona plantation at Barreira, but beyond this is the domain of private industry into which the state should not enter. The minister of agriculture should furnish all the required information in regard to this experiment, which should be published, but we do not see that anything further should be done. The people should be made to feel that the matter is wholly in their own hands.

PLANTING IN FIJI: COCONUTS, CINCHONA, COFFEE.

(*From the Handbook to Fiji*)

Under the heading "Agriculture" a considerable space is devoted to noting the prospects and possibilities connected with the chief products of the colony. Attention is directed to coconut cultivation, and after describing the method considered to be most suitable, probable results are thus referred to:—"Taking the produce in Fiji at 60 nuts per tree, per year, an acre would give, say, 4,200 nuts. This would make about two-thirds of a ton of copra, the average value of which is about £7 10s., from which deduct the expense of collecting and manufacture, which is about £2 10s., which leaves a profit of £5 per acre. It may be added that copra is shipped to Europe where it sells at from £16 to £20 per ton. And it must be remembered that in the above calculation no account is taken of the husks, or pericarp, which, by the use of the proper machinery, is manufactured into coir fibre and is of considerable value. As to the cost of land and the expense in labor, etc., entailed to bring a coconut plantation up to the bearing point, a rate cannot well be fixed as many causes may operate to vary the amount. Land may be purchased at a low or a high figure. Labor may be well and economically used, while on the other hand it may be wasted most enormously. Taking the above into considaration the cost per acre for bringing a cocoanut plantation into full bearing may vary from £20 to £40 per acre; it may be done for £20, but it might take £40. If therefore, a person has capital to purchase, say, 500 acres suitable coconut land in the proper locality, to clear, plant, and cultivate 500 acres of coconut trees up to full bearing point, he may calculate on an income of at least £3,000 per annum as the combined profits of copra, fibre, and cattle. As to the value elsewhere of full-bearing coconut plantations, a reference to the Ceylon newspapers will show that sales of such property there are never made under £100 per acre, and often much more.[a] * * * Probably no crop or product is to be found where so large a return is obtainable at so small a risk as that of coconuts. * * * The husks from 700 coconuts produce about one ton of fibre, which is of the value on the estates in Fiji of from £5 to £15 per ton, according to quality. Brush fibre or bristles is worth from £15 to £30 per ton in Fiji. The cost of labor to produce one ton of fibre, exclusive of cost and wear of machinery, may by putting down at from £5 to 10."

The exact value of the foregoing will at once be relised by the coconut growers of Fiji, while those who desire to be enlightened may easily attain to the most perfect assurance on the point through the same medium, experienced.

"Cinchona" is the next product noticed and after a truthful statement to the capacities of the group for this cultivation, the subject is quitted with the following observations:—"Here a planter who can afford to wait for the returns for seven years cannot do better than open out a cinchona plantation; whilst for one whose capital is too small to enable him to wait there are many products such as tobacco, corn, ginger, cardamoms, bananas, etc., which he could plant as well, and on the immediate returns of which he might live until the cinchona would be fit to cut. For the capitalist who requires good interest for his money and a healthy pleasant life there are few places like Fiji." Reference is here kindly permitted to the long roll of capitalists and planters who have realised this good interest, but whose names have unfortunately not been mentioned.

Relative to the next product noticed, "Coffee," the gentleman whose name appears upon the title page gives assurance that it can be received with perfect confidence. Possibly he may not have written the matter; but he has been a coffee cultivator himself; the scene of operation specially reffered to is one with which he is intimately acquainted, and these facts are a sufficient guarantee that he would not countenance an imperfect or insufficient statement of the case. With this premise it is only necessary to quote briefly:—"Perhaps no tropical industry offers more genuine attraction to a man possessed of ordinary business ability with a taste for agricultural pursuits than does coffee-planting. * * * The coffee industry is no longer in its infancy in Fiji. Questions with regard to soil, natural fertility, elevation, and shelter having now been proved by the experience of pioneer planters, may be regarded as settled, and any one now opening up a coffee plantation in Fiji need no longer run the risks attending experiment in these directions. * * * The coffee-leaf desease which some four years ago threatened to crush the coffee industry throughout the world may now be said to have all but disappeared from Fiji. Experience has shown that it may be best resisted by high cultivation, and for this purpose the incomparably rich soil of the group offers facilities that cannot elsewhere be met with. On the island of Taviuni, for instance, which on account of position and fertility seems to have been specially selected as a field for the coffee industry, the disease is rarely to be met with. Of this island Mr. F. B. Thurber in his 'Coffee from Plantation to Cup' remarks:—'In the island of Taviuni, in the Fiji Group, there are some half-dozen coffee estates ranging in area from fifty to three hundred acres. Coffee trees are just coming into bearing (1880). At the Sydney Exhibition the first gold medal was awarded to an exhibit of coffee from Fiji.'" This is all that is said as to the present prospect of the industry. It is of course left to the Executive Commissioner to dilate orally upon the astounding progress which has been made with these half-dozen estates since the date above quoted. He may also be expected to supplement it with glowing references to the Wainunu, Bua, Rewa, and Serua plantations, and to explain under what exceptionally favorable condition, apart from those of fertile soil and admirable climate, they have steadily attained to their present high state of remunerative development. Connected herewith his own personal experience will supply a most encouraging illustration, and it will further permit of the confidential intimation that as soon as the exhibition is over it is his fixed intention to rush back to Fiji, put in a large area of coffee and to retire in a few years upon the magnificent addition, he will thereby be able to make to the colossal fortune he has already amassed.—*Fiji Times*—[This is, of course, sarcastic, coffee culture in Fiji, so much vaunted by Mr. Mason in the Hand-Book having been, really a great failure.—Ed.]

[a] Surely there is some great mistake here! Has coconut property in Ceylon ever sold at £100 per acre?—Ed.

AGRI-HORTICULTURAL SOCIETY OF MADRAS.

The Dinde Tree.—Read the following letter from Mr. Morris, dated Kew, 6th July 1886:—"In the Report of your Committee for the year 1885, mention is made of the seed described as 'Dinde,' a valuable timber tree sent to the Society from Kew. Mr. Dyer desires me to say that since the despatch of the seed it has been determined as *Colorophora tinctoria* or the Fustic Dyewood of the West Indies. I notice that in your Report you do not speak very favourably of the 'Tree Tomato' in Sourthern India. It is quite possible that it may not be quite so good with you as it undoubtedly is in the West Indies, but on the other hand, it may be found, on larger knowledge and experience to possess qualities which may commend it to general approval. The fruit should be allowed to fully ripen on the tree. This is an essential point as regards flavour and size. For cooking purposes, all the seeds should be removed and the outer skin, then cut the fleshy part into quarters and stew or cook as you would apricot or peach, or make into jam or jelly. If found too acid, steep in boiling water for a few minutes before using, and the flavour will be much milder. The painters in Jamaica attribute to it very beneficial properties as regards liver disease; and indeed my attention was first drawn to it under th

name of 'vegetable mercury,' I cannot say anything about its medicinal properties for I have had no opportunity to test them; but I can certainly speak highly of it as a fruit prepared in the manner above described. '' Recorded with many thanks, and resolved that Mr. Morris be informed that from more recent Reports his introductions of the "Tree Tomato" to the Hills of the Southern India may be regarded as a decided success which is much appreciated.

Tree tomato.—Read the following letter from Charles Gray, Esq., dated Coonoor, 11th August 1886:—"I notice in the Annual Report for the past year that the 'Tree Tomato' is said to have proved a failure as regards the flavour of the fruit. All I can say is that on the Nilgiris every one that I have given a fruit to, has pronounced it most delicious; and if the longing looks cast on the fruits on the tree after one has been given as a trial, are to be taken into account, I quite believe it. Unfortunately my supply is limited, or I could have disposed of hundreds, and if you have any surplus seed, I should be glad of some, as I am continually asked for some. I write this, as I, for one, (and there are many others here too) am decidedly in favour of its propagation, it being a valuable addition to our limited list of really tasty fruits, as well as being most ornamental. I do not know how the plant grows in other districts, but in Coonoor it grows with a nice straight stem about 6 feet high, and then branches straight out, each branch being very even in length; the clusters of scarlet fruit, from 3-10 in number, which hang well below the foliage, give a perfect picture that makes the tree an ornament to any garden.

Coca.—Sir Walter Elliot (M. C. S. Retired).—Read the following letter from Sir Walter Elliot.

I have to thank you for the last Report (1886) of the Agri-Horticultural Society, which contains an interesting account of your endeavour to distribute seeds of the Erythroxylon coca. In the Report of the previous year it was stated that it was expected to form an anæsthetic agent which would be useful in India. I looked for a further notice of this discovery in the present Report, but the subject of cocaine is not mentioned. Colonel Beddome told me that some years ago he tried to use the dried leaves as the Peruvian miners do, who chew them with powdered chalk as a stimulant, but he did not perceive that it had such an effect. The trivial name recalls to me a substance with which I was familiar many years ago, when employed under the Bombay Presidency. It was sold in the bazaar under the name of Kokum, a soft or soapy substance procured from the Konkan, and applied to the skin when cracked and excoriat by the sun with good effect. It is prepared from the seed of Garcinia purpurea of Roxburg common in our forests, and is described by Colonel Beddome in his Icones p. 64. It has often occurred to me that it might be utilized more generally if prepared in a more refined form. I brought a piece home which I sent two years ago to my son when with his regiment, the Black Watch, on the Nile expedition. They were the most advanced party, and suffered severely when rowing all the day against the stream under intense solar influence. It did not reach him in time to give it a full trial, but if it had, I am convinced it would have been of essential benefit. It might be worth the while of the Society to consider this. The Report of 1884, for which I have also to return the best thanks, made special mention of the Fourcroya, and other fibre-producing plants. When in London, last year, I found my old friend, General Fred. C. Cotton, R. E., much occupied with an improved process for extracting fibres from the cellular substance which, by the present practice of applying water from above, is apt to cause entanglement of the finer fibres. The improved practice consisted in forcing the water from below, which by the experiment then making appeared to answer perfectly in bringing out the fibres undisturbed. Very likely you may have heard of this, but I think it was well to mention it in case you have not. Owing to my complete failure of sight, I am unable to take the same interest in these matters that I used to do, in addition to which my advanced age acts as a still further hindrance. I still, however, love my garden, and should be glad if you would send me a small packet of seeds of Nilgiri and other Indian plants, which I formerly had, but have lost, I may mention particularly the Meyenia and some of the handsomer Acanthaceæ and Scrophalaceæ. I sent a small packet of Ipomœa Quamocut seed to my daughter in 1859, which after her marriage was found in her room, where it had been overlooked for 20 years, I sowed them, however, in 1881, though without the least expectation that they would germinate. To my great surprise they did so, when, owing to the carelessness of a stupid gardner, they were lost during my absence, after they had attained a height of 10 or 12 inches; I should like to try this exepriment again if you can send me a few seeds, both old, if you have them, and new. I shall feel much obliged if you will make my grateful acknowledgments to the President and committee for their kindness in sending the Reports." Recorded. The seeds will be sent.—*Madras Mail.*

KAPOK, or tree cotton, is attracting some attention just now, not only abroad but in this country. We therefore reproduce in another column this week, a somewhat lengthy paper on the subject from one of our English exchanges. Our contemporary has got a little "mixed" about the various sub-orders which make up the natural order which chiefly contain silk cotton trees: for instance, the N. O. Trestromaceæ (the Tea and Cammellia order) is included among the allied orders of Bombaceæ. In other respects, the paper contains much interesting information, and will repay perusal.—*Indian Agriculturist.*

FIBRE.—Our esteemed correspondent, Dr. Bonavia, of Etawah, calls attention, to the *white* flowered variety of the *Calotropis Gigentea* ('Madár') as an excellent fibre-yielding plant. Owing to the branching habit of the ordinary 'Madàr' and its low, straggling growth, it loses much of its value as a fibre plant, as the staple is very short. With the white-flowered variety it is different. The plants are single-stemmed, erect in habit, and grow to over six feet in height. We have frequently come across this variety in the North-Western Provinces and the Punjab, especially in the Delhi district. Dr. Bonavia's suggestion is a good one, and the experiment is worth being carried out on a small scale at first, if necessary.—*Indian Agriculturist.*

BRICK TEA.—Mr. C. Maries, the Superintendent of the Durbhunga Rej gardens and parks, gives a Calcutta paper an account of the manner they make brick tea in China. It is interesting, *apropos* of the subject, to know that tea bricks are used as currency in Tibet, where the salaries of the Chinese officials are paid with them. Mr. Maries says:—"I have visited the factories in Hankow, China, where brick tea is made. I was there in 1878, and, after watching the process with great interest, I saw only dust tea used—generally of the dirtiest nature—the very siftings of siftings to all appearance. The dust was weighed out and put into thin cloth bags; the bag was then put over a cauldron or large boiler and steamed for a certain time. When thoroughly steamed (the time was, as near as I can remember, about five minutes), it was taken and put into a strong wooden mould and pressed under a beam press, coolies acting as weight for the press by running along the beam. All was done most quickly and easily: it was less like work than play. After the pressing the mould was taken into a drying room, where the tea was allowed to remain in the mould till the cake was hard. The cake was then turned out and dried like common clay bricks till perfectly free from moisture. I did not see any other material mixed with the tea; nor was it damped before steaming. If the dirty Chinese dust would make good tea for Russian consumption, I should think the clean dust and refuse of the Indian tea-factories, such as I have seen, would make a profitable article of export. This brick tea is sent overland from Hankow to Siberia."—*Indian Agriculturist.*

TREE ROOTS AND BUILDINGS.—At a recent meeting of the Society of Arts, in the course of a discussion on Indian Archæology, Mr. Sewell said he did not know anything which would advance the preservation of ancient monuments in India more than the discovery of some means of checking the growth of tree-roots on the temples. All sorts of things had been tried in Southern India, but they had discovered nothing effectual. They burnt the roots with red-hot crowbars, and some people had suggested putting sugar upon them, in order to attract ants and other insects, but he did not think that was very practicable. If any remedy were discovered and made known, it would be invaluable.—*Indian Gardener.*

REMEDY FOR EARACHE.—The *Therapeutical Gazette* recommends the following as an effectual means of administering chloroform in this complaint, and one which is absolutely devoid of danger. This is to fill the bowl of a common clay pipe with cotton wool upon which pour as much chloroform as it will retain without dripping. This done, insert the end of the stem carefully into the ear, and let some one blow gently the vapour of the chloroform against the tympanum. The person blowing through the pipe must of course be careful not to *inhale* the fumes of the chloroform. This is an exceedingly effectual relief for earache in children when there is no inflammatory disturbances. —*Burgoyne & Co.'s Price Current.*

CANARY ISLANDS COCHINEAL.—A recent consular report states that the value of cochineal exported from the Canary Islands during the past year was £127,023. It is still the most important staple of exportation, and the principal product of the islands. We hear, however, that an attempt is about to be made to cultivate the tea shrub on these islands. With regard to cochineal, in spite of the above results, there has been a general falling off, amounting to something like 10 per cent as compared to the produce of the year 1884, particularly on the Grand Canary, where the crop of cochineal is always more than half the whole yield of the islands. It is asserted that the trade is evidently declining. Nevertheless, the recent rise in price gives some hope that the cultivation of the opuntia for the rearing of the cochineal insect will not be entirely abandoned for many years to come. It is not a little surprising that the discovery of the coal-tar dyes should have injured the cochineal trade; and it would doubtless have ruined it ere this had it not been found that most of the coal-tar colours are poisons, which cannot be employed with safety in pharmacy or in confectionery. This fact alone ought to cause a revival of the "good old times" as regards cochineal.—*Burgoyne & Co.'s Price Current.*

THE BAMBOO.—The following is an extract from the "Exhibition" number of the Journal of Indian Art for May 1886, describing the plans of the Indian Courts at the Colonial and Indian Exhibition:—"In the centre of the Economic Court the great Bamboo Bridge, or as it may be called trophy, is a conspicuous object, and the collection of over 3,000 articles made from this most versatile material, can only be briefly introduced by a quotation from Colonel Yule's Anglo-Indian Glossary, page 41—'In fact it might almost be said that among the Indo-Chinese nations the staff of life is a bamboo. Scaffolding the ladders, landing jetties, fishing apparatus, irrigation wheels and scoops, oars, masts and yards, spears and arrows, hats and helmets, bow, bow-string and quiver, oil cans, water stoups and cooking pots, pipe-sticks, conduits, clothes-boxes, pan-boxes, dinner-trays, pickles, preserves and melodious musical instruments, torches, footballs, cordage, bellows, mats, paper; these are but a few of the articles that are made from the bamboo. To these may be added from a cursory inspection of a collection in one of the museums at Kew, combs, mugs, sun-blinds, cages, grotesque carvings, brushes, jans, shirts, sails, teapots, pipes and harps."—*Indian Gardener.*

THE SANITARY VALUE OF TREES.—Dr. Stephen Smith recently read a paper before the New York Academy of Sciences on the sanitary value of trees in the city It is a well-known fact that during the intense heat of summer there is more suffering and death from sunstroke and high temperatures in the Northern cities than in the South, a result which must certainly be attributed to the absence of suitable protection. From three to five thousand people die every summer in the metropolis from the effects of heat. In the arid, treeless streets and avenues the temperature often runs from 130° to 150° Fahr., when under the branches of a thrifty shade tree it would not exceed 70° or 80°. In the absence of sheltering trees, the stone and brick walls act on the principle of the regenerative furnace, and absorb the heat of the sun to yield it up again during the night. If trees were planted in the streets the pavement and surrounding walls would be much cooler, and at the same time the trees would absorb the deleterious gases thrown off from the lungs and from decomposing matter, yielding in return a supply of pure oxygen. The value of a systematic culture of trees in all of our large cities can hardly be estimated. From both a sanitary and artistic stand-point they are a very desirable addition to any city.—*Indian Gardener.*

COMICALITIES IN PLANTS.—There is a jack in the pulpit, the flower of the plant known as Indian turnip (*Arisæma triphyllum*). Who could ever look at one of these singular blossoms, says a writer in the *Western Review of Science*, without that same stirring the risible faculties which one experiences in perusing a parody or caricature, or witnessing a pantomime? The very sight of one is provocative of mirth. How many times in my school days did I challeng the teacher's frown by involuntary giggles of the whimsical look of the imprisoned Jack! Monk's hoo of the genus Aconitum, has quaint, comical flowers, suggestive of an old lady's head in a night cap. The well known fly-trap, *Dionæa muscipula*, strikes the mind with all the effect of a joke. The leaves of this plant are fringed with stiff bristles, and fold together when certain hairs on their upper surface are touched, thus seizing insects that light on them. Seeing the leaf stand temptingly open, a poor fly pops in for shelter or food. No sooner has it touched its feet than some sensitive fibres are affected, and the cilia of the top closes in upon the intruder, imprisoning him as effectually as if a boy had taken him and closed him in a box. The pitcher plant, or monkey cap of the east, although not particularly ludicrous, has a whimsical arrangement which borders closely upon the human economy. To the footstalk of each leaf of this plant, near the base, is attached a kind of bag, shaped like a pitcher, of the same consistence and colour as the leaf in the earlier state of its growth, but changing with age to a reddish purple. It is girt around with an oblique band or hoop, and covered with a lid neatly fitted, and moveable on a kind of hinge or strong fibre, which, passing over the handle, connects the vessel with the leaf. By the shrinking or contracting of this fibre, the lid is drawn open whenever the weather is showery or damp. When sufficient moisture has fallen and the pitcher saturated, the cover falls down so firmly that evaporation cannot ensue. The water is thus gradually absorbed through the handle in the footstalk of the leaf, giving sustenance and vigor to the plants. As soon as the pitchers are exhausted, the lids again open to admit whatever moisture may fall; and when the plant has produced its seed, and dry season fairly sets in, it withers, with all the covers of the pitchers standing open. The flower of the *bee orhcis* is like a piece of honeycomb, and the bees delight in it. Then there is the snapdragon, the corolla of which is cleft, and turned back so as to look like a rabbit's mouth, especially if pinched on the sides, when the animal appears as if nibbling. The flowers of the cock's comb, and the seed pod of the *mostynia probosscidia* bear curious resemblance to the objects which have suggested their names. Some kinds of the *Mendicago* have also curious seed-pods, some being like bee-hives, some like caterpillars and some like hedgehogs—the last being itself an essentially ludicrous object.—*Scientific American.*

VEGETABLE CULTURE IN NUWARA ELIYA:

INSECT PESTS—A NEW WRINKLE &C.

(*Written for the "Ceylon Observer."*)

Kitchen gardening at the Ceylon sanitarium is not "all beer and skittles." I have been up here for nearly a year opening up extensive gardens, for the rearing of choice European vegetables, and, though as is usually the case, I have had to pay for my experience, I have yet no wish to bottle up and hide under a bushel, any useful wrinkles, or little knowledge I may have gained.

You have long ago asked me, to jot down some instructions as to the growing of vegetables in the highlands of Ceylon. To begin with, I had not until lately acquired sufficient knowledge to authorize me to write on the subject with any degree of confidence. In the second place, constant outdoor work, superintending Nuwara Eliya coolies,—and *such coolies*—is not conducive to scribbling and desk work. I am not, I think, naturally a bad-tempered fellow, but if Job himself had had the ordeal to go through, I do believe the writings of that patient Saint of old, would have been handed down to his posterity in a very much more modified form. But I am wandering from my subject, and first let me give you a few lines on our insect pests.

1.—*Insect pests.*—The worst enemy to Horticulturists here, and indeed lower down to about 3,000 ft. elevation, is the "black grub," the most destructive of all loathsome creeping things, it has been my misfortune to make the acquaintance of. It is the larva of a small gray moth,* and reaches to the length of about 1½ inches. This black *imp* may be termed an *omnivegetarian*, feeding on no particular plant, but cutting down indiscriminately everything that comes in its way. Fancy what a blessing this little *cuss* would be if it would only confine its attacks to the herbage and weeds, which nature originally provided for it to feed on! Not a bit of it, his taste has got highly educated. He has a decided predilection for the succulent cauliflower, and is ravenously fond of a *good salad*, beetroot and lettuce plants not having a ghost of a chance with him. The omnipresence of *these* "varmints," seems to me to be a good example, of Darwin's theory of the survival of the fittest,or at least in this instance of the *most voracious*. The unkindest part of it is, that this knowing poochie, does not seem to feed on the plants it attacks, but simply cuts their throats, just at their junction with the ground. In a word, he is a regular little garotter. He leaves his victim prostrate and knowing his deeds are evil, proceeds onwards in the darkness of night, to repeat his wanton mischief. The *mothers* of these little imps must be bad ones, for they do not attach their eggs to any particular food plant, as most respectable and high caste moths and butterflies do, but deposit them in the *ground*—instinct dictating to them that their ill-begotten progeny from their naturally predatory habits—will have no difficulty in gaining a livelihood. Now what are the cures for this pest? To begin with we have a plant growing in Nuwara Eliya—a tall species of Lobilia, † which when cut up and put round the stems of the young plants, undoubtedly wards off the attack of this destructive grub. This acts, however, only so long as the acrid, milky juice of the plant is fresh and potent and this chopped up Lobilia requires to be repeated frequently, to be of much efficacy.

But now let me give you and your readers a wrinkle, which to a great extent, thwarts this villainous little vegetable garotter. My friend W. and I sometime ago put our heads together, and vowed vengeance against him. We made up ever so many horrible concoctions, the rehearsal of which would be far from pleasant:- many of them were most effective and such as no poochie ever born could *face*,—but too expensive and troublesome to pay. At last we got on the right tack, and the best and most effective cure we have yet discovered, is one, which I fear you will look on, as down right desecration and vandalism,—but the truth must be told. Our old *Ceylon Observers* are carefully cut up into squares of 3 by 3 and 4 by 4 inches. These little fragments of the "Old Rag," are carefully rolled round the necks of our cauliflowers, beet and cabbage plants &c., and form real *comforters*. We then finish off by giving these fragments of your valuable journal a dash of coal tar and when Mr. Poochie comes in contact with them, he sheers off in quest of a more palatable diet. The past numbers of other local papers are dissected in the same ruthless way, but I feel sure, the editors will excuse the apparent sacrilige, when they view the matter in a utilitarian and philanthropic point of view. The *London Times*, the *Spectator* &c., sent me occasionally by a very dear friend, share the same fate. It is indeed an interesting subject for reflection, that the mental food provided for man by so many able journalists, should scare away the black grub. Mr. Poochie has evidently no stomach for *tarred literature*.

The next destructive larvæ we suffer from here are those of several species of beetles—or what are generally known as white grub—repulsive looking things with big heads, but not very injurious to vegetables.

A much more serious pest is a little tiny black fly which appears only, thank goodness, at certain seasons. There are several species of these, some almost microscopical; two of them are evidently of the *Ichneumonidæ* family and to the minute larvæ of which, we fear, we have to trace much of the damage done to our very young seedlings. The wire-worm is also a severe scourge to say nothing of the cockchafers.

Sulphur when sprinkled over the seed beds just before the first or cotyledon leaves make their appearance, will be found useful in warding off the attacks of the small black flies: and of course, one of the best plans to keep down black grub, is to constantly collect them at the roots of the newly cut plants. This, however, is far too expensive and tedious a task in a large garden.

I have noted briefly our worst insect enemies, and in my next I will enumerate and return thanks individually to our best garden friends—the *insectiverous birds*.

A. W.

* *Agrotis segetum*—A clouded, dark grey moth 1¾ inch in expanse of wings, with whitish margin to upper wings, and abdomen whitish grey. A similar American species, is *A devastator*. the moth of the "cabbage cut worm." A specific name most appropriate to our DEVASTATOR.

† *Lobilia excelsa*.

BURMAH: PLANTING AND NEW PRODUCTS.

(*By an old Ceylon Planter.*)

ARRACACHA.

Arracacha is an esculent tuber known in the vernacular of the West Indies by this name; it requires no water, it flourishes equally well in dry or wet season, it gives a much larger yield than the ordinary potato; many people in Jamaica, even the blacks, prefer it to the yam and potato. No insect or blight—nothing seems to interfere with its growth, and it is believed that its general introduction into India would go far towards making many of our provinces nearly famine-proof! If such a result can be attained it is certainly worthwhile trying its introduction into this country. The Arracacha is a native of the elevated regions of equatorial America, Pasto and New Granada, where the root is largely cultivated for food. It has since a very recent date been introduced into Jamaica; it is called by botanists *Arracacha esculenta* and is classed in the natural order *Um-*

belliferæ.* In Spanish it is known as *Apio* (from the Latin *Apium*, celery), and is in appearance as a growing plant similar to celery, as a substitute for which the tender shoots can be used. It may be used with advantage when celery or parsley is used. It is also described as being somewhat like the hemlock, but its leaves are broader, its stem is dark-green, deeply striated but not spotted; it grows to about three feet high and its flowers are of a dingy, purple colour. The roots, which are the object of the cultivation, are large and divided into several tubers which in shape and size are like short carrots, but more oval or rounded and irregular in shape. As food, the tubers are very wholesome and nutritious, and when boiled are firm and have a flavour intermediate between a chestnut and a parsnip. A fæcula, analogous to arrowroot, is obtained from the root by rasping in water, as starch is from the potato. The yield in tubers is very large and as much as 16 tons can be had from land that will not bring more than 9 or 10 tons of potatoes. There are 36 heaped bushels to the ton; so, put this at the low rate of 50 cents per bushel, and so make your calculation. The mean temperature of the Arracacha country is said to range from 64 deg. to 82 deg.; the tuber is cultivated at an elevation from 4,000 to 6,000 feet above sea-level, the night temperature being from 55 deg. to 65 deg. in the shade. The climate is said to be free from the extremes of frosty cold weather and dry summer heat; it is one of continual moist. Would not this suit your beloved "Nuwara Eliya," Mr. Editor!

The Arracacha requires a deep, rich soil, or loose mould like the potato; and the ground if thoroughly cultivated so as to provide a deep friable clean bed, will give well-developed roots. A large number of sets is produced by one plant and the propagation is rapid. The *modus operandi* is as follows: the propagation of the Arracacha is effected by the separation from the plant at maturity of a number of small peduncles or heads (leaf-stalks) spreading from the central root, which also underground throws out the carrot-shaped horns which are the best of the edible part. The hard upper part of the central tuber to which these leaf stalks are attached serves for hogs or cattle, as do the leaves for the latter.

The planting is done in rows, with a distance of from three to four feet between each row, and as much between each in the rows. The sets are planted by simply making a hole in the prepared ground about six inches deep with a pointed stick and inserting the set slanting with the concave of its curve upwards, and then treading in the soil slightly leaving the short bit of the stem barely at the surface. The average length of the set with the small piece of root attached will not exceed three to five inches. The set being broken off, the root should be neatly trimmed to a clean smooth surface. Weeding and earthing-up constitute the subsequent culture as often as required. It is customary also when the plant grows large to gather together the leaves and twist their necks moderately—a process said to prevent running into head and favouring the development of the root. There does not seem to be any particular season for planting. In favourable situations the planting may take place whenever ground and seed are available, and probably the close of the well-defined dry season would be the safest period.

The plant requires from 10 to 12 months to reach maturity, but the tubers (or carrot-shaped roots) may be gathered two months earlier than this period if much wanted. In this event, of course, the produce in quantity is less, but it is said to be equally wholesome and agreeable to the taste.

As to diseases properly so called, the Arracacha has none. Occasionally, when exposed to much drought it becomes as it were frost-bitten, in which state it boils semi-transparent and remains hard after cooking, and is unfit for human food. If, however, plants so affected are allowed to remain till the return of the rains and to renew their foliage, the root will recover. Manure is never employed. I can, therefore, give no opinion based on experience as to its application.

But analogy would indicate that, as in the case of the other edible roots, the support and stimulus of manure could hardly fail to produce greatly-increased crops and improve quality of same.

Wild Silk in Burmah.

You will, I am sure, be glad to learn that the wild silks of British Burmah are attracting attention; and that those prepared and sent last year by the local Government to some English manufactories for experiment have been pronounced superior than Chinese and Indian *tussur* silks.

A further supply is now being prepared under the orders of the Chief, Sir Charles Bernard, and will be submitted for experiment to some of the leading Continental manufactories.

Tea in Burmah.

You seem to be all T., all tea; the *T. A.* is monthly all T. and the *Observer* is all tea (and tea machinery). Well, you have set me planting T. T. I have planted up 34 odd acres this year, and my tea-plants are really splendid from 2 to 3 feet high already, other products covering the ground some places rather too thick, in fact. As I have written you at greater length than I intended to do, I shall forbear until my next on planting, when I shall give you a line on planting and our troublesome war.

Indigo in Burmah.

Indigo manufactured in British Burmah has been sent to India for valuation during the present year. It is known that Indigo grew wild in the country, and that the Chins and other hill-tribes extracted a dye from the plant. No manufactured indigo had, however, been sent to India; and the first attempt has been made by a native of India named Kafir-nel-din, on the Wimpadnoo island of the Shwegyin district. The cultivation was tried on a small scale, but it was sufficient to prove that indigo could, in certain localities, be cultivated in the plains of Burmah. The indigo manufactured was valued at only £6 to £6 10s per maund. The defects pointed out in the report can be corrected by more careful manufacture.

* We quote from the "Treasury of Botany" as follows:—

Arracacha. A name applied by the natives of the northern parts of South America to several kinds of plants, possessing tubers or tuberous roots, but, botanically speaking, confined to a genus of Umbelliferous plants allied to the hemlock. Its principal distinguishing characteristics are—limb of the calyx entire; petals ovate or lance-shaped, purplish, with the point bent inwards; fruit turgid, compressed from side to side, wingless, surmounted by the thickened bases of the style; albumen curved. *A esculenta* is cultivated in the cooler mountainous districts of Northern South America, where the roots form the staple diet of the inhabitants. The plant is somewhat like the hemlock. (*Conium maculatum*), but its leaves are broader, its stem not spotted, and its flowers are of a dirgy purple colour; the roots are large and divided into several fleshy lobes of the size of a carrot which when boiled are firm and have a flavour intermediate between a chestnut and a parsnip. Trials have been made to cultivate the plant in this country but the climate has not been found suited for it. It might be tried in some of our colonies with advantage. M. T. M.

The name Arracacha is also given to one of the trubs-bearing species of Oxalis, *O. crenata*.—T. M.

FIREPROOF TREES.

TO THE EDITOR OF THE "PHARMACEUTICAL JOURNAL."

Sir,—The "Fireproof Tree," described by Mr. Dyer in the *Gardener's Chronicle*, and referred to in your issue of October 2, would seem to lend some credence to the wonderful tales of Methodius, Nieuhoff (quoted by Folkard) and others, of similar "vegetable salamanders" growing in various parts of the world. One of these, near the city of Buran, in Natolia, is described as rooted in fire, and yet flourishing in great luxuriance and beauty, whilst another, somewhere in Tartary, even when cut down and thrown into the fire, can neither be ignited nor consumed, for though it becomes glowing red in the flames, yet as soon as they are extinguished the wood is again cold, and precisely the same in appearance as before. You ask, naturally enough, "to what cause this immunity is due?" Is it possible these trees belong to the same order as the one described in Bishop Fleetwood's 'Curiosities of Nature and Art' under the name of *Mesoneidereos*, which grows in Java, has iron wire for pith, and produces a fruit impenetrable by iron? Or perhaps they are related to that equally wonderful plant which Sir John Maundeville saw in the city of Tiberias:—"In that cytee (says he) a man cast an brennyngne dart in wratthe after owre Lord, and the hed smote in to the eerthe, and wex grene, and it growed to a great tree; and yit it growethe, and the bark there of is like coles." However this may be we shall have in future to read these old travellers' tales somewhat less sceptically than heretofore.—C. O. BELL.

[The above from the *Pharmaceutical Journal* reminds of the property, of resistence to fire possessed by some of the Indian figures. After "a good burn" which destroyed most of the felled forest on a plantation being opened, we found some gigantic trunks of fig trees at an elevation of about 5,100 feet, not only intact but the bark retaining its natural colour. It was many years before the trees yielded to decay. —ED.]

COLONIAL AND INDIAN EXHIBITION.

COLONIAL PAINTINGS, PHOTOGRAPHS, AND DRAWINGS.—A most interesting and bulky volume might be produced on the photographs and paintings of Indian and Colonial scenery exhibited in the different courts of the Exhibition.

New Zealand.—The collections of New Zealand paintings will not readily be forgotten, especially those of the celebrated Pink and White Terraces, which have become famous, if not historical, on account of the recent eruption.

New South Wales.—The photographs also are of unusual excellence. The New South Wales collection of paintings will also be well remembered, many of them giving vivid impressions of characteristic vegetation, especially of forests scenes in which the various species of Eucalyptus play a prominent part. The splendid set of water-colour paintings of Australian plants by Mrs. Ellis Rowan will be especially valued for their general beauty and accuracy of drawing.

Trinidad shows some instructive photographs of the growth and preparation of Cocoa (Theobroma cacao), the staple product of the island; while on a screen between the Trinidad and the British Guiana courts is a series of excellent photographs, several of which illustrate the cultivation and preparation of sugar, including a general view of a sugar plantation, a field of young canes, banking and planting, weeding, passing canes through the mill, view of manager's quarters—a really fine house, behind which are the works, and in front and around some tall Palms and various tropical plants—apparently very comfortable quarters, which is fully confirmed by another photograph of interior of the manager's parlour, the appointments of which are even luxurious. This series is both interesting and instructive. One photograph which cannot fail to attract attention represents a portion of a trench 3 miles in length filled with the Victoria Regia Water Lily, the circular leaves of which are so thickly grown together as to form a covering from bank to bank. Three miles of this magnificent aquatic must be a splendid sight when in flower.

Straits Settlements.—In the Straits Settlements a collection of photographs of buildings and some of the principal economic plants are shown, amongst others a group of Sago Palms at Singapore, an avenue of Cocoanut Palms, also at Singapore; a Tea plantation, in which the plants strike us as being very wide apart, not only in the rows but from each other. That illustrating the preparation of Gambir (Uncaria Gambir) is of considerable interest. Outside the thatched huts, which are shown on either side, is spread the Gambir to dry on light Bamboo frames. Another photograph shows a very fine group of young Betel-nut Palms, the trunks of which are remarkably straight and slender. A Pepper plantation, with the crop in process of harvesting, is shown, as well as Liberian Coffee trees in full bearing.

Ceylon.—In the Ceylon court, besides others of special trees and characteristic vegetation, the series illustrating the preparation of Tea is extremely good, and will be found very useful.

Natal.—In Natal there are a large number of photographs of very varied subjects. Those bearing on subjects with which we are most interested are amongst a series exhibited by Mr. G. T. Ferneyhough, of Pietermaritzburg; one represents the smoking of Dakka, or Hemp (Cannabis sativa), or, as the Kaffir calls it, "Isangu." Dakka is described as being a "corruption of the Dutch work for the weed." The following description is given of the photograph:—"The plant grows wild all over Natal in waste places, and produces large crops of seed, but is useless for fibre—at least, so far as experiments have gone, and the natives alone make use of it. At a certain stage of its growth, *i.e.*, when the flowers are fully out, branches are cut off, and allowed to dry in the sun, and are then tightly packed in bundles, wrapped round with grass matting, when it is ready for use. The pipe of the Kaffir is a species of hookah, and is called 'Igadu.' It consists of a bullock's horn, in which about half-way up is tightly inserted a hollow stick in a slanting direction, which reaches nearly to the bottom of the horn. This stick is surmounted with a bowl or pipe-head, made of a softly cutting greenstone—"soap-stone," which is very heavy. The pipe being filled with 'Isangu,' or Hemp, the horn is filled with water, and the smoke is drawn up into the mouth; several puffs are taken, until a volume is secured, which is retained for a time and partly swallowed. This soon produces spasms, and results in a most violent fit of coughing, that would kill any ordinary white man. This is the luxury sought for, together with the stupefying and soothing influence of the narcotic contained in the plant. The fit of coughing having subsided, the saliva generated is then passed through a long hollow reed, and a series of bubbles results which are formed into circles, representing kraals, or into strings and other shapes, and according to number, size, and other indications are taken as signs of future wealth, number of wives, and other items interesting to the childlike mind of the Kaffir. This continues until they have had enough, and sleep or go away. The smoking of this wild Hemp is the most noxious and injurious habit that the native indulges in."

While writing of Natal it may be well to mention that the exhibits of Tea grown and prepared in the colony have attracted a considerable amount of attention, and that the Tea is now on sale in the Natal court. We have had an opportunity of tasting this Tea, and find that the quality is very good. The only fault is that it is a little too much roasted. This, of course, will be readily improved upon, and there seems no reason whatever against Natal becoming a regular Tea-growing country. Numerous samples of Tea from different estates are exhibited, and it is worthy of note that the China Tea from one estate—namely, that of Mr. Brickhill—was obtained from plants introduced from the Royal Gardens, Kew, twenty years ago.

Fruits, &c.—Amongst a fine collection of preserves from native fruits those exhibited by Messrs. Jameson & Co., of Durban, attract most attention, though from the fact of their being in sealed tins the public are unable to see what they are like, still less to judge of their value. Mention may, however, be made of three of these from characteristic tropical fruits, namely, the "Amatungulu" (Carissa [Arduina] grandiflora), which is of a dark reddish colour, not unlike Plum jam in appearance, but with a less decided flavour. The Papaw (Carica papaya), about the medicinal properties of which so much has been written of late; this produces a fine soft preserve of a yellowish-green colour, and a slightly acid taste. The Granadilla (Passiflora maliformis) has, perhaps, the most distinct and agreeable flavour of either, having a slight trace of Pine-apple; one objection, however, is the presence of the very numerous black seeds, which cannot readily be crunched between the teeth, nor can they readily be ejected, inasmuch as the pulp clings to them with great tenacity. It is interesting to see what can be done in the matter of preserve-making from tropical fruits; and though few, if any, can ever approach the best known English fruits, the foreign produce might be made to supplement that of our own country. Though it may not be practicable to import fresh fruits in any quantities into England from distant countries, there seems to be a field for tropical candied fruits, which might be brought in tins or jars, as well as for whole fruits preserved in syrup, and hermetically sealed in a similar way.

The Natal exhibits of vegetable food substances generally are very interesting, and great credit is due to Mr. Morton Creen for his readiness in making the exhibits known, and assisting by the help of samples to develope the resources of the colony.—John R. Jackson, Curator, Museums, Royal Gardens, Kew.—*Gardeners' Chronicle.*

HALDANE'S SUB-TROPICAL CULTIVATIONS.

This very instructive and well got-up work should be in the hands of all those planters, who desiring to profit by past experience in regard to coffee, are resolved to vary their cultivations as much as climatic conditions will allow. Mr. Haldane has entered very fully into the geographical and climatic distribution of the various classes of products with which he deals, in some chapters placing before his readers carefully prepared maps, on which are indicated the localities of certain growths. In many instances, such as that of vine culture, the reader is informed why certain latitudes are unsuited, and others suited to particular products, by attention to which planters and settlers may often avoid costly mistakes.

Of the Grape vine, Mr. Haldane says:—"Beyond the 50° parallel of latitude, the fruit is deficient in the saccharine matter required in alcoholic fermentation: the wine not possessing sufficient alcohol to preserve it is sour, and more like vinegar than wine. On the other hand, if the vine is grown in too warm a climate, too much grape-sugar is produced, and the grape gives a thick, sweet alcoholic fluid of indifferent quality. When the vine is cultivated in tropical countries, where there is no winter to check its growth, which is therefore uninterrupted, we find it producing in the same cluster flowers and both green and ripe fruit in consequence of which wine-making becomes impracticable." Whether this has been found to be the case in Ceylon I am not aware. The author alludes to the practice of the Jaffna vine cultivators of baring the roots of vines during the dry season in order to check vegetation, and arrest the flow of sap as is caused by a winter, but I find no notice of vine-growing in Colombo where grapes as good as those of Jaffna are occasionally produced, but the probability is that the climate on the west coast of your island is too humid for the vine, Mr. Haldane insisting on the necessity for a dry atmosphere.

The chapters on the *citrus* variety of fruits contain some interesting information, and seeing how readily the tree grows and bears in Ceylon it is surprizing that so little has been done for the production of a finer class of orange than is usually met with in your bazaars, where in fact the articles sold under that name are very frequently "sweet limes." The author tells us there are 45 varieties of the sweet orange, 31 of the sour variety, 12 of sweet lemons, 5 of bergamots, 47 of lemons, 9 of limes, 1 of citron, 17 of the cedrat, and 6 of the Shaddock or Pomplemouse (Pumeloe).

Mr. Haldane says he has eaten most perfect oranges in Ceylon grown at an elevation of 1,000 ft.; we have tasted some of the finest and most delicate flavored grown at almost sea level; at the same time we agree with the author that as a rule the Ceylon oranges met with in the native bazaars are sorry rubbish, of which the Sinhalese growers do not appear to be aware any more than they are of the difference between a good and a bad egg. It seems strange that, whilst in several of the warm colonies of Australia the cultivation of the orange for marketable purposes is carried on upon a large scale, little, if anything, has been done in your island towards extending the production of this really fine fruit. In New South Wales it is usual to estimate the value of a full grown orange tree at £1 per annum and fine trees in full bearing have given a return of £100 per acre. Large trees 18 years old have given from 150 to 200 dozen oranges yearly. The trees are subject to root-rot, the remedy for which is to bare the main roots for a short distance round the stem and expose them to the sun for a short time.

The lime is cultivated in the West Indies for the production of lime-juice, in which there is a large and paying trade to Europe, after the juice has been boiled down to a certain state of condensation. The tree grows readily from seed and taken from the nursery may be planted out fifteen feet apart; they begin to bear in four years and are in full bearing at eighteen years.

Mr. Haldane affords a good deal of information about tea and coffee cultivation as well as of rice, sweet-potato and arrow-root cultivation. The Olive cultivation is believed to have a good future in some of the Australian colonies, and would no doubt thrive in your hill districts. The best situation for this culture is on the slope of a hill facing the morning sun, beyond the influence of fog or mist, and well sheltered from high winds. The tree is very easily propagated and lives to a great age, some say 300 years. They commence bearing when 10 years of age and reach their prime at forty, giving a gallon of oil per tree: at the age of 30 years the tree will give a return of 2s. Space alone forbids our doing full justice to this very carefully compiled work, which is worth all the money charged for it.—J. C.—Local "Times."

THE COLONIAL AND INDIAN EXHIBITION AT SOUTH KENSINGTON: DRUGS.

Ceylon.—Drugs are largely represented in this Court. A collection of three hundred and sixty-two specimens of native remedies is exhibited by Dr. Trimen, the Director of the Royal Botanic Gardens at Peradeniya, and the special catalogue gives the vernacular and botanical names of these drugs, with their medicinal uses, making it one of the most perfect of its kind in the Exhibition. A case illustrating the cultivation and manufacture of cinnamon in all its stages, accompanied by series of photagraphs, and by specimens of the tools used in the process, forms a very interesting exhibit. This is from the property of Mr. David Smith, M.P. for Brighton. The exports of cinnamon appear not to have increased much during the last ten years, having been 1,262,250 bales of bark and 258,381 of chips in 1876, and 1,574,022 of bark and 628,914 of chips in 1885. The chips consist of the cuttings from imperfectly grown cinnamon branches; they are said to be largely used in perfumery and in the distillation of cinnamon oil, much of which is made in the island. The current value of cinnamon is given in the Official Catalogue as 1*s.* 3*d.* per pound for the first quality, 9*d.* to 11*d.* for the second sorts,

and 6*d.* or 8*d.* for the third; these prices allowing profit only on very well cultivated and carefully managed properties. There is also a good show of cardamoms, some of the samples being remakably fine. Two kinds of the plant are cultivated in Ceylon, viz., the ordinary Malabar kind, which throws out its racemes horizontally, and the Aleppy, commonly called the Mysore cardamom, which has upright racemes and is more robust and hardy than the Malabar kind, standing drought and a high altitude better. The Malabar cardamom is, however, usually cultivated, since it is more productive. The cardamoms known as Ceylon cardamoms are gathered by the Sinhalese from wild plants, and dried in a comparatively careless manner, while the cultivated cardamoms are treated with great care. The fruits are cut off with scissors by the coolies, then spread out in trays, slowly dried, and subsequently bleached, the chief object being to prevent the capsules splitting and to have them of a whitish colour and well filled and solid. If gathered in the immature state they are of a light colour, and have what is known in trade as "lean" appearance. A good deal of the spice is said to be consumed in India for cooking and chewing. Nutmegs are exhibited from the Kalutara and Kégalla districts. The tree is grown chiefly by natives, at altitudes ranging from 1000 to 1800 feet. The annual value of the exports amounts to only 26,000 rupees. Cloves are shown from the same districts. This spice is grown in similar localities to the last, and comes into bearing when seven years old, continuing to yield crops for fifty years or more. The yearly shipment of cloves amounts in value to 6,000 rupees. Pepper is shown by three exhibitors, but although commonly grown by the natives it is not exported; several varieties of the plant are in cultivation in the island. Of vanilla there are two exhibits. According to the Official Catalogue the flowers have to be fertilized by hand, the insects of Ceylon appearing not to be able to effect this process, unlike those of the native country of the plant (Mexico). The flowers usually appear during the hot dry north-east monsoon, *i.e.*, from January to April, and the pods begin to mature about the commencement of the following north-east monsoon, increasing in size and ripeness until January. As soon as they begin to show an orange tint, they are gathered and air-dried, cotton wool being fastened round them to prevent their splitting open. The plant thrives only in rich moist ground, under somewhat lofty shade, and fruits well in the neighbourhood of Kandy; with care it has borne fruit also near Colombo.

Cinchona bark forms a very prominent exhibit in this Court. A trophy formed of trees and large quills of bark serves to illustrate the varieties in cultivation and the several modes in which the bark is removed, as well as the usual size of the trees at different ages. From these specimens it is evident, however, that the name of Ledger bark is applied to more than one kind of bark rich in quinine. It was not until 1872 that the planting of cinchona was commenced in Ceylon in earnest, and it increased between 1873 and 1878, until about 4,000,000 plants had been distributed to planters, in addition to large plantings in private nurseries. Much of the seed obtained in 1886-7 from *C. succirubra* and *C. officinalis* produced trees of a hybrid character rich in alkaloid, these trees being known under the name of *C. robusta*. The methods of harvesting adopted in the island have been by uprooting, by coppicing, by stripping, and more recently by shaving. The last-named process has usually, but not invariably, been found to yield a larger percentage of alkaloids than the original bark. The extent to which it may be carried has not yet been ascertained. Many experienced planters recommend shaving the tree at five years, and again at six, and coppicing at seven, taking care that a good-sized sucker is allowed to start from the collar before cutting down the tree. The reason that the shaving process finds so much favour is that it enables the planter to obtain handsome and continuous returns without destroying the value of the tree. Although some of the finer varieties have at times yielded as much as 10·50 per cent of sulphate of quinine from trees three and a half years old at an altitude of 3,200 feet, at the present day there are few that give 4 per cent, the largest proportion yielding only 1·50 to 2·50 per cent. The shipments of late years have consisted largely of the strippings of the branches and twigs, containing not more than ½ per cent of quinine. The exports of cinchona bark from Ceylon have risen from 18,731 pounds in 1875 to 11,678,360 pounds in 1885. A specimen of sulphate of quinine is shown by Messrs. Symons and Cochrane, of Colombo.

The essential oils of cinnamon bark and leaf and citronelle and lemon grass oils are represented by several exhibits. According to the Official Catalogue the shipments of citronelle oil have increased from a few thousand ounces about a dozen years ago to 1,760,677 ounces in 1881 and 5,721,112 ounces in 1885, and there are now about 10,000 acres of land under cultivation; this over-production having caused the oil to fall to one-third its former value, and the price being now unremunerative, growers are now abandoning many of their grass fields.

The oil of lemon grass, or as it is commonly called oil of verbena, is manufactured entirely by the natives, but not more than 8,719 ounces were exported last year. Oil of cinnamon is distilled in the island from broken quills and the coarser portions of the bark, which are incapable of being worked in with the usual quills. The finest oil is valued at a rupee per ounce, but the inferior quality commands only one-fourth of that price. The shipments of the oil have risen from 41,719 ounces in 1881 to 117,023 ounces in 1885.

Of the resins exhibited the following seem worthy of notice, viz, that of *Doona cordifolia*, shown by Dr. W. C. Ondaatje, of *D. Zeylanica*, which is colourless and hard and makes a good varnish, and that of *Vateria acuminata*, which is a good clear white dammar-like resin. A fossil resin, dug up on the island, named "Bindummala,"* the origin of which is unknown, is also shown. Of dye stuffs that of the jak wood *(Artocarpus integrifolia)* is worthy of note. It is used by the natives for dyeing house mats and fibres for ornamental purposes and gives to cotton and silk the peculiar pale canary colour which is required for the robes of the Buddhist priests. Mililla wood (*Vitex altissima*) is used to give a still paler yellow, but neither of these dyes are exported. Sapan-wood, which in 1883 was exported to the extent of 11,404 cwts. has declined to 2,834 cwts. in 1885, owing to the low price now obtained for it.

The chief tanning materials used in the island are ranawara bark (*Cassia auriculata*), and the half-ripe fruit of the timberi (*Diospyros Embryopteris*). The latter is also used to coat the planks of boats to preserve them from the attacks of marine insects. The tannin of the plants of this genus appears to be of a peculiar character and to deserve further investigation. Very fine specimens of plumbago are exhibited in this Court from the western and north-western provinces. The trade in this article has increased from less than 1,000 cwts., forty-five years ago, to 279,057 cwts. in 1883, half of which goes to the United States, and of the remainder seven-sixteenths to the United Kingdom, and one-sixteenth to British India and Europe. The yearly value of the export varies from one and a half to two million rupees, the highest qualities ranging in value from 100 to 135 rupees per ton, and the lowest quality from 30 to 45 rupees per ton. The trade is entirely in the hands of the Sinhalese.

Of fixed oils coconut is the most important exhibit. The amount exported in 1885 was 274,998 cwts. The oils of the bright yellow, or "king" coconut, is said to be devoid of the strong aroma of the ordinary oil, and is highly esteemed by all classes of natives and many Europeans as hair oil. The value of gingelly oil exported is given at 7,500 rupees. The cultivation of croton seed has been

* The "Dammar" of the Ceylon export list.—ED.

taken up during the last few years by a few Europeans, and the samples exhibited look fresh and clean.

The oil of *Aleurites moluccana*, known in Ceylon as kekune oil, is said to be exported to Europe for soap making and for cloth dressing for which purpose it is reported to be superior to olive oil. Margosa or kohomba oil (*Melia Azedarachta*) is stated to be much used by native practitioners for suppurating scrofulous glands. The oil cake resulting from the preparation of coconut oil, and called "poonac" in Ceylon, is said to be used pretty generally by French military authorities for cavalary horses, since a small portion added to their ordinary food gives a glossy appearance to the coat of the animal, and at the same time promotes its general health*. Jaffna, or sea moss (*Gracilaria lichenoides*), which is commonly used in Ceylon as a nutritive food for persons of weak digestive powers, is only occasionally exported. Concerning the edible birds' nests exhibited, it is stated in the Official Catalogue that the bird which makes them (*Collocalia francica*) builds in large dark caverns in any locality, from the seaside to the highest hills. They contain much less glutinous matter than those of Java and Borneo (see *ante*, pp. 41-42). The nests are built close together against the face of overhanging rocks, and the bird is of a smoky colour, and darker on the head, wings and tail than elsewhere, whereas the Java and Bornean birds are said to be bluish. The nests are collected by Chinese, who pay Government a small annual sum for the exclusive privilege of collecting them in certain caves, chiefly of the Morowak Korale of the Southern Province. The yearly value of the export amounts to about 4,000 rupees.

In this Court, Dr. W. C. Ondaatje exhibits dried pulp of the nux vomica fruit, from which loganin was obtained by Professor Dunstan; also several medicinial barks, and the concrete milky juice of *Alstonia scholaris*†, which possesses some of the properties of india-rubber. Specimens of these products have been presented to the Museum of the Pharmaceutical Society by Dr. Ondatjee.—*Pharmaceutical Journal*.

GOVERNOR GRANT DUFF ON PLANTING IN MADRAS.

The last Budget of official papers brought us the Review Minute of the retiring Governor, from which we extract largely matters more or less directly concerning the Nilgiris, and local industries.

Cinchona, Horticulture, Botany, Economic Plants, &c.

It well may be that in some far off future the English may have the fate of the Portuguese, and that their most enduring monuments, in many parts of the Peninsula, may be the plants which they brought to India from other climes. Not the least important of these will be the various species of the genus *Cinchona*, although these have not, like the "promotion nut" (*Anacardium occidentale*) of their predecessors, shown any capacity in India for fighting, unaided by man, the battle of life. The story of the introduction of these precious trees by Mr. Clements Markham and others is well known. The Nilgiri plantations remained for many years under the charge of an intelligent gardener. After his death they were placed for a time under the Forest Department, but that arrangement was not one that could last; and in 1883, Mr. Lawson, formerly Professor of Botany, at Oxford, and in charge of the exquisite garden which stretches along the bank of the Cherwell close to the bridge which Macaulay has described in a famous passage, came out to take charge of our *Cinchona*, as well as of all the Government gardens on the Nilgiris. The time had arrived when a great number of important questions were ripe for examination by a trained botanist and a trained quinologist. Ere long accordingly we added to our establishment Mr. Hooper, who had worked under Dr. Koppeschaar at the Hague, and came out possessed of all the latest learning on this subject. Mr. Lawson soon saw that considerable changes in management were wanted on all the estates, and set himself to make them. First, with the assistance of Dr. Trimen of Ceylon, the plantations were carefully inspected, and some alarming doubts, which had been raised by Mr. Cross about the value of many of our trees, set finally at rest. Thereafter, a great number of trees which had done their work were cut down, and fine healthy shoots are now springing from them. Then, a considerable acreage in and near Naduvatam, which had gone or was going to ruin, was taken in hand, and is being replanted. Further, the Cuprea bark from New Granada, a species of *Rimijia*, a genus nearly allied to *Cinchona*, was sown, and will, it is hoped, give fair results, while the same is hoped of the *Cinchona Santa Fe* and *Carthagena*. The growth of the various species of Cinchona at different elevations, and the amount of their respective yield are also being carefully watched; while the diminution in the cost incurred in looking after our Cinchona estates, since Mr. Lawson took charge of them, is as remarkable as the increased efficiency which has characterised his management. One of the objects to which Mr. Hooper has turned his attention since his arrival has been the production of a preparation of Cinchona alkaloids, closely resembling that known as De Vrij's liquid extract. This he has succeeded in producing to the satisfaction of the Medical Department at an astonishingly low price,* and the problem now is to try to get it spread amongst the people. Time and patience will be required for this, though there are some very encouraging symptoms; but fever is in South India so terrible a scourge that ignorance and prejudice will eventually be sapped by interest. Mighty indeed, must be the political reform which would be worthy to be named with this in the promotion of true well-being. As I have elsewhere † pointed out, we want a class of practitioners intermediate between the really skilled persons turned out by our medical schools and the Vythians who have still such a hold upon the people. This want was much in the mind of the late highly-intelligent Maharaja of Travancore, and I have read an excellent private letter of his, upon the subject. We still hear at intervals the wish expressed that Government would divest itself of its Cinchona plantations in the supposed interest of private trade. To do this *prematurely* would be to take a very false step; but a very large part of the Government Cinchona plantations will, it is to be hoped, soon be devoted to preparing the cheap febrifuge to which I have just alluded. I need hardly say that the amount of the Cinchona even now put on the market by this Government, is as compared with what is produced by private growers in India, Ceylon and elsewhere altogether insignificant. Mr. Lawson also, soon after his arrival, began greatly to improve the Government Gardens at Ootacamund, and to give them a more markedly botanical character by carefully naming the very numerous and valuable collection of plants, which are scattered about over the large area of beautifully broken ground which they cover. He gave no less care to the gardens at Coonoor as well as at Burliar, and laid, by endless plant-hunting in every interval of leisure, the foundation of a very fine herbarium at Ootacamund.‡ At length the moment came for the

* This is quite new to us. Has coconut poonac ever been added to horse feed in Ceylon? The favourite food for cattle is gingelly poonac.—Ed.

†We have found it difficult to preserve these trees and *Cassia fistula*, in consequence of the value placed by the natives on the barks as medicine.—Ed.

* We expect to be able to sell a bottle containing eight doses of five grains each, for one anna, which represented I may mention for the English reader, three halfpence, *when the ruppee was at par*.

† Adress to the University of Madras, 1886.

‡ His own already very considerable collection has been supplemented by many of Wight's plants sent from Kew, and I was happy, before leaving the hills, to see them all comfortably lodged.

establishment of a botanical department, Sir Joseph Hooker and Mr. Thiselton Dyer lent their invaluable assistance, the Secretary of State agreed to our proposals, Mr. Lawson was satisfied to undertake new duties for a very slightly-increased remuneration, and the reproach was taken away from this Government that it did nothing systematic for the encouragement of either scientific or economic botany, for which Ceylon, Jamaica, and so many other less important British dependencies do so much. When the arrangements now in progress are entirely completed, Ootacamund, which is a particularly good climate for preserving dried plants, will contain the principal herbarium of the Presidency, but a typical collection will be left in Madras, and other collections will, doubtless, as civilisation extends, be formed in other important centres. In time, too, new botanical gardens will be created, with a view to making experiments to which the climatic conditions of the existing gardens do not lend themselves. The public spirit and intelligence of the rulers of some of the neighbouring states, such as Travancore (exceptionally well situated for botanical experiments) will, I doubt not, one day be enlisted in the same good cause. We have received from Kew not only a great deal of guidance during the last five years, but also many seeds, such as the following. I mention only plants of economic value, not those which are merely ornamental, or interesting to the botanist alone:—

Erythroxylon coca.	Cinchona Santa Fé.
Rhus vernicifera.	„ Carthagena.
„ succedanea.	Rimijia Purdieana.
Ceratonia siliqua.	Ipomœa chrysorhiza.
Quillaja saponaria.	Ullucus tuberosus.
Arracacia esculenta.	

I found *Erythroxylon coca* established in one or two places; but the immense medical value of the plant was quite unknown in 1881. It has been very gratifying to me to find that it can be so readily multiplied here, and that as Mr. Hooper and Dr. Drake-Brockman have proved, the alkaloid produced from the plant in Madras is as efficacious as that which is produced from it when grown in South America.

Arracacia esculenta and *Ullucus tuberosus* are both food-plants. The former is an important article of diet in the higher regions of Northern South America in spite of its near alliance to our familiar hemlock. The other is related to the *Bassella* or Indian Spinach, and comes from the Bolivian and Peruvian Andes. Both seem likely to succeed at Ootacamund.

Ipomœa crysohiza is a New Zealand form of the Polynesian sweet potato, which is well spoken of, and is certainly palatable.

Rhus vernicifera gives the valuable Japan lacquer; *Rhus succedanea*, the Japan wax; *Ceratonia siliqua* is the Caruba so important in Sicily; *Quillaja saponaria* is a Chillian tree, rich in a vegetable soap.

The others have been already alluded to. Another benefactor has been Mr. Thomas Hanbury, whose collections of living plants at La Mortola, not far from Mentone, are amongst the most remarkable in Europe. One cannot now walk through the gardens at Ootacamund without seeing many traces of his friendly co-operation. I have kept up a very close correspondence with Kew from the time I arrived in this Presidency, and have done what little I could to repay, by sending thither very large quantities of seeds,—the debt which every British dependency owes to that magnificent and supremely Imperial institution.* So slight was the connection between it and Madras before 1881, that I do not think any single person connected with the Royal Gardens, at all knew what was the ordinary vegetation, cultivated or indigenous, in the neighbourhood of that city. I have also had very careful lists made by that most devoted botanist, Mr. R. Hollingsworth, of the plants in the park of Government House Madras, and at Guindy, while to the collections at both places I have added,—thanks to the kindness of Dr. King of Calcutta, Mr. Gamble and others,—a large number of species. The Government has not had it in its power,—owing again to the pecuniary difficulties of the Imperial Treasury,—to do quite as much as it could have wished to help so valuable an institution as the Agri-Horticultural Society of Madras, excellently managed by Mr. Steavenson and others; but it contrived to enable the Society to lay the foundation of a botanical library, and I have no doubt subsequent and wealthier Governments will be able to do more. A great deal of miscellaneous, horticultural, agricultural, and vegetable economic information has been circulated in these recent years by the Government, and we have introduced the practice of sending every scrap of intelligence of that kind to Kew, where it is utilised for the general advantage of the whole of Oceania, and of many broad lands which do not belong to our Political System. Mr. Morris, now of Kew, but recently of Jamaica, lately informed me that the Pepper which was under the intelligent superintendence of Mr. Ross, C.S., transmitted a year or two ago, through Kew from Tellicherry, to that island, has succeeded perfectly. Considering the immemorial antiquity of the Malabar Pepper trade, it is strange that it remained for our generation to make this gift from the East to the West.

PLANTING.—Indian Governments have been sometimes blamed for not welcoming with enthusiasm the English capitalist. Madras is not open to that reproach. Every encouragement is given to the English capitalist to settle and to cultivate in those districts of the Presidency where the climate makes this possible. The planters on the Nilgiris and elsewhere have in the last five years met with special consideration; but the mischief is that the English *capitalist* won't come. There never was a truer maxim than that "the first duty of a landlord is to be rich." If he has not other means, it is idle to attempt to cultivate land in India or in any country I have heard to tell of, with a reasonable hope of success. No good-natured "concessions" on the part of Government can do anything more than stave off the inevitable. They are too often only a cruel kindness. I once said to a friend "How do the —s get on with their estate?" "Excellently," was the reply, "their father gives them the money to work it." "And what return does he get," I rejoined. "Oh, the return he gets is that one of them periodically returns to him." C'est magnifique mais ce n'est pas le commerce! What we above all things want in the Nilgiris and similarly-situated tracts is the English capitalist, who will buy his estate without needing to mortgage any part of it, and retaining enough money to live upon, and to work it to the very best advantage, without ever having recourse to the money-lender, while he gives as much of his personal attention to planting as he would give, if he meant to succeed in any other profession. Such men will be able to tide over bad years, and sooner or later may do fairly well, while those who count upon a succession of good years will certainly be disappointed, however much Government may do for them.—*Nilgiri Express.*

DEODORISING IODOFORM.—Coffee has been used for deodorising Idoform with very satisfactory results, and without interfering with its antiseptic effects Ground coffee is employed in proportions varying from thirty to fifty per cent. Fifty per cent is said to completely deodorise the Iodoform, and the coffee being itself an antiseptic no bad effect is produced. Iodoform so prepared should only be used for outward applications.—*Burgoyne & Co.'s Price Current.*

* Berlin, Cintra, Christiania, Upsala, Orotava in the Canaries, Cambridge in Massachusetts, the Island of Grenada and Mauritius are a few of the widely-scattered places to which our Madras seeds have found their way within the last five years. It often happens that, just from their very commonness, things do not get forwarded the great botonical centres in Europe from the tropical countries. I recently found that they wanted at Kew the *palmyra*; the Custard apple which appears so often on our breakfast tables; and last, but not least, the very handsome but ill-used tree which goes through life under the name of *Odina Wodier*, that is, if I translate it correctly, the worthless, worthless one.

TRIAL OF A COTTON-PICKING MACHINE.—A dispatch from Sumter, S. C., states:—The cotton-picking machine, invented by C. T. Mason of this place, was tested this week in the field in the presence of committees from the New York Cotton Exchange and the Charleston Exchanges and representatives of the State Agricultural Department. The machine picked cotton at the rate of 180 pounds per hour, without injuring the bolls or plants. The general opinion of those present is that the machine is correct in its principles, does fairly good work now, and can be made completely successful.—*Bradstreet's.*

A NEW VEGETABLE OIL FROM JAMAICA.—Samples of the solid fat of "antidote cacoon" from Jamaica were exhibited at the Colonial and Indian Exhibition at South Kensington. This is probably the first time that the solid oil of the last named seed has been exhibited in this country. In Trinidad it is used to prevent steel and iron from rusting. It is white, and of the consistence of coconut butter, without having any special odor. The seeds are excessively bitter, like colocynth, and appear to be a good purgative of considerable value in dropsy. The seeds contain, according to an unpublished analysis by Mr. E. C. C. Stanford about half their weight of fatty oil which if the seeds could be procured in sufficient quantity would probably find a use in commerce.—*Oil, Paint and Drug Reporter.*

KOLA NUT.—One of our English exchanges (*Planters' Gazette*) understands that Mr. Epps, the well-known cocoa manufacturer, has recently been devoting attention to the kola nut, and that he has succeeded in producing a paste containing all its valuable properties, and, at the same time, very palatable, especially when mixed with cocoa. It is found that kola nut is very beneficial to those who suffer from weak action of the heart, and there is an increasing demand for it, particularly in the United States. Such being the case, and as the kola nut grows and fruits to perfection in Southern India, this announcement ought to act as an incentive to planters in that part of the country, to take measures for the extensive cultivation of this plant, and open up a trade with European cocoa manufacturers.—*Indian Agriculturist.*

LANTANA AS A MEDICINE.—In a notice of drugs from the Cape in the *Pharmaceutical Journal* we find the following statement:—*Teucrium africanum*, the tribal remedy of the Kaffirs, seems to possess antiseptic properties. When a cow has died of milk fever the Kaffirs boil the flesh along with this plant, and believe they can eat it with impunity. It is used in ophthalmia, in glanders, and for snake bites, but in cases of very venomous snakes, *Lenotis Leonurus* is given with it. It appears to merit investigation as to its active principal. *Lantana salvifolia* appears to have similar properties, and is reputed to have the power of intoxicating birds. Dr. A. Smith found small doses of the infusion beneficial in incipient bronchial affections.—*Pharmaceutical Journal.*

EULYPTOL.—"Eulyptol" is the name given by Dr. Schmeltz to a mixture consisting of six parts of salicylic acid to one each of carbolic acid and oil of eucalyptus, which he considers preferable as an antiseptic to iodoform, corrosive sublimate or carbolic acid (*Journ. Pharm.*, Oct. 15, p. 361). Dr. Schmeltz considers that a chemical combination takes place between the ingredients, since carbolic acid cannot be detected in the mixture. It is described as having a strong aromatic odour and acrid burning taste, and as being nearly insoluble in water, but very soluble in absolute alcohol, ether, chloroform, and a mixture of equal parts of alcohol and glycerine. It is also soluble in ammonia and alkaline solutions. According to Dr. Schmeltz, it completely arrests the fermentation of all putrescible substances, a small quantity added to urine, under any condition, being sufficient to preserve it during a month.—*Pharmaceutical Journal.*

HYBRIDS.—In spite of an alleged instance of fraternisation, resulting in the production of a new hybrid, the experiment of turning cats loose in Australia to destroy the swarms of rabbits, is reported to have proved eminently successful. In one of the worst infested districts of Victoria 250 cats were bought at 1s. a head, enclosed for a time in a limited space by means of wire netting, fed on rabbits, and afterwards turned loose in batches, food having been still supplied in a rough building for any cats which might not at once support themselves by hunting. Not a single cat is known to have found its way to its original home, and as to the result of the experiment, the special reporter of the Melbourne *Farmers' Gazette* says:—"During a thorough inspection of the sand hummocks just a little before twilight, our party only succeeded in seeing three rabbits. The cats, on the other hand, were to be met with everywhere, and maugled rabbits, some slaughtered but recently, and others dead for weeks, were come across in all directions. The cats were evidently the complete masters of the situation." The writer goes on to express the opinion that there is no doubt whatever as to the success of the experiment, which is, moreover, as expensive as it is successful.—*Indian Agriculturist*—[But when the supply of rabbits runs short, we suspect the poultry yards of the settlers will be in danger.—ED.]

MUGA SILK.—Experiments, writes a Calcutta paper, were tried by the Agricultural Department in Assam last year to determine the practicability of growing *muga* silk for the English market. A small quantity of *muga* yarn was sent to Mr. Wardle, of Leek, in January last, which cost on an average R3-11 per lb., exclusive of carriage, but Mr. Wardle has not as yet reported on its value for the purpose of the English manufacture. Again, 6,000 *muga* cocoons were sent to a gentleman in Calcutta, who had invented an improved process of reeling this silk which would enable him, he fancied, to obtain a remunerative price for it in the English market. This, however, did not prove to be the case, for the yarn, when reeled and sent to England, was valued at a price insufficient to repay the cost of producing it in India. The largest experiment was made by the Bengal Silk Company, who were supplied by Government with three lakhs of *muga* cocoons at a cost of R600, or R2 per 1,000. These cocoons were reeled into 67 lb. of yarn, besides 58 lb. of marketable floss and waste. Unfortunately the yarn was damaged on its way to England, and proved unsaleable; so that the result of this experiment, by which it was hoped to test the possibilites of a trade in *muga*, was defeated. It is to be hoped that these failures will not prevent further experiments with the silk, which may yet prove an important addition to the industrial products of Assam. —*Times of India.*

AGRICULTURE IN MAURITIUS—For supplies of cattle and sheep Mauritius is entirely dependent on other countries, notably Madagascar, the Cape, and India; but fish abound in the surrounding seas. So much of the agricultural area of the island is taken up with sugar growing, that small room remains for other branches of farming, hence much of the grain consumed by the inhabitants, especially rice, is imported. The raising of cereals, such as maize, millet, gram dhal, and rice is attempted on a small scale, and yams, manioc, and sago have been produced in trifling quantities, but the total local supply of vegetable food stuffs is inconsiderable. Fruits, on the other hand, are cultivated to a large extent, and embrace apples, avocado pears, bananas, custardapples, figs, guavas, the *litchi* (*Nephelium litchi*), a delicious pulpy fruit from China, *mabolo* (*Diospyros discolor*) of exquisite flavour but objectionable odour, mangoes, pine-apples of the choicest kinds, shaddocks, and tamarinds. Mention must also be made of the papaw fruit, from which, in this island and Bourbon, a passable *compote* is made. Spices, raised in small quantities, comprise betel, cloves, ginger, nutmeg, pepper, pimento, turmeric, and vanilla, pods of the last-named being sometimes exported. The date palm has become well established; so also has the coconut, whose oil is now shipped in thousands of gallons annually. Sugar is the all-absorbing object of culture, engaging the whole population, and affording an export value of about £3,000,000 a year.—*Journal of the Society of Arts.*

INDUSTRIES IN MYSORE.

(*From our Bangalore Correspondent.*)

The tanning of skins for leather is an industry which is carried on pretty briskly at Bangalore. There are upwards of 30 large tanneries at work, all owned by natives and worked solely by them. Dressed skins from Bangalore have always maintained a good reputation; the export trade in these are good, large quantities being shipped *via* Madras to London, various places on the Continent, to America, besides being sent up to Northern India. The principal tanning material used is the bark of the *Cassia Auriculata*, which grows abundantly in some of the districts of the Mysore Province. The Government levies a license fee of about 8 annas per cent. and in the district of Toomkoor alone the fees so levied amounted in one year to R20,000. All the bark is brought into Bangalore, but much of it is passed on to parts in the Madras Presidency where tanneries exist.

The rains this year all throughout the Mysore Province have been seasonable and plentiful. The staple crops of the country have grown well and the yield will be a bumper one in many parts. Raggi, though the new crop is not in the market yet, is now being sold at 40 measures per rupee, and jola at 25. It is a curious thing, however, to note that the old gowdas and ryots do not like the bumper crops, alleging that a very good season is alway followed by a bad year.

The Mysore Government maintains a stud breeding farm at Kungal, about 30 miles from Bangalore, for the purpose of supplying remounts to the Silladar Cavalry, which latter is about 2,000 sabres strong. There are 11 stallions at the farm: 3 Australian and 8 Arabs; a thorough-bred English stallion is now on the way out. The total area of the stud farm is 257 acres, on which good crops of grass, oats and maje are raised. Australian and Cawnpore oat seeds are used and are found to do very well. Experiments with silos and ensilage making are carried on, and as far as the experiments have gone, the slow filling of silos seems to be the best method for preserving fodder. The stock mares are principally Australian, and stud bred, and it has been found that there is a smaller percentage of deaths among the foals of the former than of any other class.

JAVA BUDGET AND PLANTING.

AMSTERDAM, Oct. 27th.—The most important event of the past week has been the introduction of the Bill for Government assistance to the Sugar cultivators in Java. The Minister proposes to authorise the Governor-General to make an agreement with the sugar planters, working under Government contracts, by which delay of payment is granted of the excise duty due during 1887, providing that planters pay interest on the outstanding amount at the rate of six per cent per annum. Regarding free cultivation, the Governor-General may assist sugar manufacturers by granting advances on the crop of 1888 not exceeding the rate of one and a half guilder per 100 kilos at an interest of six per cent per annum, and under a guarantee that the Government advance shall have precedence of any other claim with which the undertaking might be charged, and in the event of suspension the total Government advance to be paid immediately. In introducing the Bill the Minister pointed out that the measure is only temporary, being proposed with the intent of assisting the sugar cultivators during the present difficult times, and as soon as an improvement sets in the advanced capital is to be refunded. For this reason a decrease of the fiscal burden is not included in the scheme, neither a reduction of the Government's railway tariff, which would only afford a trifling benefit. The Minister concludes by stating that the proposed measures will involve a temporary loss to the Government revenue, obtained from the sugar cultivation, which will be recovered when more favourable times set in. The maintenance of the sugar industry in Java being a matter of general interest, the Government urges an early consideration of the Bill. A revision of the regulation of the land rents in Netherlands India is in progress, and in connection therewith a revision of the export duty on sugar will be necesary.

The report on the Java Budget of the sections of the States General has been published. Some members expressed satisfaction at the fact that the Minister proposed to improve the financial position of the colonies. On the other hand, several members criticise the policy of the Government, which does not comply with the repeated complaints of those concerned in the Java trade, and maintain that the high railway tariff, the export duty on coffee and sugar, whereas a fresh tax on tobacco was put on, no decrease of the compulsory labour was introduced, and the endeavours made for an improvement of the military and naval forces would prove to be insufficient. This opinion was opposed by certain other members, who referred to the proposals of the Government for the construction of railways and the reorganization of the system of police in Eastern Sumatra, which will certainly be for the welfare of the population. Attention was directed to the unsatisfactory position of the Indian army and the reorganisation of the navy; the construction of a harbour for men-of-war was advised. The opinions regarding the concentration system in Acheen were divided. Many members disapproved of it, but others believed that it would lead to the pacification of Acheen. The renewal of the concession for steam navigation in Netherlands India was also a matter of consideration. Many members were against the existing monopoly, which is not to the interest of trade in the Archipelago, and advised to grant the concession to a Netherlands Company. A contract should be closed with one of the existing companies working the line between Holland and Java. Several members preferred the publication of the terms for the new contract and to invite tenders, a private agreement involving numerous difficulties. The idea of the Minister about the construction and working of the Government railroads was not joined, and some members advised to sell the same to private companies, while others opposed both the Government's regulation and the sale of the railroads.

In the month of May several commercial firms in this city forwarded a petition to the Minister for the Colonies to hold at least eight Government auctions of cinchona bark during the year instead of two, and to announce the dates of the auctions in the *States Gazette* and the *Java Gazette* in December of every year. Information has been received now that the Minister will comply with the request of the petitioners, and make a trial during the years 1887 and 1888, which will doubtless lead to a more favourable competition of this market with other foreign markets.—*L. & C. Express*, Oct. 29th,

THE POSITION OF CEYLON PLANTING PRODUCTS.

In criticism of certain correspondence which appeared in the local papers about two months ago, an esteemed correspondent now in England has sent us a communication which is evidently the outcome of the deliberations of not a few capitalists and proprietors interested in Ceylon. We accordingly give prominence to the views expressed :—

"We noticed more than one correspondent recently writing a few words of warning as to the danger of haste in the abandonment, or comparative abandonment, of one of your most important items of planting enterprize, Cinchona. One correspondent pointed out very forcibly how inadvisable it is to prematurely abandon this form of cultivation. According to him, many of your planters, owing to the low prices for the bark now obtainable in the European markets, are neglecting the further planting of the tree. The writer and others at home are at one with that gentleman in the view he expressed, feeling that there is every reason to hope that some day or other the demand for quinine, as its use becomes ex-

tended under the influence of present cheapness, will again bring about such a condition of the market for the raw bark as shall enable its cultivation to become once more profitable.

"That view has been strengthened by communications we have had with authorities at home. We have all seen how whole fields—whole estates we may say—which formerly grew little else but coffee have been transformed bodily into tea-gardens. It is perhaps due to a considerable extent to the consignments falling off in the Eastern exports of the berry, that prices are once again rising largely in Mincing Lane. It is not Ceylon alone, it should be remembered, which has had the prosperity of its coffee industry checked by that potent enemy leaf-disease. There is scarcely a coffee-growing country in the world which has not been more or less a sufferer from the same cause as has affected Ceylon. The adjacent continent, Java, Fiji and many other countries, have had to regret the presence of the disease and its results to their prosperity. But comparatively a few years have passed and we have before us the consequence of a reduced outturn in improved prices, prices which may well induce Ceylon planters, now that there are evidences that the effect of the fungus is weakening, to pause before they further denude their lands of the coffee bush, and revert to that wide acreage of a single product to which, we believe, we may in great measure attribute the birth of the disease on our estates. There is no reason to conclude that the perpetuation of such a system with regard to tea will be never free from its natural consequences than has proved to be the case with coffee, and although Dr. Trimen, when speaking at the Ceylon Dinner lately held in London, declared it to be impossible that the present form of leaf-disease which has proved to be so disastrous to coffee should attack tea, we have no assurance that some other form of pest may not be bred should we revert to our former mistake of devoting our lands wholly, or nearly wholly, to a single form of cultivation.

"Into this error we at home observe a disposition to fall; and we may, therefore, add our note of warning to that already given by yourselves and some of your local correspondents. We believe that some Ceylon planters already fully recognize that the impetuous clearing out of coffee is being carried too far. The Uva Estates Companies seem to be strongly alive to the danger of acting too precipitately in this direction, and they have determined to proceed henceforth with very great caution. Their directors are observant of the increasing rates for their coffee produce arising from the diminished supplies of its higher classes, and they now make a judicious selection of those fields wherever the symptoms of returning health to the coffee are most manifest, and retain them under the same conditions of careful and high cultivation as were formerly practised with respect to them. We counsel that such an example should, as far as may be possible, be generally followed, not with respect to coffee alone, but also as regards cinchona. It should be borne in mind with respect to the latter that the presence of cinchona trees on estates affords advantages altogether independent of the pecuniary value of their bark, and to sacrifice these by neglecting the further planting of the tree, would, it seem to us, be highly injudicious. Our experience of the markets for colonial produce has fully satisfied us that no single form of it has ever become so permanently reduced in price as to nullify all hope of future profitable cultivation. The markets follow of course the natural law attending supply and demand. Seasons of depression in prices, if this be long continued, cause decrease in production, and as the result, prices again rise to their normal level. Now this is what we see at the present time taking place with regard to coffee, and we believe the same result will as surely follow with respect to cinchona. The present favourable prices obtained for Ceylon tea will almost as certainly experience reaction due to its large production, present and prospective, and it may be, therefore, that the day will come—if the present course of wholesale denudation of coffee and cinchona be persisted in,—when your planters will strongly regret the total abandonment of those other forms of cultivation which have until lately appeared almost hopeless as to their yielding a satisfactory return. We should recollect the outcry in which all shared when misfortune overtook Ceylon as to the impolicy of treating all your eggs in one basket. Are you not tending once again in that mistaken direction? We fear that your are, and that the future will again force regret for doing so upon us. Reading the signs of the times, and warned by past experience, we would counsel less haste in the abandonment of coffee and cinchona cultivation than at present seems to find favour among the greater proportion of your Planting Community."

Amount of Quinine in Cinchona Trees.—The late Mr. Howard found that the amount of quinine varied largely in trees of the same species growing in the same locality. High-class barks should alone be cultivated.—*Gardeners' Chronicle.*

The Drying and Withering.—Referring to the work of the patent "Dessicator," a well-known planter writes that with reference to his withering he feels almost independent of the weather, now that he has got a "Brown's Dessicator" as his Drier. When the weather is unfavourable for withering, he simply conducts the hot air from the "Dessicator" to the withering room, and by that means he has the withering under his control with, as he thinks, a very satisfactory result. He adds:—"I find that in weather that would otherwise take two or three days to wither leaf, I can have the day's leaf ready, and well withered the following morning by keeping the fan going all night to raising the Dessicator heat, to say 230° to 250°."

Demand for Mica in Canada.—We have a letter from Toronto from an ex-Ceylon resident who says, he (along with a fellow-townsman, a former Kandy Banker) is interested in learning all about the mica procurable in the island. He encloses a specimen which is finer and clearer than the best we have yet seen in Ceylon. Of good quality our correspondent says a large quantity can be sold in America, but he has to learn that there have been several here collecting and buying before him for the London market, whence doubtless it is widely distributed. We shall be ready to give the address of our Toronto correspondent to any mica collector who may wish to try Canada with a parcel.

Inga Pulcherrima.—A small plant of this novel South American plant—a recently struck cutting—is now in flower at the Royal Exotic Nurseries, Chelsea. It is quite a tiny plant, but it has thrown one cluster of erect long crimson-coloured stamens. Mr. Court states that he has had the plant under his care at the above nurseries for the space of twenty-three years, but has never previously succeeded in flowering it, though he had seen fine specimens of it in Mexico, 6 to 8 feet in height, and covered with clusters of flowers. It is there cultivated as an ordinary greenhouse plant, placed out-of-doors during the summer, but housed during the winter. The cutting—now a blooming plant—was taken only in August last, and it was bloomed in the pot in which it was rooted.—*Gardeners' Chronicle.*

Correspondence.

To the Editor of the "Ceylon Observer."

ANTS ON CROTONS.

The Castle, Slave Island, 12th Nov. 1886.

Dear Sir,—May I so far trespass on your valuable time as to ask you how I can prevent ants attacking crotons. A kind of mould or blight appears and I notice whenever this is so, the ants are busy. I have lost several crotons from this cause and I would not have troubled, but that most of these shrubs are now attacked by this pest.—Yours faithfully,

BARLOW A. MOORE.

[We suspect that the crotons are infested with mealy bug, white scale, or some form of aphis. Ants are well-known destroyers of Aphis and this will account for their presence. A good remedy is to paint the stems thoroughly with the following mixture:—½ lb. of soft soap, ½ lb. of flour of sulphur, ¼ lb. of tobacco, and a wine-glass of spirit of turpentine. Mix the sulphur, turpentine and soap into a paste with warm water, boil the tobacco for an hour in a covered saucepan in some more water, strain it, mix it with the soapy mixture and then add enough water to make one gallon.—Ed.]

TEA PLUCKING: HEAVY AND FINE; AND COST OF CULTIVATION: A WORD OF WARNING.

Dear Sir,—Referring to "C. S."'s correspondence in your paper of 15th inst. *re* Tea Manufacture and change of system, I will, with your permission, make a few remarks. I think "C. S." is a little out when he says "that the cost of plucking tea per acre is rateably the same whether the yield is large or small." And further out when he remarks that "it might be urged that the cost of plucking 200 lb. per acre will be greater than that of 400 lb.; if this is so, the 400 lb. may be plucked and the leaf passed through a green leaf sifter and the coarse leaf put in the manure pit." No one ever said that the cost per acre for plucking 200 lb. would be greater than that of 400 lb. What is said and known to every practical man is that a small yield will cost more *per lb.* to pluck than a large yield *per lb.* The rates would be for plucking 400 lb. per acre 9 cents per lb.

200 ,, 16 ,,

So if my figures for plucking are correct and in practice, I fancy I am nearer to it than "C. S." His 200 lb. per acre (allowing all his other figures to be correct) will cost him in Colombo cents 43·50 per lb. "C. S's." system is not fine plucking at all. It only means the rejection of souchong leaf, either by leaving it on the bushes and only taking the bud and one leaf or plucking it all and, as he says, "pass the leaf through a green leaf sifter and put the coarse leaf in the manure pit." As I understand fine plucking, it is to take the bud and one leaf *before* a souchong leaf has time to form on the shoot.

Although I have not, like "C. S." sunk my bottom dollar in tea, I am deeply interested in it and I would be the last to run it down. Yet I cannot but think that inflated and inaccurate writing will have much of the over-production to answer for, and I think it is to be regretted, that some of the "authorities" have not based their estimates on a more moderate yield than 400 lb. per acre. Unless we are to assume that the capital invested in planting and in the erection of the palatial factories recommended in the "Manual," as sunk irretrievably, I think it but right that interest on this capital should be included in expenditure. If one of our "authorities" would frame an estimate on a more probable yield than 400 lb. per acre, say 250 lb., adding interest on capital, then show what it would cost f.o.b., it would be more to the purpose, though I fear it would be too late to do good, as the mischief is already done.—Yours faithfully.

PLANTER.

A NEW COFFEE TREE.

24th Nov. 1886.

Dear Mr. Editor,—I enclose an amusing cutting from *Public Opinion*:—

"A New Coffee-tree.—The *Giornale d' Agricoltura e Commercio* for August reports the discovery in West Africa of a new variety of coffee-plant, whose berry appears greatly to resemble that of Arabia in appearance and flavour. It grows, however, not on a shrub but on a tree nearly 7 ft. high, which develops rapidly and yields an abundant crop. Arrangements are already being made for introducing its cultivation in favourable localities."

The Italian paper seems to have discovered a very promising *mare's nest*, seeing that the claim of this coffee plant to be a new variety, is based on the *astonishing fact* that it grows on a tree *nearly 7 ft. high*; our own old variety would grow double that height if permitted. If you think it worth while, you might copy the "para" in the *Observer* for the edification of those who, like myself, once cultivated the noble shrub.

Ex K. C. B., now K. T.

ENEMY OF COCONUT PALM.

Pallai, 29th October 1886.

Dear Sir,—Will your entomological referee kindly afford me some information regarding the beetle I herewith send you. What name does it go by, and what is its appearance in the larva state? From interested motives I should also like to know what it generally feeds on! As far as my experience goes, it does not appear to be very common to this part of the country, and, until very recently, I was under the impression it was the black coconut-beetle, or *Kurumiriya* of the Sinhalese.

Is it at all destructive to coconuts, and if so, in what way?

I captured the present specimen on the ground, as he was taking a quiet evening stroll, having probably emerged from some hole or heap of rubbish near by. His appearance is certainly formidable, and I should say he was capable of doing a considerable amount of mischief with the pair of forceps or shears with which he is provided; but I trust they are not quite so powerful as to enable him to effect his escape from the parcel before it reaches you.—Yours faithfully,

"COCONUT PLANTER."

[Our referee has been trying to find out the name of the beetle, but has not been successful. It belongs to the family *Prionidæ*, genus *Prionus*, and the larva which is large, fleshy and white, feeds on the decaying wood of fallen trees. The beetle usually conceals itself in the daytime and roams about after dark. The one sent by our correspondent, is a male; the female has probably much smaller mandibles. The family comprises some of the largest known beetles.—If our correspondent could send some more specimens of the beetle, it would be well.—Ed.]

DOES TEA IMPROVE OR DETERIORATE BY KEEPING.

Dear Sir,—There is a question on the subject of tea, and one about which opinions vary so much that no definite conclusion can be arrived at by the uninitiated, and I know no one more able to ventilate

the subject than yourself, or the columns of whose newspaper are more freely placed at the service of the public. The question is this:—Does tea improve or deteriorate by keeping? Some tea planters say that it improves, and others say that it begins *at once* to deteriorate, unless put in bottles and hermetically sealed. I am a believer in the former theory, and will give my reasons, and shall be glad to hear any arguments in favour of the deterioration theory. In Australia, where tea is more universally drunk than in any other country, we no more doubted that age improved tea than we doubted the fact that port wine required maturing. In Britain *everyone* that I have made enquiries of, who has tried Ceylon tea, declares that it requires age, and I am, at the present time, using tea which has been standing in the open chest for over two years, and it is now very much better than at first. Many of my friends drink Ceylon tea only, and they invariably complain of the falling-off in quality, when they begin a new chest, but, as each new chest has the same fault, a fault which in a week or two disappears, I conclude that it is merely the want of age that is complained about. I am not asking you to convince me that my taste is wrong, and that the taste of my many friends here, who use Ceylon tea, is also deficient; that you will hardly be able to do; but I would be very pleased if you would give some practical reasons why some planters are so dogmatic on the deterioration theory, and others are just as inconvincible with regard to the opposite view of the case. What would those advocates for drinking new tea think of people always having an unopened chest in stock, and, as soon as it is opened, a new chest is purchased, to lie ripening in their store-room to be ready for use when the other chest is finished? I am not arguing in favour of old tea: I am only making a statement that I, and all the friends I have in Britain who drink Ceylon tea, are convinced that age improves the flavour and the strength of your staple. I will be much interested in your reply to this, and as I am asking you the question for the information of many others besides myself, I trust you will excuse my trespassing on your space to such an extent as I have done.—Yours truly,

Scotland, Oct. Ex-K.C.B.

The experience related is certainly contrary to the commonly-received opinion. The general idea is that tea is at its finest three months after preparation, and surely this is borne out by the rush every year for the new China teas—the race home, and the prize offered to the first steamer in, as also by the higher prices paid for these new teas. On one thing we are clear that like port-wine, "Ex-K.C.B.'s" tea must be kept hermetically closed, to improve by age; if the chest is left open, the tea loses bouquet, though if the surrounding atmosphere were rich in germs might gain a new flavour?—Ed.

Indian Teas.—There has been a good demand for Indian Tea, and prices remain steady, as the continuous heavy supplies have proved amply sufficient to meet the larger requirements. It has been frequently reported that the bulk of this season's imports would be much inferior in quality to those of recent years, but this has certainly not been confirmed by the late supplies. Of the finest sorts there has, it is true, been a diminished supply, but the medium and lower grades, for which the principal demand exists, are now not only more plentiful, but quite equal in quality and condition to the Teas of former seasons. There seems no good reason to suppose that the shipments yet to arrive will be inferior to those now being offered, and the latest advices infer that the total crop will be a large one. There is therefore every probability of a steady and increasing development in the consumption of all Indian Teas. The large Indian crop is further supplemented by the steadily-growing supplies of excellent Teas from Ceylon, which are not only freely used by the grocers for blending purposes, but are now being sold unmixed to the public for consumption. With an estimated import of 72,000,000 lb. of Indian and about 5,000,000* lb. of Ceylon Tea, the consumption of these kinds at current cheap rates bids fair to increase rapidly—*Produce Markets' Review*, Oct. 23rd.

The So-called "Bug" on Tea Near Galle.—Our informant of the other day on this matter, writes:—"I send you a sample of the tea leaves and the insects which were called bugs, but which appear to me a sort of fly, but ask your 'entomological referee' to look at them and report." We are pleased to receive the following report from the gentleman referred to:—"No. 5 (Aphis coffeæ or coffee louse) of Nietner's 'Enemies of the Coffee Tree,' with the larvæ of Syrphus splendens preying upon them; also a few wood-bearing caterpillars." This is a very different matter to blackbug, and ought to relieve the minds of our tea-growers in the South and elsewhere. Nietner says of the coffee louse:—

5. *Aphis coffeæ*. (Coffee Louse.)

Both sexes: naked, shiny pitch-black with whitish rostrum, antennæ and legs and greenish abdomen. The rostrum reaches to beyond the base of the second pair of legs. The antennæ are seven-jointed the first, second and sixth being short, the rest long, the two basal joints are black, the rest whitish, black towards apex. Legs with femora and tarsi nearly black, tibiæ nearly white, hind-legs with base of tibiæ slightly curved. Male four-winged, with black stigma in the upper ones. Female apterous. Abdomen in both sexes two-corniculate and with an anal tube. Size middling. Young individuals light coloured.

The insect just described is found in larger or smaller communities upon the young shoots and on the underside of the leaves of the coffee tree. Its presence in large numbers produces honey-dew and Syncladium, as in the case of the bug. The procreative powers of this family of insects (Aphidæ) is well-known, and unequalled in nature: from *one impregnatino* nine fruitful generations of females have been produced in three months: in another instauce eleven generations in seven months; in a third instance they continued to propagate for four years! (Westwoop.) The eggs being hatched in the body of the mother-iusect, the young come forth alive. Such productiveness, however, does not appear to exist among the *Aph. coffeæ*: at all events the communities are generally small, and their injuries of no consequence. But a species which feeds upon the orange and citron-tree is much more productive, From the anal tubercles a saccharine fluid is discharged of which ants are very fond, as in the iustance of the Coccidæ.

The *Aph. coffeæ* is subject to the attacks of various parasites—*Syrphus Nietneri*; Syrphus *splendens*. These are two large flies belonging to the family, the meauber of which from their resemblance to bees and wasps, might be called "bee-flies." They rather resemble each other, are of dingy colours, black abdomen variegated with whitish-yellow bands; the forme is pubescent, the latter smooth; they are both 3-8" long an 6-8" across the expanded wings. Their larvæ devour the Aphides: these are soft, unsightly, eyeless and footles worms, narrowed on one end ‡'; long when full-growd That of the *Syrphus Nietneri* is brown with a lighter dorn mark, the segments are drawn out into scale-like knobs which form a ridge along the centre of the back. That of the *Syrphus splendens* is green with a whitish dorsal mark. They make immense havoc amongst the Aphides, being so voracious that in twenty-four hours they increase double their volume. The pupa is pear-shaped, resting within the larva skin for eight days when the perfect insect comes forth. Another enemy is:—*Micromus Australis*. This is a pretty little insect allied to the tribe of the ant-lions. Feeding upon plant-lice the larvæ have been called, "Aphis lions," but from their shape they might more appropriately be styled "Aphis crocodiles." This larva is about 5-16" long, narrow, depressed, tapering towards both ends, lightly covered with white hair. It is of brownish colour; sides, dorsal line and under-sickle-shaped jaws, and long, slender palpi and feelers. The former are distinctly three-jointed, the last joint being very long, and the whole palpi as long as the mandibles. Between head and throat there is a distinct neck. The larva encloses itself in a light cocoon in which the pupa rests for two weeks, when the perfect insect makes its appearance. The latter is very delicate, brownish, with green eyes. The eggs of these insects are deposited upon leaves, each egg being furnished with a long, thin peduncle, thus resembling pins or certain fungi. There are several minute Hymenoptera parasitic upon the *Aphis coffeæ*, but I am unable to give their names.

* 15,000,000 surely meant.—Ed.

THE LARGEST GAS WELL YET is described in an American paper as being started in Western Virginia on Oct 8th:—Natural gas was struck at Fairmont, W. Va., today. When the gas was struck the force was so great that all the tools were blown from the well and stones thrown from 100 to 200 feet high, tearing up part of the derrick. It is said by experienced gas men to be the largest well in the country. The noise from the rush of the gas can be heard from six to ten miles.

TEA SEED in Assam is likely to be scarce this year to judge by the following extract from the letter of an Assam planter:—"I don't know what has made the seed so bad this year; it is a great disappointment to me, but can't be helped. Am making very good tea just now, and have received good valuations from Calcutta." Fortunately there is a considerable quantity of good seed available in Ceylon now and there should be less risk in using local seed.

RUBBER IN BRAZIL.—The following extract from a sketch of the physical geography of Brazil, lately published, gives a new idea of the importance of *rubber*:—"Amongst the immense stores of valuable vegetable productions of this great forest, the india rubber tree figures pre-eminently. It exists in such vast quantities, and the collection of the juice is so very lucrative, that it has attracted to even the most remote rivers thousands of adventurous Brazilians. Rubber is doing for the Amazons what gold did for Australia and California; although most other industries on the Amazons are neglected and paralyzed, rubber has enabled Para, Manaos, and other riverine cities to make unprecedented progress. It has covered thousands of miles of rivers with steamers, and spread a vast population over vast areas that would otherwise have remained dormant for many many years."

PESTS ON TEA.—We hear of an insect shewing up rather extensively on a field of tea in the low-country and our informant considered he had very bad news indeed in giving us the information. But taking the worst view of the case of such pests, it must be remembered that there is a vast difference between tea and coffee or almost any other field product. In the case of tea, very strong measures—such as burning or stripping off all the affected leaves—can be resorted to with little prejudice to crop prospects—with simply the effect of a pruning. For fighting pests—should pests really come, in any force, and no branch of agriculture is entirely free of such—tea affords greater advantages than almost any other tropical product. In the present case, probably treatment with lime will entirely dissipate the bug.

HOW TO COUNTERACT OVER-PRODUCTION OF TEA IN CEYLON.—We call attention to the letter of "C. S." (page 409) on this subject, to which we had appended the following note:—"By all means, let our correspondent persevere in his criticisms and suggestions, which others interested will carefully weigh, and give their reasons for adopting or rejecting the systems recommended. Of course, it is the net and not the gross returns from the application of manure on which calculations of profit should be founded and in the case of the system of fine plucking recommended, there can be no doubt of the saving in packages, local transport, freight &c., resulting from its adoption. The question then is as to the theory that fine plucking is more exhausting to the plant than ordinary medium harvesting of leaves as well as buds." On this "C. S.", having seen the above in "proof" wrote:—"No, the question is whether a lingering death from fine plucking, or a sudden one from abandonment is preferable: we are told that tea-drinking, and smoking are injurious; fortunately people on't mind being killed imperceptibly."

Fortunately, we have already in Ceylon, an example of the happy medium, between the process recommended by "C. S." and the ordinary practice in plucking. In the case of a wellknown plantation, which maintains a high average price for its teas, the process adopted has been described as a comparatively light or fine plucking; but not unduly fine, just such as keeps the bushes in good order; and then the throwing away of 25 per cent of the coarser leaves. This secures a very fine regular tea from what remains, and the fourth of what is gathered goes directly back to the soil. This process would suit "C. S." well in the time of "overproduction," when it arrives.

TEA IN AMERICA.—That the American people are in a fair way to learn all about "good tea" is very evident when we find such a paragraph as the following in a Chicago paper:—

CHEAP TEA-DRINKING.—The doctors are falling into agreement that the excessive use of tea is working great injury to its consumers. Tea is now set down as more deleterious than coffee, especially when taken hot. This being the case with good tea, it is painful to think that the article commonly sold and used is in quality far below that which our grandmothers were wont to gossip over. The Chinese have discovered that England and America want cheap tea, and they consequently ship over an article which a cooly in Canton would fling into the street. The use of this wretched stuff destroys the taste for really good tea. Yet there are people who drink the latter. Japan, India, and Ceylon have become formidable competitors with China in the tea trade; and there are brands of Japanese tea worth from $15 to $18 a pound. The Russians drink prime tea, and the best which is not reserved for home use is sent to them. A well-to-do Russian family rarely drinks tea worth less than $2.50 to $3 a pound; and this tea goes much further than the cheap trash, it being true economy to use it. The best grades of tea go far to supply the craving for wine and liquor, so that a man who consumed the finest Bohea or Peru from the I-baug district would soon get into bad odor with his wine merchant. The best Indian teas bring, at wholesale by auction, in England, 75 cents to $1 a pound. From this the quality of our cheap teas may be guessed.

TEA "BULKED UNASSORTED."—With reference to the above we do not altogether agree with Messrs. I. A. Rucker and Bencraft in their remarks; from reading carefully their circular it appears they advise all planters to forward their teas as "Unassorted" and to prove their ideas they quote the result of one Garden where, by the teas being sorted, the owner lost nearly £300 sterling. They state the sorted portion was divided into six different grades. This multiplying of grades both London Brokers and ourselves have often written against. We do strongly advise for small gardens just coming into bearing where the Tea is of MEDIUM QUALITY that it should be sold as "Unassorted" but FREE from dust; but for gardens that produce exceptionally fine quality teas we advise them to be sorted into five grades namely:—Orange Pekoe or Broken Orange Pekoe, Broken Pekoe, Pekoe, Pekoe Souchong, and Broken Pekoe Souchong, with an occasional Dust, where an estate by sorting as above, would be forwarding once a fortnight only 2 or 3 packages of each description, we would recommend them keeping it back until breaks over 8 packages have accumulated, even though it may be in some cases six weeks. Messrs I. A. Rucker and Bencraft state that the "proof of the pudding is in the eating"; this is all very true, but they are only able to state for example one instance out of the hundreds that are sold in London, so we consider the parallel does not hold good. In short where a garden only produces medium Teas such as Broken Pekoes selling at 1/1 to 1/2, per lb. Pekoe 11d 1/0 per lb., Pekoe Souchong 9½d to 10½d per lb., Broken Tea 8d per lb., we would advise the invoice being Bulked and sold as "Unassorted," but NOT for gardens producing good quality Teas.—*Wilson & Co.'s Fortnightly Tea Report.*

FIBRE MACHINERY.

On Saturday, the 17th inst., an *Argus* representative visited the shop of D. P. Burdon, near the city wharf, to look at the model of a fibre cleansing and washing machine, but, owing to crowded columns last week, we were unable to mention it. Some weeks ago we saw the first machine of the series—the one for extracting the fibre—which is now on a shelf in the patent office at Washington, and were impressed with its simplicity and wonderful working powers. The last model made, as we have stated, is the cleansing and washing machine, and there is yet one more to construct, when Mr. Burdon and his associates will have a set of fibre machinery which will be worth a fortune. No part of the globe furnishes so many valuable fibrous plants as Florida, and all that is needed is the proper machinery for its extraction, and the industry will be one of the greatest in the South. We have samples of fibre in our office, which were extracted from the Spanish Maguey plant by Mr. Burdon, which measures thirty-six inches in length as pliable as thread but as tough as wire. Can a better fibre for the manufacture of ropes, twine, etc., be conceived which is so easily produced and yet so valuable? The resources of Florida in this line have been only touched, properly speaking, and it seems that it remains only for Mr. Burdon to develop them. Should these machines prove successful and practicable (and in our opinion they cannot prove otherwise), a new industry will be inaugurated in Florida which will be even greater than that of orange growing, and which will accordingly command more interest and insure the investment here of more capital. That the manufactories will be located here is almost a foregone conclusion, for the raw material is at the door, and the shipping facilities as good as could be secured at any place. We wish Mr. Burden success, and know that he is able to attend to it.—*Sanford Argus.*

DESIGNATIONS OF DIFFERENT TEAS.

A correspondent writes:—"The terms "Pekoe" "Pekoe Souchong," and "Souchong" are here treated as referring to Indian, Ceylon, and similar teas, and have no connection with the same terms as used in describing China and such-like teas. Strictly speaking, these terms are used to denote tea manufactured from the leaves in different stages of development, though for ordinary trade designation, the actual appearance of the leaf is the standard for determining to which of these grades a tea belongs:—

"Pekoe" tea is manufactured from the first two or three young leaves at the end of the shoot, or "flush," as it is technically called. The just unfolding bud at the end, which in about another day would be a leaf (and often the just expanding young leaf next it), is covered with a white velvety down, which, if not stained dark by the juice expressed during the rolling process in manufacture, comes out light-coloured in the finished tea, and the tea that contains these whitey buds is called "tippy." This "tippy" form is the characteristic of Pekoe teas, as the lower qualities do not contain it. Pekoe is rolled with great care during the process of manufacture to curl the leaf well. "Orange Pekoe" is Pekoe containing an extra quantity of these Pekoe "tips" or "ends," and is more valuable than "Pekoe" inasmuch as these "tips" or "ends" are highly prized and add to the value of tea. "Flowery Pekoe" is manufactured from the aforesaid downy buds alone, and is prepared in a different way altogether from the other teas; very little of it is made, and it is quite a fancy tea.

"Souchong" is manufactured from older leaves than those from which Pekoe is got, and less careful manipulation is given to it. It rarely contains "tip," though a few tippy leaves may sometimes be found in it. It has a bold rough leaf.

"Pekoe Souchong" is made from the leaves, taken altogether, which manufactured separately, would produce Pekoe and Souchong. It contains usually some "tip" and also some large leaf, and in all its characteristics comes between the two former grades. This class of tea is manufactured more extensively than any other, as by picking all the leaves together a great saving in labour is effected—a most important point in tea cultivation. The larger and older leaves, when picked, make "Congou"—a very inferior class of tea; and that made from the still larger and coarser ones, if they are taken at all (which is not often done, as the tea obtained is hardly worth the extra expense), is called "bohea." This latter term is, however, now practically obsolete.

In ordinary trade nomenclature a tea is called "Pekoe" if it have a wiry, wellcurled leaf of greyish liquor, and a good general appearance; "Pekoe Souchong" is bolder and containing more ragged leaf; and "Souchong" if still larger and less tightly curled. Anything in the way of whole-leaf teas below these is now known as "Congou."

As these grades run imperceptibly one into the other, it is evidently impossible to lay down a hard-and-fast rule for distingushing the kinds, and the terms must be of necessity more or less relative, not absolute. They have, of course, distinctive kinds of liquor, but to refer to these would take up far too much of your space, on which I have, I fear, transgressed too much already; but I hope we shall hear something on this point, as for practical blending purposes it is far more important that that of leaf. Perhaps someone else may be found who will give us his experience on this question, as it is of great importance to those interested in tea."—*Planter and Farmer.*

TRIAL OF COLONIAL TIMBERS.

An important and eminently interesting demonstration of the industrial value of colonial timbers was held on Friday afternoon, Oct. 8, at the works of Messrs. A. Ransome & Co., Chelsea, in the presence of about 150 gentlemen, including the Agents-General of the various Colonies and a few of the leading civil engineers, builders, timber merchants, and others interested in the employment of timber in various branches of trade. Among those present were Sir Philip Cunliffe-Owen, Mr. Edward Woods (President of the Institute of Civil Engineers), Sir Charles Hutton Gregory, Sir John Coode, Sir Frederick Bramwell, Sir Charles D. Fox, Sir Charles Mills, Sir Graham Berry, Sir Arthur Blyth, Sir James Garrick, Sir W. J. Clarke, the Hon. J. Gordon Sprigg, the Hon. Adye Douglas, the Hon. Malcolm Fraser, Mr. Alfred Dent (Commissioner for British North Borneo), Mr. Charles Hawksley, Mr. A. H. Vesey, Mr. Henry C. Beeton, Mr. Ernest E. Blake, Mr. F. G. Baker, Hon. Alex. Hay, Colonel Beddome, Colonel Percy Smith, Mr. J. R. Jefferies, Colonel Lees, Mr. W. B. Lewis, Mr. C. K. Stuart, Mr. Charles Hawksley, Mr. J. C. Homersham, Mr. A. J. R. Trendell, Mr. H. Trendell, Professor Macoum, Mr. P. L. Simmonds, Mr. James Thomson, Mr. H. J. Scott, Major G. Malet, Mr. Sydney Cowper, Mr. George H. Hawtayne, C.M.G., Mr. J. L. Shand, Mr. F. R. Saunders, Mr. Oswald Brown, Mr. Alpin Thompson, Mr. N. P. Trevernen, Hon. R. H. Meade, C.B., Dr. Trimens, Mr. W. B. Pryer, Mr. F. Josselyn, and Messrs. A., J. S., and L. H. Ransome.

The object of the meeting was to test a number of important colonial timbers which, from want of a knowledge as to their qualities, have been hitherto commercially unknown in the English market, and with a view of practically exemplifying to what purposes they could be most advantageously applied, the various samples were converted by special machinery into such descriptions of work as the colonial experts present deemed them most suitable for. It is not too much to add that no more suitable or appropriate centre could be selected for such experiments than the Stanley Works, having regard to the world-wide eminence attained by Messrs. A Ransome & Co. as manufacturers of every description of wood-working machinery. And, before going further, we may here compliment the firm on their public-

spirited action in the matter—action which cannot fail to advance the interests of the Colonies and India, as regards one of the most valuable of their natural resources.

The following is a list of the woods that were dealt with, together with a description of the uses for which they have proved most suitable:—

New South Wales.—Blue Gum for ship and house building, wheelwrights' work, posts and rails, plough beams, railway sleepers, &c.; Ironbark for carriage building, spokes of wheels, piles, and railway sleepers; Mountain Ash for wheelwrights' and coopers' work, palings, and general building purposes; Forest Oak for veneers, cabinet work, &c.

Victoria.—Blackwood for all kinds of cabinet work, carriage building, gun stocks, &c.; is also used for making casks; White Box for railway sleepers. Blue Gum for beams, joists, railway sleepers, piers, and bridges; Red Gum for veneers, furniture, railway sleepers, &c.

South Australia.—Red Gum for railway sleepers, fence posts, telegraph poles, jetty and bridge piles, wheelwrights' work, &c.; Blue Gum for railway sleepers, posts, piles, planking, and general building purposes; Sugar Gum for railway sleepers, jetty planking, bridge piles, felloes of wheels, naves, posts, &c.

Western Australia.—Karri wood for joiners' work, railway sleepers, furniture, cabinet work, &c.; Jarrah for joiners' work, railway sleepers, furniture, cabinet work, and piles; Raspberry Jam wood for ornamental woodwork and furniture; York Gum for spokes of wheels, &c.; Tuart for wheelwrights' and railway waggon work; Wandoo for wheelwrights' and railway waggon work.

New Zealand.—Black Pine for house-building, furniture, and cabinet work; Red Pine for house-building and general purposes; Totara for veneers, furniture, and cabinet work; Kauri for building, furniture, and all general purposes; also for making slack barrels, and pattern-makers' work.

Canada.—Douglas Fir for pattern-makers' work, joinery, furniture, building, and all general purposes; Bitternut, or Swamp Hickory for spokes of wheels, joinery, &c.; White Fir for joiners' work and general purposes; Black, or Swamp Ash for building purposes, joiners' work, and cask-making; Iron Wood for handles of hammers, and agricultural implements; also spokes of wheels.

Cape of Good Hope.—Yellow Wood for furniture, pattern-makers' and joiners' work, and general building purposes; Umzumbit for bearings, walking-sticks, and tool-handles; Box Wood for engraving purposes; Kamassi for engraving and turnery; Sneeze Wood for piles, posts, and Telegraph-poles, cabinet and waggon work; Stink Wood for building purposes, furniture, waggon work, &c.

British North Borneo.—Bilian for beams, piles, planks, &c.; Russock for building and general purposes; Serayah for furniture, veneers, and cabinet making.

India.—Tun, or Indian Mahogany for tea-boxes, and all kinds of furniture panels, and carving; Black Wood, or Rose Wood for furniture, gun-carriages, cart-wheels, agricultural implements, and fancy articles; Sissoo for felloes and naves of wheels, and carved work of all descriptions; Long-leaved Pine for tea-boxes and general building purposes; Padouk Wood for furniture, joinery, and carriage-building; Chugalam for furniture; Sej Wood for house and ship-building, also for making carts and waggons.

As the samples of woods from West Indies, Ceylon Queensland, Straits Settlements, Western Africa, and Fiji, were found too small for practical experiments, they do not appear in the above list.

The experiments, which were conducted with more than forty different varieties of timber from India and the Colonies, comprised tree felling, cross-cutting, sawing, planing, moulding, morticing, tenoning, and boring; while the manufacture of such things as casks, doors, pick handles, carriage spokes, and railway sleepers was carried to its completion and the articles exhibited to the assembled guests. The woods experimented upon were of every variety, from the hardest iron-bark to the soft mild working Douglas fir, but the samples left the various machines with the same smooth finish, the only difference being that the harder qualities of wood were passed through the machines at a somewhat slower speed than the softer ones.

Among the more noticeable experiments were the felling of a rough log of hard Kauri (Western Australia) timber, 3 feet in diameter, which had been planted in an upright position in the yard, and which was sawn through close to the ground by Ransomes' patent tree-feller in four minutes, and the subsequent cross-cutting of a similar log in a still shorter time; the preparation of railway sleepers by a machine which in less than a minute planed the two rail seatings and bored the four spike holes; and the planing, grooving, tonguing, and beading at one operation of boards from each sample of timber submitted for experiment, the boards being passed through the machine at the rate of from 12 feet a minute for the harder woods to nearly 24 feet per minute for the softer woods. But perhaps the most interesting experiment of all was that of manufacturing light casks for spirits, &c., from such of the colonial woods as were suitable for that purpose. In this, the cooperage department, nine machines, worked alternately by one lad, were employed, of which four sufficed for the manufacture of the body of the cask, three for the preparation of the heads, and two for making the hoops. Although, in consequence of being made of different descriptions of wood, the casks presented a varied appearance, they were, in form and contents, all precisely alike, while in point of finish and solidity, they left nothing to be desired.

At the close of the experiments, and after some refreshments had been partaken of, a conference, at which Mr. Edward Woods presided, was held in the Pattern Room of the works for the purpose of eliciting information respecting the several varieties of timber experimented upon from the gentlemen representing the colonies in which they were obtained.

The proceedings were opened by Mr. Alan Ransome, who observed that those who had witnessed the experiments must have seen enough to convince them of the excellent quality and great serviceability of most colonial woods. The question, therefore, that now demanded solution was whether they could be imported into this country at a rate which would render them commercially useful. Summarising the conclusions arrived at from the experiments which his firm had that day and during the past fortnight been engaged in, he might state, in the first place, that among the 40 odd different species of timber dealt with, some stood out as pre-eminently suitable for the English market. There were iron bark and mountain ash from New South Wales, both suitable for wheelwrights' work, and the former, owing to its peculiar hardness, for piles and railway sleepers as well; black wood from Victoria, suitable for carriage building, cabinet work, and case making; Karri wood and Jarrah, from Western Australia, both useful for joiners' work, sleepers, furniture, and piles, of which he could say that there was no fault to be found; black pine, red pine, totara, and kauri, from New Zealand, which could be employed for furniture, cabinet work, house building, and general purposes, kauri being specially useful; Douglas fir and the swamp ash, from Canada, both suitable for building, joiners' work, &c., the latter being particularly sound, strong, tough, and cheap; yellow wood, stink wood, and sneeze wood, from the Cape of Good Hope, the two former species suitable for furniture, building, and joiners' work, and the latter, from its unusual durability, for piles, posts, telegraph poles, &c.; Billian and Sorayah, from British North Borneo, the former suitable for beams, piles, and every purpose where durability was necessary, and the latter for furniture veneers, &c.; and, lastly, Padouk wood from India, which was suitable for joinery, carriage building, and furniture, was exceedingly plentiful, and was grown near the coast. Many samples of wood sent had un-

fortunately been too small for experiment, but of those operated upon he could say that they had all been found suitable, so far as quality was concerned, for their various purposes.

The Hon. Malcolm Fraser, Western Australia, referring to the two principal woods supplied by the Colony he had the honour to represent—the Jarrah and the Karri—said that they were both highly appreciated at the Antipodes, the latter being the timber *par excellence* of Australia. A considerable quantity of these woods was now in London and could be obtained for about 7*l*. per load, equal to 50 cubic feet, and which was about half the price of teak. Moreover, railways had been constructed in the Colony with the view to the developing the supply of the timber.

Mr. P. L. Simmonds, while admitting the value of most of the New Zealand woods for useful and ornamental purposes—Brinsmead and others recognised their merits for furniture, &c.—expressed the fear that the Colony would not be able to complete with other sources of supply—first of the local demand, and next because of the long distance from the London market.

Professor Macoum (Canada) described in eloquent terms the valuable characteristics of the chief wood of the Dominion. The Douglas fir of Canada was fully equal to the white pine now employed, and when the supplies of the latter were exhausted the former would of necessity take its place. The Douglas fir grew in vast quantities, attained a great height, and tapered very gradually. In their black ash, too, the Canadians possessed a species of timber which would some day be very widely employed, for it had all the qualities of the now favourite white ash, and its supply was unlimited. The Douglas fir could be supplied in England at 5*l* a load, and the black ash at the same price as elm or white pine.

Mr. E. A. Cooper (Cape Colony) commended the peculiar qualities of the Umzumbit wood—its hardness and durability. The cape yellow wood could be supplied as cheaply as any, the price being about 6*l*. 10*s*. a load.

Mr. A. Dent (British North Borneo) stated that the Billian wood, which offered great attractions to the English merchant, grew in enormous quantities, was very easy of access, and exceedingly hard and durable. As to its cost, one firm was already prepared to supply it alongside ship at 3*l* 10*s*. per ton, to which about half as much again had to be added for freight, &c.

On the motion of Sir Philip Cunliffe-Owen, seconded by Sir. C. H. Gregory, votes of thanks were accorded to the chairman and to Messrs. Ransome & Co., and the proceedings closed.—*Colonies and India.*

THE RECENT COFFEE CROP IN COORG.

The figures for the last coffee crop in Coorg, as given in a memorandum prepared by the Commissioner, are:—Plantation coffee, 5,171 tons, Native coffee 829 tons, total crop 6,000 tons. The Plantation Coffee is no doubt very near the mark, as there are ready means of obtaining exact information; but there is reason to believe that a serious error has been made in the quantity of Native. The exports of all Native kinds from Tellicherry in the past season exceeded 5,000 tons, of which about 500 tons received from Mangalore must be deducted, leaving net exports 4,500. Of this not more than 1,500 tons could be the produce of North Wynaad, the only other district from which coffee is brought to Tellicherry. This leaves 3,000 tons for the receipts of Coorg Native coffee at Tillicherry. At Mangalore the receipts were probably not less than 1,000 world tons, but if taken at the very low estimates of 500 tons the total crop of Coorg Native will be 3,500 tons. Taking the Commissioner's figures for Plantation as above at 5,171 tons, and adding the corrected estimate for Native coffee 3,500 tons, and we get a total crop of 8,671 tons. This is the largest crop the district has ever been credited with, yet, taking the acreage under coffee, given in Mr. Girdlestone's minute to the Planters' Association of 18th March last, at, 73,199 acres, it only gives cwt. 2·35 per acre. Placing the acreage held by Europeans at 37,544, and cwt. 2·77 is found to be the average yield of Plantation. There can be little doubt that Mr. Girdlestone's figures include a large area of abandoned and semi-abandoned land, which it is unfair to include in calculating the acreage ratio. A careful revision of the area upon which the above Plantation crop was grown might prove the actual effective acreage not to be much over 25,000 acres, and of this, 5,000 may be put down as yielding very inferior crops. If this estimate be correct, not more than 20,000 acres would, therefore, be the area from which the great bulk of the present Plantation crop was drawn, and that, on the average the yield was about 5 cwt. per acre. Individual estates can shew an average of from 7 to 10 cwt. per acre, and some planters can point to fields which have given 12 and 13 cwt., but although the crop, taken as a whole, is a large one for the district, the acreage yield, even on a greatly reduced estimate of the total area, is not large, though very fair.

It is impossible to arrange the figures for Native coffee with any assurance of even approximate accuracy. Apart from estates of considerable extent held by the better class of Coorgs, there are innumerable patches of coffee distributed over every part of the province, the total acreage of which it would be all but very difficulty to arrive at. On every little holding, in the smallest compound attached to the meanest dwelling, under the shade of every small tope, there is coffee to be found, bearing fairly well. It is only at the ports of export that the total yield of this class of coffee can be ascertained with any decree of accuracy. Returns obtained at the toll bars for the entire crop of Plantation and Native would be useful if they could be relied upon, but they are notoriously defective, and too much trust has hitherto been placed in them. The importance of accurate statistics cannot be too strongly impressed on the authorities. It is probable that, from defective returns of crop, the coffee industry in Coorg has been underrated, and the interests of the planting community, and the affairs of the district, generally, have in consequence, not received the consideration to which they are entitled. There is reason to believe that if the official returns of previous crops were enquired into, similiar corrections to those now noticed would have to be made.

In Ceylon everything that can conduce to the interest of the planter has the Government's first attention. The planting districts are covered with a net-work of roads, the best of their kind anywhere, great care and much money being spent in keeping them in good order; 120 miles of Railway, if not more, have been made, running into the planting districts, and this at a cost that throws any proposal ever submitted for Coorg into the shade. A recent extension of 40 miles has been completed in Ceylon at a cost of £21,000 a mile. The island has passed through a period of severe depression which still weighs heavily upon it, but the Government does not abate its activity in providng further facilities for the planter of Coffee, Tea, Cinchona, Cocoa, &c., and in doing all it can to promote his interests. Further, railway extensions are recommended, and will probably be undertaken. With Coorg it is different. No more is spent on roads and communications than can by any possibility be avoided, and the internal communications are kept in notoriously bad order. Not much more can be said for the highways by which produce is conveyed to the coast, and to outside markets. Are, though, the Mysore Railway comes within forty miles of the province, and the finer coffee districts are within sixty miles of the coast, there is no thought of giving Coorg the benefit of Railway communication with those important points, although it could be done at a comparatively moderate cost, and with every prospect of profitable results. The Ceylon planters cheerfully consented to an export duty of one shilling per cwt. on coffee to provide a fund for their first Railway, and this they paid for many years, and they fully recognized the value they had received in return when the line was completed. Some-

thing of the same kind might be done in Coorg, and in fact, in connection with the coffee industry generally, for the purpose of providing Railway communication. The Province, however, suffers from being governed from Bengal. It is too remote to have the attention given to its affairs that it deserves, and so long as its contribution to the Imperial revenue is regularly forthcoming, it excites little or no interest. It is high time for this state of things to be put an end to. Coorg is, geographically, an integral part of Madras, and it should be ceded to Madras. The administration of Wynaad by the Madras Government is by no means all that can be reasonably desired; but, when Wynaad, Coorg and the Nilgiris present an united front, the local Government may be persuaded to do more than it has yet done to emulate the able broad-minded attitude of the Ceylon Government towards private enterprise.—*Madras Mail.*

A NEW METHOD OF GLAZING SASH.—It is well known that all glass (now both in portable sashes and in fixed greenhouses), is simply imbedded in putty, and kept in place by glazier's points, no putty being now used on top, as was formerly done. It has been found that when the glass lays on the sash-bar thus imbedded the putty soon rots or wears out, and water gets in and not only loosens the glass but rots the bar as well. A most simple plan to obviate this is to pour along the junction of the bar with the glass a thin line of white lead in oil, over which is shaken dry, white sand. This hardens and makes a cement that effectually checks all leakage. It is quickly done. I have seen glass, so cemented, that has stood for ten years, still in perfect order, and it looked as if it would stand for ten years more without further repair. This plan, which is but little known as yet, is of the greatest importance; had I known of it thirty years ago I would have saved many thousands of dollars in repairing, besides having the plants under this water-tight glazing in better condition.—PETER HENDERSON *in American Agriculturist.*

COMMERCIAL COPAL.—The copal from which varnish is made is found in a fossil state, chiefly on the east coast of Africa, and consists of the exudation of former forests long since submerged. It is never found far inland. Copal varies in quality according to the vicinity where it is obtained; sometimes two descriptions are unearthed in the same district, varying in quality, structure, and shape. The young copal of Sierra Leone is globular, or tear-like, brownish and slightly odorous; the "pebble" copal obtained there is more or less white, with thick opaque crust, and is odourless. That of Gaboon is in flat pieces, with a crust of branching striæ, and the fracture is conchoidal. The copal of Lango takes the form of broken sticks, of which there are two kinds, one white to yellow grain, the other reddish or brownish, and in irregular fragments. The latter, which is transparent, homogeneous, and fragrant, is the best. Of Angola copal one kind is globular, and of uniform quality throughout; another is in the form of sticks, mostly cracked, and found in common with air-bubbles and bark; it is yellow, red, or brownish. Slightly coloured copal has a dull appearance, and is not so uniform or transparent as the strong coloured. The copals of Manila, New Zealand, and South America are softer than other descriptions.—*Chemist & Druggist.*

BRICK-TEA does not excite much attention in this country, beyond the fact that there is a large trade between China and the countries bordering it in this article. Some attempts have been made to develope, a trade in Indian manufactured brick-tea between this country and Thibet but so far without any practical results. The composition of brick-tea has also been a subject of some speculation, and erroneous impressions would appear to be extant regarding it. But a Russian *savant*, Professor A. P. Borodin, of St. Petersburg, has been turning his attention to the subject, and has analysed several specimens of a kind for which there is a very large demand. The Russian name for these 'bricks' is *kirpitchnyi tchai*, and that of the Chinese makers is *Shun-Fan*. The name, however, throws no light upon the composition of the bricks, which are extensively used in Eastern Siberia, as well as in the East of European Russia. Up to the present, it has been supposed that brick-tea was prepared from a mixture of tea leaves and a decoction of starch or rice, with various foreign colouring substances. This seems to be quite erroneous. Professor Borodin, in the specimens analysed by him, found that it consisted of quite pure siftings of black tea compressed after softening by steam. It contained from 2·36 to 2·44 per cent of theine; from 7·91 to 7·96 per cent, of ashes; 22·5 per cent of soluble substances, and from 6·72 to 6·77 per cent of tea tannic acid. But it contained no essential oil, thus differing in that "particular from tablette-tea" (Russian *plitotchnyi tchai*] or ordinary compressed tea, which is prepared by subjecting *dry* siftings of black tea to the action of a powerful hydraulic press. The price of brick-tea is only 40 copecks (about 11*d.*) a pound. The foregoing particulars are of some interest, and suggest the propriety of Indian tea-growers developing an industry which opens a way to a trade with Thibet, Yarkand, Chinese and Afghan Turkistan, &c. Professor Borodin, moreover warmly recommends, the use of brick-tea generally.—*Indian Agriculturist.*

PROFESSOR WALLACE ON AGRICULTURE.—Mr. Robert Wallace, Professor of Agriculture and Rural Economy at the University of Edinburgh, delivered his introductory lecture to the agricultural class on Oct. 20th at the opening of the session. In introducing the subject Professor Wallace pointed out that even in this great manufacturing country the industry of agriculture was the largest and most important of all, locking up more capital and employing more labour than any other. He had already shown that the appreciation of gold, increasing for a number of years, had a tendency to lower the prices of all commodities, agricultural and other, and that those who were bound by leases must suffer each year. He thougt it entirely illusory to find in legislation alone a remedy for present or future evils. Proprietors should meet and consult together as to what would be the best course to follow in their own interests as well as those of the country. The system adopted in Scotland of leasing land for a longer or shorter term of years was, he thought doomed to vanish. All long lease contracts must come to an end. Proprietors would consult their own interests if they would at once, without waiting for the termination of leases, adopt a sliding scale for the fixing of rent, based on the average prices taken in the local markets. In fact this was an old custom and many rents in the Lothians had been fixed annually by the average yearly price of wheat. He stated as a noteworthy fact, drawn from his own personal experience, that the districts where systems of mixed farming were followed had suffered less than where one single crop or one single branch of agriculture had been depended upon to meet all costs. Mixed husbandry had many advantages. By dividing the risks among a number of crops or varieties of stock the principle of an insurance company was to a certain extent adopted. Further, the growth of a variety of crops conferred on land all the advantages of the improved systems of rotation. Variety of live stock was also a source of wealth as much as variety of cropping. Turning to the connexion between agriculture and the University, he said that the degree of Bachelor of Science in the department of Agriculture, which would be opened for competition in a few weeks, would give a grand stimulus to agricultural education. He advocated Lectureships or Chairs of Forestry and Agricultural Chemistry, and generally upheld the advantages of education in the art. In conclusion, he urged them to prepare themselves for any emergency that might arise in the future. Fortune helped those who helped themselves, and no one could succeed who did not rely on his own industry and perseverance. Success was impossible without application. He had no fear that Scotchmen would lag behind in the race.—*London Times.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, November 4th, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 a £7 5s
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar per lb. and Ceylon	Clipped, bold, bright, fine	2s a 3s 1d
	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 4d
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	8½d a 1s 11d
2nds	,, ,, ,, ,,	7½d a 1s 6d
3rds	,, ,, ,, ,,	7d a 1s 2d
4ths	Woody and hard	6d a 11d
Chips	Fair to fine plant	1¾d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	75s 6d a 83s
	Medium	70s a 74s
	Triage to ordinary	50s a 65s
COFFEE Ceylon Plantation per cwt.	Bold to fine bold colory	88s a 100s
	Middling to fine mid.	73s a 87s
	Low mid. and Low grown	64s a 71s
	Smalls	64s a 70s
,, Native	Good ordinary	50s a 60s
Liberian	Small to bold	45s a 55s
East Indian	Bold to fine bold	82s a 100s
	Medium to fine	70s a 80s
	Small	58s a 68s 6d
Native [per ton	Good to fine ordinary	50s a 60s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£7 a £18
FIBRE, Brush, per ton	Ord. to fine long straight	£15 a £40
Stuffing	Coarse to fine	£7 a £20
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £35
Do [cwt.	Roping fair to good	£9 a £13
COLOMBO ROOT, sifted ℔	Middling wormy to fine	10s a 30s
CROTON SEEDS, sifted	Fair to fine fresh	30s a 35s
GINGER, Cochin, Cut	Good to fine bold	80s a 115s
per cwt. ,,	Small and medium	40s a 70s
Rough	Fair to good bold	32s a 55s
,,	Small	22s 6d a 30s
NUX VOMICA, per cwt.	Fair to fine bold fresh	8s a 11s
	Small ordinary and fair	5s a 7s
MYRABOLANES, pale, per cwt.	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	6s a 6s 6d
Pickings	Burnt and defective	4s a 5s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	¾d a 1d
LEMON GRASS ,,	,, ,, ,, ,,	1⅛d a 1⅜d
ORCHELLA WEED [℔ lb.	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	8d a 8¼d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	11s a 15s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	5s a 11s
Dust	Ordinary to fine bright	3s a 10s
RED WOOD, per ton.	Fair and fine bold	£5 a £5 5s
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £44
Do. chips	,, ,, ,,	£10 a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	8d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2d a 4½d
TURMERIC, Madras, ℔ cwt	Finger fair to fine bold	11s a 12s
Do.	Mixed middling [bright	10s a 10s 6d
Do.	Bulbs whole	9s a 10s
Cochin	Do split	6s 3d a 7s 3d
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	14s a 23s 6d
2nds	Foxy & reddish 5 a 8 ,,	10s a 12s
3rds	Lean & dry to middling under 6 inches	5s a 9s
4th	Low, foxy, inferior and [pickings	1s 6d a 4s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS.
ALOES, Soccotrine and	Good and fine dry	£7 a £10
per cwt. Hepatic	Common and good	£4 a £8
CHILLIES, Zanzibar	Good to fine bright	30s a 31s
per cwt.	Ordinary and middling	25s a 29s
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	9¾d a 10d
	Ordinary dull to fair	8d a 9½d

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTATIONS
,, Stems	,, fresh	1¾d a 2d
COCULUS INDICUS	Fair	7s a 8s
GALLS, Bussorah & Turkey blue ℔ cwt.	Fair to fine dark blue	52s 6d a 60s
	[cwt. Good white and green	46s a 55s
GUM AMMONIACUM per	Blocky to fine clean	15s a 40s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts, part yellow and mixed	£13 10/ a £14 10/ £10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£ 7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden per cwt.	Sorts	65s a £5 12s 6d
Ghatti	Fair to fine pale	42s a 85s
Amrad cha	Good and fine pale	80s a £7 5s
	Reddish clean	40s a 73s
ASSAFŒTIDA, per	Clean fair to fine	30s a 38s
cwt.	Slightly stony and foul	22s 6d a 26s
KINO, per cwt.	Fair to fine bright	42s a 46s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 95s
OLIBANUM, drop	Fair to fine white	45s a 55s
per cwt. ,,	Reddish to middling	32s a 44s
pickings	Middling to good pale	9s a 11s
siftings	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, fair to fine sausage		2s 2d a 2s 5d
,, ,, Ball		10d a 1s
unripe root		1s 8½d a 2s 1d
liver		

FROM CALCUTTA AND CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
CASTOR OIL, 1sts per oz.	Nearly water white	3½ a 4¼d
2nds ,,	Fair and good pale	2⅝d a 3d
3rds ,,	Brown and brownish	2¼d a 2⅝d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	2s a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 8½d
	Fair to good black	1s 10d a 2s 2d
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
ALOES, Cape, per cwt.	Fair dry to fine bright	25s a 29s
,,	Common & middling soft	8s a 24s
Natal	Fair to fine	35s a 40s
ARROWROOT Natal per lb.	Middling to fine	3d a 4½d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.	QUALITY.	QUOTATIONS.
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	63s a 67s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	32s a 32s 6d
	Pressed	27s a 28s
Block [per lb.	Good	21s
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 5d a 3s 6d
Medium	83's a 95's	2s 1d a 2s 4d
Small	100's a 160's	1s 4d a 2s
MACE, per lb.	Pale reddish to pale	1s 9d a 2s 10d
	Ordinary to red	1s 1d a 1s 6d
	Chips	1s 2d a 1s 3d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	12s 6d a 14s 6d
medium	,, ,, ,,	12s a 13s
small	,, ,, ,,	8s 6d a 10s 6d
Flour [per lb.	Good pinky to white	8s a 9s 3d
TAPIOCA, Penang Flake	Fair to fine	1½d a 2½d
Singapore	,, ,,	1¾d a 2⅝d
Flour	,, ,,	1¼d a 1½d
Pearl	Bullets, per cwt.	15s a 17s
	Medium ,,	16s 6d a 17 6s
	Seed ,,	16s a 17s 6d

CEYLON AGRICULTURAL SCHOOL.

ANNUAL REPORT: NOV. 1886.

The Colombo School of Agriculture was opened in January 1884, and hitherto there has been no public prize day, the Director desiring that the school should be established on a firm basis before any public attention was drawn to it.

Now, however, that the training of the first batch of students has been completed, and very satisfactorily completed, the prohibition of publicity has been removed, and on behalf of the students I welcome your Excellency very heartily to this our first prize day, and we thank you, sir, for the great honor you have done us in coming here today.

A short history of the school may not be out of place. It was first proposed by the present Director in 1883, and it was very generally predicted that it would be a failure. It was said that Students who were cadets of the better families of Ceylon would be above working with their own hands at ploughing and other farm operations, while, if students of the lower class were admitted, no practical good would attend the opening of the school. Nevertheless, out of some 80 applicants for admission 28 students were selected and admitted in January 1884, only 3 of whom represented less than 100 acres of land, while many represented very large acreages.

The design of the school was to train these students for cultivating their lands and the lands of their friends by the light of more modern Agricultural knowledge, and, by the use of improved implements of tillage, care being taken in no way to do away with existing native customs but to bring out what was best in them, and to supplement them where necessary with more modern knowledge.

The few poorer students were to be trained for future use as school-masters.

There was at one time an intention to attach this school to Mr. De Soysa's Model Farm, but the Director considered Model Farms expensive and cumbersome, and arrangements were made instead to follow the German system, and to send the students out for their practical work to the lands of private land owners. And here I desire to publicly express our gratitude to Mr. Abeyratne for permitting us to work upon his property.

I am glad also to state that every one of the students now in the school has performed his full share of manual labour shrinking from nothiug, but working pluckily and heartily at the most wearisome details, thus improving their physique and health, and gaining practical knowledge of all operations, from tending buffaloes up to ploughing with their own hands.

The first year's work was theoretical only and was devoted to the ordinary subjects of a High school education, but substituting agriculture, chemistry and botany for Latin and Greek.

The second and third year's work has been both practical and theoretical with book work on the lines above mentioned.

Mr. Charles de Soysa has with his usual generosity given a prize for the best students in Agricultural Chemistry and analysis of soils, for which we thank him heartily.

With regard to the book-work of the school, it has been mainly in charge of Messrs. Charles de Silva and H. D. Lewis, whose services I desire to acknowledge, while the field work and actual Agricultural Teaching has been in charge of Mr. Jayawardene who was trained at Saidapet and who has turned his training to good account.

Our work on Mr. Abeyaratne's land has been heavily handicapped by two bad floods, but, nevertheless, we succeeded in obtaining a proportion of rather more than 12 bushels of paddy for every 9 bushels obtained by the native method, although the native land in competition with ours was the more heavily manured.

Experiments have also been made with various gardens, or dry-land products with a view to checking the wasteful cultivation of such soil-exhausting crops as anu, &c. in chenas. We have found for instance that dholl, which is seldom grown by the Sinhalese, will grow with little trouble in any soil, and it is a most agreeable and nutritious food. It is hoped that the students who leave us tomorrow will spread the knowledge of this valuable food amongst their own people in their own villages.

But I must not weary you, sir, with details. I will now only state that according to the proposal sanctioned by your Excellency, six of the students who are leaving us now will assume appointments next January as Village Agricultural Instructors at Mullaitivu, at Toppur, and at Kanankudah in the Tamil districts, and at Minuangodde, at Panapitiya, and at Bandarigama in the Sinhalese districts. Too much importance cannot be laid upon the success or failure of these young men. The natives of this country are very generally opposed to what they deem new-fangled ideas, and it will require much tact to guide them aright.

For instance they say that our ploughs are too heavy for their buffaloes; it will be for these village instructors to show them that they are not too heavy if the buffaloes are trained to their use. A horse requires breaking to harness, and a buffalo requires similarly training for these ploughs,

And above all it will be their duty to train up the boys of the villages to which they are sent, boys whose minds are not yet rooted into prejudice, to a knowledge which the grown up men may be too proud to acquire.

In this their arduous duty they will be cheered by your Excellency's presence here today, and I am confident that each one will do, if possible, more than his best, feeling that your eye, sir, is upon him, and that your best wishes attend his work.

H. E. GOVERNOR SIR A. GORDON said: You have been good enough, Mr. Green, to ask me to come here today to distribute the prizes to the boys of this school, and I have had great pleasure in accepting your invitation, though I should have had that same pleasure under any circumstances, because it is always an interesting thing to see boys assembled together, and yet more interesting to think, that those to whom the prizes are given, are about to go out into the world, and in their own persons experience the value of the lessons which they have learned: that is the case in any school and at any prize-giving; but the interest is today deeper and more peculiar, because it is not only the boys who are about to leave the Institution, but, it may be said in one sense, that it is the Institution itself which is now, for the first time, going out into the world. (Applause.) Hitherto its work has been confined to that of training; now it remains to be seen what the value of that training has been, and what its results will be on those who leave it and go out to apply elsewhere the principles which they have learned here. Those who so go forth from you today bear with them not only my good wishes, but the good wishes, I am sure, of all the company which is assembled here today. But, as is usually the case, it depends more upon yourselves than on any one else whether those wishes will be realized or not. We may wish you success, but the making or marring of that success is in your own hands. Some of you on leaving this place, go to try novel experiments and have received novel appointments. Now, it depends very much—I do not know that we should be very far wrong if we were to say it depends altogether—on the manner in which those first few students who are leaving this place discharge their individual duties whether this Institution becomes a failure, or whether it proves a benefit—and lasting benefit—to the country. But although those who go to take up these posts are the most conspicuous, and their failure or success will be most marked, do not think that I undervalue the importance of the action of those returning without such appointments to their own homes, and their own districts (Applause.) In some respects, their work is even more important than that of the paid teachers recognized by Government (Applause.), because the influence they exercise will not be the official influence, but simply the influence that their own good sense and their own tact may gain for them. Now, some of those who are educated here, when they go back to their own districts, and live among their own people, and are surrounded by their old associations and superstitions will no doubt forget a great deal they have been taught here and will take up again the old habits and associations which surround them: that is quite inevitable. It is not a thing that can be avoided in case any number of people are going back to their old associations. I mean that you will find that new methods of ploughing, new systems of agriculture are troublesome; that they are unpopular amongst those whom you live, and they will gradually be dropped out of sight and forgotten. That will be the case with some, and it will be a pity, although it is inevitable, but there are others with whom that will not be the case, and I am not sure that some of these others may not do more to prevent the success of our scheme here than those whom I have just mentioned—I mean those who go back

to their own district full of the importance of what they have learned and full of the importance which that learning has given to themselves, and who set themselves above all the people of the country as knowing something better than they, and are prepared to set them all to right and tell them that they are all wrong, and that unless they are listened to, nothing can be done properly, that nothing has been done rightly hitherto, and that they are prepared to shew they are right. Now you may depend upon it that that is not the way in which such influence will be gained: the lessons you wish to be taught will not be learned, and, perhaps, more harm to improved agriculture may result from want of tact and self-conceit than from indolent apathy or the taking again to old habits? But between those two extremes I hope, and I believe, there a will be others who will neither be elated by knowledge little more than their neighbours, nor yet so apathetic as to fall back into the prejudices and superstitions of those who surround them. From them I expect great results, and with tact, patience, care and good humour I have no doubt that you will do much to introduce improvements in agriculture into the rural districts of Ceylon; and in so introducing them you will increase the prosperity, the wealth and the happiness of the people to whom you belong (Applause.) I can conceive no happier destiny than that of those who are placed in a position which naturally confers on them some influence, who should exercise that influence with wisdom, moderation, and in such a manner as to enjoy the esteem and goodwill of those about them and lead them gradually into improvements of which they will see the result. As to those who are going with Government appointments, they too will require to exercise very great care as to the mode in which they perform their duties. Of course, so long as they teach merely in a Government school, they can make the Government school boys listen to them, but if they attempt to teach other people, as I said before, it will depend upon themselves whether they will get listeners or not. They may be like those crying out in desert places, or they may be real leaders of the people; that they may be of the latter is my earnest hope. I trust that in future years, when I, or my successor, who will more worthily fill my place comes amongst you to distribute prizes, that we shall meet here some of those who are leaving us to-day, and that you will then give some account of the experience which you have had since you left this place, and will be able to cheer all those who have taken part in this Institution and its management with the intelligence you give them of the manner in which your mission has been received by those among whom you have gone. Wishing you every success, not only as agriculturists but as individuals, I now beg to repeat the pleasure I have had in distributing the prizes. (Applause).

Mr. A. M. FERGUSON made some practical remarks with regard to the cultivation of dholl, and alluded to the grand physique of the men of Northern India, as a result of living on dholl porridge, dholl being largely cultivated in that part of India. He referred in eulogistic terms to the irrigation works initiated by H. E. the Governor, and went on to say that the fish in the globes around the room suggested to him that those in authority who had the power to initiate experiments should endeavour to wipe away from Ceylon the reproach of knowing very little about the cultivation of fish. In Java there were two harvests, one of fish, and another of grain, and the fish harvest was fully equal to the grain harvest. He mentioned this because fish was a very welcome addition to the table and there was no possible reason why they should not be largely cultivated in Ceylon, for it was really a part of the great science of agriculture.

BROKERS' REPORT ON CEYLON PRODUCTS:

COCOA, RUBBER, AND ALOE FIBRE.

(*Extract from letter from Mr. J. L. Shand to P. A. Ceylon.*)

In the box which I have packed ready for you and which I hope to send in a few days by Mr. W. Saunders. there is a parcel of several best Trinidad varieties of cocoa and also three samples drawn in London with valuation attached. Mr. Pink, who is a great cocoa authority and who is reporting upon the cocoas in the Exhibition, thinks Ceylon is making a mistake in copying the West India mode of preparation. He says the bright colored beans which Pallekelle used to send command a special market both at home and on the Continent. He considers we should continue washing and he values Wariapolla unwashed considerably lower than the same mark washed. He also thinks that the value of produce has not been increased by the introduction of new kinds of cocoa. External appearance goes for nought in the trade and the stoppage of fermentation at the proper time seems the secret of success. He considers Ceylon cocoas will never reach the height which some of the large full West Indian beans fetch, but I pointed out to him that this might be only a matter of age of trees. He says plainly that Ceylon is not sending as good a marketable colour as it did a few years ago and he recommends striving for the brighter colour.

I was in the City yesterday with one of the largest South American cinchona brokers who showed me by his books the days when the unit of sulphate of quinine was worth 2s. There has been a little activity in the market this week, but stocks must fall before prices rise much. The cultivated Bolivian bark which generally yield from 4 per cent to 6 per ct. of sulphur of quinine are what the trade look to most as the future source of supply. There is no belief in the very large quantity coming from Java and plenty of room for from 6,000,000 to 8,000,000 lb. of good Ceylon bark annually and considerable rise in prices should Ceylon exports fall to this figure, is the general verdict of the trade.

I enclose you two reports upon samples of the aloe fibre sent by Mr. Henry Brown and upon Wariapolla Ceylon rubber. The three samples of rubber were all taken from the same piece.—The coffee market continues firm and there is expectation of considerable further improvement in prices.

Patry and Pasteur present their compliments to J. L. Shand Esq. and beg leave to hand him a report on and valuations of the following samples of Ceylon Rubber:

1.—Fairly well cured and worth today 2s per lb.

2.—Badly cured and would be somewhat difficult of sale, worth say 1s 3d to 1s 6d according to position of market and buyers' requirements.

3.—Low, dirty and inelastic; badly cured and false packed value about 6d per lb.

38, Mincing Lane, 28th October 1886.

38, Mincing Lane, London E. C. 28th Oct. 1886

J. L. Shand Esq. Ceylon Court, Colonial Exhibition.

Dear Sir,—We have submitted your sample of aloe fibre to experts, who report upon it as follows:—The sample is of good quality and well prepared, and if the bulk prove equal to this, it should find a ready sale.

The present value is about £20 per ton. Great care must be taken to send it home perfectly clean *unentangled* and as long as possible.—We are, dear Sir, yours truly.

(Signed) PATRY & PASTEUR.

P. S.—We enclose our reports on rubber samples.

PLANTING IN CEYLON: SCOTTISH TRUST AND LOAN COMPANY OF CEYLON, LIMITED.

We are indebted to the local agents Messrs. Cumberbatch & Co. for a copy of the Report for the year ending August, 1886:—

Capital, ...	£250,000
First issue (fully subscribed)	£150,000
Of which paid up, ...	£45,000

The Directors beg to present their Ninth Report to the Shareholders, being for year to 31st August 1886. Since last Report the price of Coffee has materially improved, and Ceylon Tea is steadily maintaining the favourable promise of former years, but owing to the shortness of the Coffee crop, the heavy fall (50 per cent.) in the price of Cinchona, and to the fact that the Tea Plantations on the Estates in the Company's hands are not yet of sufficient age to give substantial returns, the Directors are of opinion that it would be in the best interests of the the Company to retain rather than to distribute the balance at the credit of Profit and Loss Account.

The Directors have to explain that owing to the want of full information, at the time of making up last year's Accounts, as to the apportionment of the produce of the different crops and years they were led to include in the Estate produce on hand and *in transitu*, at the end of 1884-85, a considerable quantity of Cinchona which really belonged to the crop of 1885-86. The prices at which the produce was valued in the last account were fully realized, but the error regarding quantity requires a re-adjustment of Accounts by taking the sum of £2,560 6s. 7d. out of the balance of Profit and Loss at 31st August 1885 and placing it to the credit of the Estates for the year to which the present Accounts refer. The balance therefore of £6,805, 8s 6d at credit of Profit and Loss at the end of last year must be reduced to £4,245, 1s 11d.

The Company's Estates being now thoroughly in hand, there has been no difficulty in determining what produce belongs to the year 1885-86, and care has been taken, as on the former occasion, to adopt a safe basis of valuation. Of the £4,651, 2s worth of produce stated as on hand or *in transitu*, £3,321, 2s has since the close of the Account been satisfactorily realised.

The net return from the Company's Estates for the year is £2,764, 13s 9d, as against £3,354, 19s 6d for last year (which is the corrected return after deducting £2,560, 6s 7d of crop over-credited as above explained). Had the price of Cinchona not fallen so considerably, the return for this year would have shown a considerable improvement over that of last.

The Company have now 863 acres of Tea under cultivation, and 177 acres more are prepared for planting. The Directors have ordered the erection of the Company's first Tea factory, which will serve for two of the estates, Annfield and Rahanwatte, from which some crop is expected during the current season.

The interest on mortgages in arrear last year has been paid up. Of the £1,723 19 9d. Interest in arrear at the close of the account, £820 14s 11d. has been either paid or provided for to the satisfaction of the Directors. Payment of £487 10s. of the balance, which is all due by one estate, has been deferred by arrangement until Tea production commences,—the Proprietors having undertaken to expend at least this amount in Tea extension,—and the remainder is being gradually paid off by consignments of produce to the Company's Agent in London.

Sums amounting to £10,148 18 6d. have been received during the year in extinction and reduction of Loans, and of the five remaining rupee loans the Directors have arranged for the conversion of three into sterling.

The Debentures which the Company agreed to renew at Whitsunday last were renewed at a reduced rate of interest, and the Directors have further reduced the rate for renewals at Martinmas. The Debenture Debt has been reduced during the year from £64,925 to £60,375, and will be further reduced at Martinmas from Cash on Deposit. It will then stand at little more than 50 per cent. of the uncalled Capital.

The Balance at the Credit of Profit and Loss Account is £3,522 5 2
and the Directors propose to carry to Reserve Fund. .. 1,000 0 0

Leaving .. £2,522 5 2

to be carried forward to next account.

Under the rotation fixed by the Directors Mr. Kidston retires from office at the Meeting; he is eligible for re-election in terms of Section 14 of the Articles of Association.

BALANCE-SHEET AT 31ST AUGUST 1886.

Dr.				
Loans made in Ceylon ..			£50,667	14 10
Real Estate at the amount of the Bonds foreclosed ..			42,770	16 8
Tea cultivation—Amount expended on Estates for year 1884-85 ..	£1,286	9 4		
Do. for year 1885-86..	1,192	1 6		
			2,478	10 10
Cash Balances—Royal Bank of Scotland ..	£3,711	9 3		
Chartered Mercantile Bank	651	5 0		
Sums on Temporary Deposit	7,900	0 0		
Ceylon Agents ..	24	13 9		
	£12,297	8 0		
Less—Due Secretary ..	24	10 8		
			12,272	17 4
Balance due by Oriental Bank Corporation, in Liquidation (ex Interest), 5s per £			464	0 5
Interests on Investments and Deposits—Accrued £895 10 1				
In Arrear 1,723 19 9				
	£2,619	9 10		
Less—Accrued on Debentures.. ..	989	2 3		
			1,630	7 7
Value of Estate produce on hand or *in transitu*, as estimated			4,651	2 0
Office Furniture (London).. ..			30	0 0
			£114,965	9 8

Cr.			
Capital—First Issue of 15,000 Shares of £10 each, whereon £3 per Share have been paid up	£45,000	0	0
Borrowed on Debenture	60,375	0	0
Reserve Fund	5,500	0	0
Outstanding Accounts	568	4	6
Profit and Loss Account for Balance	3,522	5	2
	£114,965	9	8

PROFIT AND LOSS ACCOUNT FOR THE YEAR 31ST AUGUST 1886.

Dr.			
Interest on Debentures paid and accrued, ...	£3,440	17	10
Commission to Ceylon Agents,	67	5	1
Commission on Debentures, ...	231	13	0
General Charges, including Office Rents, Auditor's Fee, Outlays in Ceylon etc., ...	231	13	1
Telegrams	23	14	8
Debenture Stamps, ...	8	1	3
Home Salaries, ...	510	0	0
Directors' Remuneration, ...	200	0	0
Postages, ...	12	0	9
Income-Tax, ...	122	18	6
Balance of Profit, ...	3,522	5	2
	£8,370	9	4

Cr.			
Balance at 31st August 1885, £6,805, 8s 6d, under deduction of £2,560, 6s 7d found to be applicable to year 1885-86, ...	£4,245	1	11
Less Carried to Reserve Fund,	3,500	0	0
	£745	1	11

Interest on Investments—					
Received, ...	£3,639	3	11		
Less Accrued at 31st August 1885,	1,756	0	5		
	£1,883	3	6		
Accrued to date,	818	14	9		
In Arrear,	1,723	19	9		
				4,425	18	0
Return from Estates in Company's possession for 1885-86,				2,764	13	9
Bank and Deposit Interest received and accrued, ...				261	9	8
Discount and Exchange, ...				170.	18	
Registration Fees, ...				2	7	
				£8,370	9	4

WIRE TRAMWAY TO CARRY ESTATE PRODUCE.

(*From our London Correspondent.*)

There has been shown to me very lately a drawing which fully illustrates a design for a wire-rope tramway to take down the produce from a Ceylon estate. For certain considerations, it is desirable that that estate should not be named. It is, however, one of many similarly situated as regards difficulty of transport. Its greatest elevation, and that on which the machinery of the estate is situated, is some 1,200 feet above the cart road, while the distance of the curing establishment in which machinery has to be worked is fully three miles from the river where water power to work it is obtainable. Very considerable previous experience has been had by the proprietors of the estate with similar tramways (I doubt that being a proper term) on other estates; but in all such cases the distance over which the wire-rope has to be actuated is very much less, the greatest distance hitherto absolutely worked with, being, I believe, one-and-a-quarter mile only. It was asserted to me that very close calculation, based on the experiences above referred to, shew that fourteen horse-power can be relied upon to give all the motive-power required for the greater length of line, to overcome all its friction, to perform its duty, and yet leave a sufficient residuum of force to work the machinery of the curing house. This amount of power, it is said, can be readily obtained from an overshot waterwheel to be worked by a stream running at the base of the hilly range on the summit of which the estate under reference is situated. The engineer who designed the rope-way shares in my own view that waterwheels are preferable to turbines in this and similar cases. Although the former are not so fully economic in their nett results as the latter, they are less liable to frictional wear in positions difficult to get at for repair as are turbines. It has, therefore, been decided to use the waterwheel. About 8 horse-power, it is determined, will suffice to carry the burdens and overcome the friction to be imposed upon the rope, leaving 6 horse-power available for driving the machinery of the factory. If this design is carried out, as I am assured it will be, and the limits of power assigned shall be found to be sufficient, it would, we think, give great impetus to the use of such means of conveyance on Ceylon estates. But it must be confessed that the spaces between the standards supporting the rope look somewhat alarming. One of these is fully a quarter of a mile, and we all know what a tremendous power would be necessary to stretch a wire rope over that span, quite independently of any load which may be imposed upon it. The catenarian curve, one would suppose, must prove so great that at some point or other between the supports the ground must be touched. We are told that such a supposition need not be entertained; but we shall undoubtedly feel more satisfied than we are when such an assurance has been justified in practice an ounce of which—we proverbially know—is of more value than a pound of theory. The names associated with this scheme incline us to attach weight to the probable efficiency of the design. Should it prove as reliable in practice as is claimed for it, there seems no reason why in the end a system of these rope-ways may not supersede any scheme of subsidiary tramways as feeders for your lines of railway in the hills. There would be a fine opening for some of your independent engineers—Mr. Grinlinton for example—to start a Company to establish lines of such carriers to tap the base of certain groups of hill estates. Subsidiary lines for each individual estate might well remain in the hands of their owners. If three miles prove capable of being worked by 8 horse-power, there seems little reason to fear, but that a line of ten miles could be worked between fixed points, and the transference of the boxes as they came down from individual estates to the principal ways could readily be arranged for. There can be no want of water-power at spots to be selected to drive a rope of ten miles, and supposing this rope to start from one of your railway stations, and take a course up a valley on the hillsides of which numerous estates are situated, such a line would prove to be of incalculable benefit to estate owners, and must pay well the enterprizing men who may start it. This suggestion is thrown out for what it may be worth; but it is due to a careful inspection of the design referred to, which is guaranteed to bear a practicable character. Of course, the value or otherwise of such a suggestion must be dependent upon such a guarantee being demonstrated by actual experience to possess worth. Presuming that to be established, however, it seems to those of us who have considered the question that there will be an opening of great public and private value for some of your public-spirited men to take up. It is probable, we hear, that the estate line named will be working before the first six months of 1887 have expired, and necessarily it will provoke intelligent observation. Upon the result of that observation should depend the decision whether the more extended application of the system might not wisely and with profit, be undertaken in Ceylon.

THE TEA PLANTER'S MANUAL.

Mr. Owen, who is already well-known to those engaged in tropical agriculture from his Cinchona Planters' Manual, has now written a similar treatise* on the present leading Ceylon industry, which is—though written principally with regard to the conditions existing in that island—likely to prove very useful to all tea planters. He has been well treated by his publishers, who have issued his book in a neatly printed and handy form, at a moderate price; the index and table of contents, too, appear full, so far as we have had occasion to use them. Amongst the attractions of this volume are two lithographed plans of factories which may be commended as the subject of a happy dream to the beginner in tea; they are said in the advertisement to be "worth the whole charge," and, to do our little fault-finding at once, we may pronounce them very elegant, but totally unsuited for a work of this kind. The first is to be built of iron, and the second of wood; supposing water power available, and therefore no steam power wanted, and the requisite timber procurable on the estate, the cost, including machinery, is, respectively, R32,000 and R22,000. "There are also," we are told, "numerous little details in the fitting up of a factory for which it is quite impossible to estimate accurately." Now Indian planters will willingly admit that Ceylon

estate buildings are generally a credit to their architects, and an example to be striven after, but the sums we have named are simply impossible to the ordinary cultivator, who, it must be remembered, will, in perhaps the generality of cases, have to also provide an engine. It would have been much more to the purpose if the author had given us half a dozen plans of less costly factories, and of existing buildings adapted to new needs. Some very fine tea houses—notably those on the Carolina and Mariawatte estates,—have indeed been erected, but it is improbable that imitators desirous of spending equally large amounts would omit to get professional advice, or copy a plan out of the book we are reviewing without attention to local circumstances. The vast bulk of Ceylon tea making is, however, done in more modest edifices.

Mr. Owen tells us that his "Manual" is more intended as a compilation of the opinions of others, and the results they have arrived at, than an original work. He has, however, done well in collecting this information from various scattered papers, and has brought it up to date. The Ceylon tea enterprise, which has recently made such remarkable strides, dates—commercially at least—from 1841; the Dutch are said to have previously attempted it, and failed. Messrs. Worms manufactured some tea about that date, with the assistance of a Chinaman, at a cost of about £5 per lb. but their estates, now owned by the Ceylon Company comprise a large area under tea. Coffee, however, paid, and, except in phenomenal cases, still pays better than tea, so until the terrible inroads of leaf disease and other pests made planter despair of pulling their trees round, little attention was paid to any other product. It will be in the recollection of readers of Mr. Owen's previous work, that the greatest difficulty was experienced in inducing Ceylon planters to believe that the cultivation of cinchona was worth attention as a commercial speculation. In 1867 only 10 acres were planted with tea; twelve years later this had increased to 6,500 acres; but there are now said to be 116,000 acres opened, including old coffee land replanted, and it is confidently predicted that this will be doubled in a few years. The total consumption of the world is said to have been 350 million lb. in 1885; two-thirds of this was taken by Great Britian, and it is worthy of note that the quantity of Indian and Ceylon tea in this proportion, has risen from 3 per cent. 20 years ago to 39 per cent. This loss has been borne by China, and it certainly looks—in the absence of any disposion on the part of the Chinese to mend their ways—as if the anticipated increase of Ceylon to 30 million lb. in 1888-9 would result in a further falling-off of the demand for the China varieties. The advantages possessed by Ceylon as a tea-producing country are naturally laid stress upon by Mr. Owen; in some respects it may be doubted whether a long enough trial has been given to establish these beyond dispute; however, the hill districts are certainly healthy, and the railway to Nanuoya (on the occasions when it is open for traffic) is a great convenience; the system of roads throughout the planting districts is on the whole above the Indian average. As to the low country, we are told that the principal new district, the Kelani Valley, "though very hot, is not specially unhealthy; residents have, of course, to take care of themselves, so that exposure to heat may not result in fever, but in general healthiness these districts compare most favourably with the plains of India." This is as it may be, but we have heard that residents in the Kelani Valley consider it imprudent to stay there more than three months without a change.

In selecting land for tea in Ceylon, the investor has two courses open to him: he may either purchase abandoned or semi-abandoned coffee land with a view to replanting it, or he can take up a block of forest in the low country; little forest remains in private hands at high elevations, where all Government lands is reserved. Tea has been found to thrive from a little above sea level to 6,000 feet, and taking one thing with another the profits seem about equal. At low elevations a type of plant closely approaching indigenous tea should be selected, and in the hills a hardy Assam hybrid. Under no circumstances does Mr. Owen recommend the China plant. The advice given respecting nurseries, manuring, manufacture, and the every-day working of a tea estate will we think, be found generally interesting and useful to planters in search of information on these matters. Clean weeding is of course insisted on; it is not usually adopted, for some reason, on tea estates in India, but it has been found the best system with coffee, and is undoubtedly the cheapest; the Assam plan is to grass-knife down the weeds, and then trench and bury in; it seems an unsatisfactory proceeding and likely to exhaust the soil, but it gives excellent results, and no amount of argument is likely to induce a change. Shade of all kinds is found injurious to tea, more especially that afforded by cinchona trees, which perhaps partly accounts for the extirpation of these trees which has been going on in the island. Some attention has recently been drawn to an alleged exception to this rule in the case of the "sau" or *albizzia stipulata*, but it does not exactly appear how it acts; there seems to be no doubt, however, that tea in its vicinity is in some way benefited; it is a quick grower, and is often planted with coffee. When it becomes necessary to renovate the soil, either cattle or artificial manure can be used; there can be no doubt that the former is infinitely the best, and if the amount said to be sufficient for a tree, both by the editor of the Tea Planter's "Vade Mecum" and the present author, namely 7 or 8 lb., is really so, it ought to be universally adopted. We believe, however, that on the most largely yielding estates considerably greater quantities are applied. Castor poonac seems to be the best artificial fertiliser, as far as experiments go at least, as a plot manured with 24 cwt. gave 961 lb. of tea to the acre. The art of manufacturing tea must be learnt practically; in his chapter on this subject Mr. Owen gives a good deal of instruction as to what to aim at and what to avoid, which is well worthy of attention. As regards packing and shipping, the leading rule is to send in as large breaks, and as few varieties as possible. A tea "account sale" is an even more distressingly complicated document than one of coffee, which is saying a good deal, but certain fixed charges mount up if there are several lots to be dealt with. Nearly all tea-house work is now done by machinery, and in chapter 9 will be found some account of the machines chiefly used in India and Ceylon, and an appendix contains instructions as to the care of boilers, taken from the *Indian Tea Gazette*. Chapter 10 gives estimates for opening an estate and bringing it into bearing. It is somewhat difficult in India to check this, and some of the charges more especially for the first year's weeding, usually heavier than afterwards, appear rather small. No doubt, however, every care has been taken to get correct information. A capital of R58,000 is apparently required for 200 acres; at the end of five years, supposing a yield of 350 lb. per acre all round to be obtained, and no manuring to have been necessary, R40,600 would be still outstanding. Of course with more gradual extension less money would have to be invested, as the old fields could be made to pay for the expenditure on new clearings, but probably 200 acres is as little as it is usually profitable to put up machinery for.—*Madras Mail.*

THE "lime-juice and glycerine" of commerce contains neither lime-juice nor glycerine, but consists of equal parts of olive-oil and lime-water, scented with essence of lemon.—*Indian Gardener.*

CHLOROFORM AND TOOTH EXTRACTION.—Chloroform applied after the extraction of a tooth has a twofold effect: it allays the pain, and arrests the bleeding. The best strength to use is two parts of chloroform in 100 of water.—*Burgoyne & Co.'s Price Current.*

ECZEMA, according to Dr. Wyss, succumbs to resorcin. To allay the itching, he used a vaseline ointment with 10 per cent of resorcin, and the effect was surprising and most gratifying. In every case he had tried it, it had been a success. When the eruption is oozing is the best time to apply this remedy.—*Burgoyne & Co.'s Price Current.*

LIBERIAN COFFEE IN NORTHERN AUSTRALIA.—Mr, Holtze returned from a trip to the Adelaide River last week, and he has kindly showed us a specimen of the Liberian coffee plant taken from the block of land experimented on by Fisher and Lyons. To us it appeared a perfectly healthy plant, entirely free from any traces of the ravages of insects, and Mr. Holtze describes it as a fair average specimen of some 10,000 plants growing on the plantation. He had taken from the plant no less than 320 berries, and as it is only about three years since the plantation was started, and during the major portion of that time it had been utterly uncared for, the bush gives an excellent idea of what might be done by careful cultivation. The whole of the plants are said to be in a fine healthy condition, with an average height of three feet, and many are already bearing luxuriantly. It is the intention of Mr. Holtze to send the plant to Adelaide as a practical proof of what the Territory can do in the way of growing coffee, and if such a result can be furnished by a plantation that is allowed to run wild, we think it is only a fair assumption that the industry would well repay a little care and attention.—*Northern Australian Paper*, Oct. 15th.

JAFFNA: AGRICULTURE AND PUBLIC INSTRUCTION.—This is the season for paddy cultivation in Jaffna. The rains for sowing were rather late this year, and then when the plant had germinated there was not sufficient rain to make it grow. And now the fields are being scorched by heat. This is unusual. The thermometer has risen from 82 to 88 degrees, and the paddy-plant is all over the peninsula, diseased, more or less. The disease is called in Tamil "Kurukkutti. When the fields are sufficiently flooded the diseased plants rot away hopelessly. The only way the farmer meets this disease is by pulling away the diseased plants along with the weeds by the roots, and replanting the vacant spaces. This year whole fields are diseased in this way, and the poor farmers are very busy with extensive replanting. There is another important disease from which the paddy-plant often suffers. We haven't any trace of it anywhere this year. It is called in Tamil "Sental." I have noticed this disease of the paddy-plant at length here, just to draw the attention to it, of the Government, or rather of Mr. Green, the Director of Public Instruction, and of his Agricultural School. Scientific farming is quite unknown in Jaffna, and it is high time now for the Government through its Agricultural School to lead the way for improvements and to enlighten the farming public in different ways. A good service has been lately done to Jaffna by one of its educated farmers by distributing freely the entire edition of his pamphlet on Agriculture. The work is dedicated to Mr. Green. Mr. Green is said to have already perfected his arrangements for agricultural teaching at least in Batticaloa, Trincomalee, and Mulaitivu. Cannot the funds at the disposal of the Director allow him to provide agricultural teachers to each of the following places, viz., Jaffna, Point Pedro, Chavcachcheri, Mannar and Vavuniya Vilankulam at least.—*Cor.*

TEA MACHINERY.—Yesterday afternoon (Nov. 27th) there was a trial at the Store and Works of the Colombo Commercial Company, of the new Cycloid Tea Roller patented by Mr. Hutson, Engineer to the Company. The roller is very simple in appearance and construction being an octagon box with an iron lid which fits inside above the charge of tea, pressing the same down as the rolling proceeds. Apart from this pressure the motion is entirely confined to the table below, on which grooves are scientifically cut to give the leaves the needful twist. The roller is very easily driven, and has already been at work on Hunasgiriya estate with very satisfactory results. It is also moderate in cost. The Colombo Commercial Company have altogether an exceedingly busy place in Slave Island—in great contrast with most coffee stores in Colombo. Mr. Hutson has metamorphosed a great part of the store besides adding new buildings. The steam engines now do other work besides driving coffee peelers, sifters, &c. There is extensive timbe sawing, and box-cutting and fitting machinery—the best in the island we suppose—for tea boxes, of which a large supply is turned out. Bone-crushing is an industry always associated with our Colombo mills; but it was news to us to learn that the bone dust was being shipped from this mill to Europe. Hydraulic machinery pressing cinchona into compact bales was working noiselessly and well; while another Department in its busy as well as noisy (hammering) action, gave evidence of the steady demand which has sprung up for Brown's patent "Dessicator" for tea-drying. This machine and its good work have already been described in our columns, and altogether we congratulate the patentees and the Company on the good useful work evidenced during a visit to their Stores. Of course, coffee is not dead yet in Uva, and a goodly share of the Principality's produce comes to the Slave Island Mills, so that altogether we have here as busy a scene as can perhaps of the kind, now be found in Colombo. Mr. Hutson is becoming well-known upcountry where his skill as engineer and machinist is widely appreciated.

JAVA; AMSTERDAM, Nov. 3rd.—Advices from Java continue to be very unsatisfactory. Sugar plantations and manufactories are being sold at ridiculously low prices, one manufactory at Probolingo being acquired by a mortgagee for the sum of fl. 4,000, what the second mortgagee sustained a loss of about fl. 400,000. Several other manufactories have changed hands at fl. 100 or thereabouts. These facts show conclusively how gloomy the present state of matters is, and how enormous the losses must be in this branch of industry, which formerly yielded large profits. It is not surprising that under these circumstances efforts should be made to secure more effective assistance from the Government than is afforded by the proposed scheme of the Minister. The Netherlands India Railroad Company has further reduced its tariff for conveying sugar by c. 25 per picul. According to statistics just published, it appears that the imports in Holland during last year decreased by 2 1-5 per cent compared with 1884, and the import by 3.25-100 per cent., whereas the general exports have increased by 77-100 per cent., and the transit business by 17.29-100 per cent.—*L. and C. Express.*

WILD-BIRDS PROTECTION.—The destruction and trapping of birds (says the *Singapore Free Press)* of all kinds and sorts is going on as actively as possible, notwithstanding the provisions of the Act in such case made and provided. This should be put a stop to, or the consequences will be serious to the fruit and coffee trees and tapioca and sugar plantations, which represent our agricultural poverty. If insects are allowed to get the upper hand, human as well as vegetable creation will suffer, and therefore, on purely selfish grounds, we hope the Government will urge the Police to carry out the law. Hundreds of birds are snared and shipped on board of steamers homeward bound, whilst the Frenchman in Malacca is said to be shipping his thousands of skins a month. It is no wonder that the traveller in the Malay Peninsula sees so few birds. Where there is nothing for them to eat, the feathered tribes do not care to congregate, and where there is they are shot and trapped. If the gunning tribe devoted their skill to snipe, or deer, wild pig, tigers, or elephants, they might be viewed as useful members of society, but when anything with a feather is indiscriminately sacrificed, massacre becomes a nuisance, and calls for the strong hand of the law to suppress it. There can be no objection to the flying-fox being added to the list of game, as it may help to keep the ardent sportsman from further evil, and a stray pariah dog might help to fill his bag, but birds, in general, should be protected from the devastating guns and blow-pipes of our Eurasian Winkles,

ABYSSINIAN ECONOMIC PLANTS.

Among the vegetable articles of diet of the Abyssinians, the first place is taken by *teff* (*Poa abyssinica*), a herbaceous plant, whose grains are as small as a pin's head; the meal from this forms the bread in general use. A much inferior black bread used by the poor is made from a kind of millet called *tocu so* (*Eleusine Tocusso*), frequenting the low grounds. In addition the roasted seed of the flax plant (*Linum usitatissimum*) is somtimes eaten, as it was by the ancient Romans and Greeks. Another admired vegetable is the flower stalk of the local plantain, called *ensete* (*Musa Ensete*), the fruit of which is dry and unfit for eating. The stem is cooked with milk and butter. It is cut off just above the rootlets, and about two feet high; if old, the green outer coat is peeled off till the white interior shows. It is as tender as a well cooked turnip, with a flavour like the best new bread somewhat underdone. It is an excellent dish, nourishing, wholesome, and digestible. From meal cakes a fermented drink called *bousa* is made.

The coffee grown in Abyssinia is principally sent to Djedda and Upper Egypt; though not of first rate quality, it possesses a special aroma, and is sold at the rate of 16 dollars per *cantaro* of 113 *rottoli* (say 37s per cwt.)

The women of Gurage make mats of the leaves of the *ensete*. The *ecca* of the Abyssinians, a species of asclepiad, produces a tough fibre, used in making cordage and tissues on the Red Sea littoral. The bark of *Calotropis gigantea* afford excellent fibre used for various purposes. The tender leaves newly pulled from the stipa of the *doum* palm are woven into all kinds of matting and basket ware. The powdered seed of a large tree called *berebera* (*Milettia ferruginea*) is thrown into the water to stupefy fish and facilitate their capture. The native dress consists of a large folding mantle and close-fitting drawers. The houses are rude conical structures covered with thatch.

Among the local products figuring in the exports are:—Calves' hides, salted and sun dried; beeswax, chiefly from Gedaref; ivory, tamarinds, ostrich feathers, gutta-percha, from Kassala; gum arabic, mother-of-pearl, leopard skins, about 1,000 annually to India; musk, contained in bulls' horns, to the number of 200 to 300 a year; honey, and tobacco, chiefly from Sanaaid.—*Journal of the Society of Arts.*

CINNAMON AND PADDY (RICE.)

Cinnamon peeling is now in full swing, and will be carried on, weather permitting, into the New Year. All planters are now paying special attention to the make of their Cinnamon, which, in spite of improved make, seems to be still receding in price. Quarterly sales, which conservative old-stagers authoritatively declared would arrest the downward course of prices, have been resumed only to find prices still going down. With the present prices Cinnamon yields but a narrow margin of profit, and if things do not look up, all excepting those who prepare quills of very fine quality will have to throw up the sponge, or cease manufacturing the coarse qualities of Cinnamon like Mr. De Soysa.

I read with great interest the correspondence relating to the alleged remedy for flies in paddy fields. Hulugala Ratemahatmeya too proclaimed his Kerosine oil remedy with the same confidence. It was tried and found wanting. Though I used Kerosine oil, both morning and evening everyday, and failed to stay the plague of flies, yet I was not so unfortunate in its use as Mr. Wickremesinghe, who asserts that the blade and ear that came in contact with the oil blackened and died. I have not much faith in the Kerosine-ashes cure, especially in the proportion of the materials and the intervals between application. Kerosine oil does not retain its disagreeable smell in situations exposed to wind and rain for so cosiderable a period as two days. I will be inclined to have faith in the efficacy of the Kerosine-ashes mixture, if applied twice a day during the week or ten days that the ears are hardening. The flies continue their ravages from the time the ears are forming till the husks of the paddy are too matured to allow of their being punctured—a period of about ten days. If remedies be applied towards the latter period, when the flies have ceased to be able to do damage, their disappearance is too readily attributed to the remedies used. Last season, after all remedies had failed and I had resorted to the old practice of catching them by passing a fan-like contrivance smeared with a prepared sticky substance over the ears, it occured to me that by substituting tar for the prepared sticky stuff, I might so taint the ears as to be avoided by flies. The results exceeded my expectations; but I was not quite certain that the disappearance of flies was due to the tar or to the maturing of the ears, or I might have posed before the public with my "perfect remedy." Through the courtesy of Messrs. Brown & Co. of Colombo, I was favoured with some carbolic powder for experimenting, but it unfortunately reached me after I had establisliied a scare with tar. I shall, however, during next season give both the carbolic and Kerosine powders a trial and report results. With reference to Mr. Jayawardene's letter to the *Observer* anent the attack of caterpillars on the fields under his charge, there is no cause for alarm in their attacks. I too, at one time had my field attacked by a green caterpillar on the leaves, and an orange coloured maggot at the heart of the plant. A free application of fresh ashes, or perhaps the "effusion of time," caused them to cease their ravages. I used the ashes of coconut husks, which are particularly rich in potash. I attributed the attack of worms to the stagnant water in the field, as the attack was during a period of drought when I was chary of letting out the water in the fields as I had not sufficient to replace it, and it stagnated.—Local "Examiner."

THE GROUND NUT TRADE OF PONDICHERRY.

The export of ground nuts from Pondicherry for the season of 1886, has nearly come to a close. A steamer is now loading in the roads, and the last for the current year is expected to arrive in a few days. The shipments up to date amount to 873,302 bags, and the two cargoes yet to be cleared will add about 50,000 more to the total, making in all 923,302 bags. At the beginning of the season we estimated the crop available for export from the districts served by the port of Pondicherry at upwards of a million of bags, and if to the above quantity is added the shipments of three cargoes from Cuddalore, say 85,000 bags, the total number of bags exported will be 1,008,302. A still further addition to this total should also be made for the export in ground nut oil, which, for the nine months ending September 30th, amounted to 15,589 casks, and for the whole year will probably reach 17,500 casks, representing in raw material, about 170,000 bags of nuts, Total export crop therefore may be taken, approximately, at 1,180,000 bags, as compared with 720,000 bags during the corresponding period of the previous year, and 850,000 bags in 1884; the increase being equal to 64 and 39 per cent respectively. Twelve years ago, ground nuts, as an article of foreign export, were comparatively unknown, the small crops produced being eagerly bought up for local consumption. The present trade seems to date from about the year 1875, when 211,470 bags were exported; but the season was quite exceptional; the crops being unusually heavy, and the home rates very high, and, in the following year, 1876, only 72,700 bags were shipped on foreign account. In the next two seasons, 1877 and 1878, succeeding the famine years 1876 and 1877, the traffic entirely ceased, the aggregate exports for the two years amounting to only 609 bags. But, by this time, the value of the nut had become known, not only in France but also in Italy, Germany, and Belgium, and during the two years which followed, large profits were made by all concerned in the trade, owing to the great demand in the continental markets. The following statement

gives the total shipments of ground nuts, and ground nut oil, and the approximate minimum and maximum price per local candy of 529 lb. (English) for each year from 1875 to 1886 inclusive:—

	Bags of Nuts.	Quotations Highest.	Lowest.	Casks of Oil.	Quotations. Highest.	Lowest.
1875	211,470	R. ...	R. ...	16,672	R. ...	R. ...
1876	72,700	...	...	7,278	...	...
1877	216	...	...	5,143	101	80
1878	393	...	...	6,057	96	68
1879	167,179	22½	19	6,060	68	52
1880	281,882	22¾	20½	7,273	76	55
1881	257,803	21	18¾	4,979	68	49½
1882	387,311	19	15	9,942	54	42½
1883	552,847	24½	15¼	8,777	63	42
1884	746,876	23½	19	10,492	64	56
1885	615,558	21	19¼	10,403	67	50½
1886	923,302	20½	14½	17,500	53½	40½

It will be seen by the above figures, that the prices of both nuts and oil have greatly fallen since the first report quotations were recorded. In 1879 the average rate was R20-12-0 per candy for nuts against R17-8-0 for 1886, the fall being equal to 18·57 per cent; and for oil, in 1877, R90-8-0 per candy as compared with R47 for the current year, or 89·48 per cent less. It is evident from these facts that the largely increased production has had the effect of lowering prices, and, judging from the increased cultivation year by year, it would seem that the producer has not suffered any material loss. Pondicherry has obtained the lion's share of the ground nut trade; for the total exports from the whole of British India during the three years ending 31st March 1886, amounted to only 1,533,314 bags, while the shipments from Pondicherry alone for the same period reached upwards of 2,250,000 of bags. It is shown also, by the accounts published of the trade of British India, that the export of nuts during the three official years declined from 534,716 bags in 1883-84 to 507,345 in 1884-85 and 491,753 in 1885-86; the fall being equal to 5·40 and 8·74 per cent, respectively, whereas, as we have already stated, the shipments from the French port for the same period increased by 39 and 64 per cent. The statement below shows the freight engagements (in sterling per ton of 20 cwt.) for Marseilles for the last eight years, *viz.*, from 1879 to 1886 inclusive:—

	Highest.	Lowest.	Avge.		Highest.	Lowest	Avge.
1879	£3-5-0	£1-12-6	£2-4-6	1883	£3-0-0	£2-10-0	£2-13-9
1880	3-7-6	2-15-0	3-2-9	1884	2-10-0	1-12-6	1-19 9
1881	3-5-0	2-17-6	3-0-3	1885	2-10-0	1-10-0	1-17-9
1882	3-2-6	2-17-6	3-0-6	1886	1-16-3	1-11-3	1-14-0

The French home prices have ruled very low throughout the season and notwithstanding the greatly reduced rates of freights, shippers have never ceased grumbling, even from the commencement of the year, when the nuts were quoted at R14-0-0 per candy. The trade is of vital importance to Pondicherry, forming, as it does, nearly three-fourths of the total exports of the port, and giving employment—apart from the cultivation—to several thousand people. The crop prospects for 1887 are excellent, far surpassing any previous season, and the area planted is largely in excess of last year's sowing.—*Madras Mail.*

ALL vegetables, when cut, may be kept fresh by putting the stalks into water. Servants generally insist on immersing them, which favours decomposition. Parsley, in particular, can seldom be guarded from a watery grave. Carrots, turnips, and the like, if placed in layers in a box of sand, will keep for many weeks.—*Indian Gardener.*

CINCHONA.—A local contemporary announces that the Government of Madras is apparently about to withdraw, partially, from competition in the growth of cinchona, and that at the request of the Director of Cinchona Plantations, the Collecter of the Nilgiris has been instructed to dispose of the Kalhati Gardens by the end of the year. This is a step in the right direction, and we hope before long all Government Cinchona plantations will be disposed of, retaining only such, if necessary, upon which it is intended to conduct special experiments.—*Indian Agriculturist.*

CEMENT.—A French authority gives the following recipe for transparent cement. The advantage claimed is the absence of the slightest yellow tinge, so that the addition of the cement is imperceptible, while it possesses an extreme degree of tenacity. Mix in a well-stoppered bottle 10 drachms of chloroform with 12½ drachms of non-vulcanized caoutchouc in small pieces. The solution is easily effected; when finished, add 2½ drachms of mastic, and let the whole macerate from eight to ten days, but without heat. A perfectly white and very adhesive cement is thus produced.—*Indian Agriculturist.*

ROOT HAIRS.—That the largest portion of the liquid used by the growing plant makes its entrance through the roots, from the soil, is a well-established fact; but those parts which are the most active in the absorption of this food material in solution, were for a long time not so clearly understood. By careful experiments and microscopic investigation it is found that the extreme tips of young roots are about the only portion which take little or no part in this work. A short distance back from the growing points, on nearly all growing roots, may be seen with the aid of a microscope a large number of minute slender bodies extending out in all directions from the surface of the root. These thread-like structures are not inaptly called root hairs, and consist of sac-like protuberances, as outgrowths from the epidermis or surface cells of the root. With the naked eye they are not easily seen, but their presence may be inferred from the manner in which they cling to the particles of the soil, when a young root is lifted carefully from the earth in which it was growing. This power which they have of fixing themselves to the grains of earth is very great; so that, when a plant is taken, violently from the soil, large portions of these delicate hairs are broken from the roots and retain their attachment to the soil. As the root grows along in the earth new hairs are produced, while those behind perish as the root becomes woody, and a dense, non-absorbing, protecting epidermis is formed; so that the active life of a single hair is of short duration. The office of these hairs must have already suggested itself to the reader. By means of these prolongations the greater part of the absorption takes place, though the newly-formed surface cells are also active.—B. U. HALSTEAD, in *Gardeners' Monthly.*

POROUS CARBON.—A report of a new system of sewage in operation at Southampton, published in last Saturday's *Times*, reveals the existence of a certain mineral powder found in Devonshire and known as porous carbon, which, according to the report, possesses remarkable properties. This substance is said to be rich in available iron, alumina, and carbon. By treatment the metals are rendered soluble, and then the mixture is a wonderful chemical precipitant. It is mixed with the sewage in the proportion of 2½ to 3 grains per gallon, whereupon it at once destroys all odour and precipitates and oxidises all solids and organic matter. The effluent water is rendered almost perfectly pure, while the precipitate "mixed with road scrapings" finds a ready sale to farmers, who fetch it away for manure, and pay 2*s.* 6*d.* per ton for it. If this be true, the sewage problem is solved, and for the solution we are indebted to Mr. W. B. G. Bennett, engineer, and Mr. Arthur Angell, chemist. The virtues of the porous carbon are not limited to its use as a precipitant. "In addition to its chemical properties," says the *Times*, "it possesses the mechanical property of adding to the lightness and porosity of the soil by reason of the presence of the particles of earthy carbon." There are several points of mystery about that sentence, but the chief one lies in the main statement. With only two or three grains of the carbon to the gallon of sludge there would only be about half an ounce to the ton of manure; unless this acts after the manner of a ferment, which would be very wonderful indeed, it is difficult to understand how much a minute proportion can have much mechanical influence on the millions of tons of earth which form the soil of a ten-acre field.—*Chemist and Druggist.*

DELI PLANTING TOBACCO.

(Translated for the "Straits Times.")

One mischievous drawback to planting life in Deli has always been the recurrence, year after year, of incendiarism in tobacco sheds on estates; several of the latter being continually marked out for the purpose by fire-raisers. These fellows always turn out to be Battaks exclusively, who take to this pastime not from any grudge against the planters thus singled out, but from causes which throw light upon certain peculiarities of Battak character. The available information shows that the Malay rulers who domineer over the Battaks treat them with indifference, harshness, and the utmost unfairness. The feeling of resentment at injustice done is so highly developed among these people that they turn to account every means that serves their turn to gratify it, no matter how strange the method may be to European ideas. Burning down tobacco sheds happens to be one favourite means to gain this end. They know, too, that incendiarism is a highly effective way to bring pressure to bear upon the planters, owing to the burning down of tobacco sheds at certain seasons, meaning nothing more or less than the destruction of the whole crop gathered in. They have now taken to destroying the standing crops as well, thereby making the tobacco growing business very risky indeed, all through the fault of the authorities in not taking stern measures to counteract the evil. The authorities burden the planting community there to the utmost limits with many and heavy taxes but afford them scant protection against evil-doers. The prospects in store for the planters are impoverishment by attacks of Achinese marauders, the burning down of their tobacco sheds and the destruction of their standing crops.

DYEING AND CALICO PRINTING IN INDIA.

BY J. BELMONT.

RED AND SHADES OF RED.—The Indian dyers, in using cochineal, employ alum very largely as a mordant, the result being a crimson. They employ a yellow dye, such as "harsinghar," together with cochineal, to get a good scarlet.

I have previously stated that cochineal finds a great competitor in coal tar reds. This is a great pity for the future of India, the country being so well adapted for cochineal production.

A shrub called *Grislea tomentosa*, belonging to the natural order *Lythraceæ*, yields a red dye. This shrub is not known outside India. It grows to a height of ten feet at least, and has long spreading branches. The bark is smooth, peeling off in thin scales; the wood is pale nut-brown, and is used for fuel. This shrub flowers between February and April, and the petals contain a red colouring which is of no little importance. It is found in many parts in India and is largely used in the Punjab for dyeing silk. It is valued at about two rupees per cwt.

Another shrub, *Lawsonia inertius*, yielding a red colouring mattter, is found in several parts of India. The Hindus call it *henna*. Dr. Balfour says that this shrub is the camphire of the Bible and is mentioned in the Song of Solomon. It has small leaves, and greenish yellow flowers of great fragrance. The Greeks, Arabs, and the Turk, Indian, and Persian Mahomedans, often present the flowers to their friends.

There is no doubt but that the camphire, or as it is also called in English, the cypress shrub, has been used for many centuries as a dye. It is fairly fast and is employed by the Mahomedan women as a dye for their nails and their hands and feet, the colour given being a reddish orange. By merely steeping the leaves in water, a light reddish-brown colour is obtained, which, applied to cloth mordanted with alum, is fairly permanent. Acids destroy the colour, but alkali and infusions of astringent vegetables deepen it. Camphire is largely used as a hair dye. Sometimes myrtle leaves are mixed with it, the resulting colour being a purplish black. It is sold in India at five rupees per maund (82 lb.)

One of the most valuable red dyes known to the Indian dyers is the Indian madder. There are several varieties of the plant, the roots of them all yielding a colouring matter. The plant is found in several parts of India. One species (*Morinda bracteata*) is a small tree with large shining leaves. It is known to the natives under various names, comprising *hurdi*, *huldi-Kunj* and *ronch* in Bengal, *mhan-bin* and *yaiyoe* in Burmah, and *Yahooganha* in the Sinhalese language. The bazaars of Bengal sell the wood, which gives a bright yellow colour. The native dyers use it very largely. Another species of Indian madder is the *morinda citrifolia*, called by the Hindus *al*. This tree has also smooth shining leaves and white flowers. It is found in several places outside India, including Queensland and several islands of the Pacific. In Madras it is very plentiful. The bark, especially that of the root, yields a red dye, which, fixed with alum, is fairly fast. Most of the red cotton turbans worn in Madras are dyed with this species of madder. Many uses are made of this dye. It is largely employed in dyeing handkerchiefs, cotton cloth, carpet thread, and in Calico printing. The root is usually sold cut in small pieces. This colouring matter is very cheap and plentiful. The best kinds can be purchased for 8*s*. to 10*s*. per maund (82 lb). The cultivation of this plant does not appear to pay in some parts of India, and its price has declined to a very large extent. At one time it was sold at the following rates:—The thinnest part of the root (bhara), twenty rupees the maund the middle part (jharan), ten rupees the maund, and the thickest or upper part (ghatiya), nine rupees the maund. The prices are now eight rupees, four rupees, and two rupees respectively. It is thought in India that European dyers would largely use this colouring matter if they were only better acquainted with its properties. Many of the Indian dyers use it along with more expensive dyes for producing reds. The plant after being dug up, is sorted into three qualities, and packed into bags. It is sold to the dyers in this state, and they extract the colouring matter when required.—*The Dyer and Calico Printer.*

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special Letter.)

COWS AND MILK—HOGS—MISTLETOE.

PARIS, Nov. 6.

M. Nicolas is a wealthy wine merchant in Paris, and has forty depôts distributed over the city for the retail sale of his wines. Later we shall see how he has utilized these. Like many commercial gentlemen he desired to occupy himself with farming: so he purchased an estate of 1,200 acres at Chaumes, thirty miles from Paris in the department of the Seine and Marue. The estate cost over half-a-million francs; it consists as a rule, of poor and cold clay land; about 270 acres were wooded, and 530 had to be re; claimed. The remainder were worn out from exhaustive cropping. Reclaiming, draining, road making and building suitable offices, were the first tasks undertaken. M. Nicolas having put his hand to the plough, never looked back. The soil requiring to be brought into a state of tilth and heart, a three course rotation was followed. This permitted the land to be cleaned, divided and fertilized. Manures had to be purchased, and these comprised the street-sweepings of Paris, farmyard manure, Peruvian guano, superphosphates, marling and limings. Lucerne is grown on a separate part of the estate; all the cereals are cultivated in lines. To rapidly ameliorate a soil without investing considerable capital in manure it was indispensable to maintain numerous live stock, but in what end keep the latter? What speculation would bring in tangible profit? It was in studying this phase of the question, that M. Nicolas decided to become a dairy farmer, and utilize his forty wine depôts in Paris, for the sale also of the milk. It may be remarked here, that the generality of public houses in Paris, now sell milk by the glass from capsuled

special bottles. M. Nicolas commenced with 12 cows; in 1878 he had 22; in 1883, 210, and at present, he has nearly 300. He confines himself to one race—the Normand. It is this breed which is peculiar to the rich pastures of Normandy, and that yield the famous Isigny and Gournay butters. The Normandy or "Cotentin" cow is a voluminous animal, and is invariably recognised by her brindled hide. The Cotentin was formerly a good beef-producing cow, but this has now become secondary to the milking quality —some cows yielding from 24 to 32 quarts daily—which is of course exceptional.

The cows are purchased always in calf in Normandy and kept for two years. Before being introduced into the general shed, they are placed during four or five weeks, in a little, special farm called the "quarantine." This precaution has completely prevented the introduction of the foot-and-mouth disease. Eight quarts of milk is the average daily yield of each cow. The morning milk is placed in wrought iron pans, plunged all the day in marble troughs, through which runs a stream of fresh water. The cows are a second time milked at noon. At five in the evening, the two milkings are mixed, submitted to a cooling process and poured into special glass bottles—with name of farm engraved thereon,—of ¾ of a quart to ½ quart each, hermetically closed and forwarded to the central depôt in Paris to be distributed to the branch depôts, and then to clients at their domicile at 14 to 16 sous the ¾ quart, following season. The general expenses amount to one-third of the selling price.

M. Nicolas delivers from 1,300 to 1,600 quarts of milk daily in Paris, and he aims to secure uniformity of composition in butter caseum and sugar. A leading chemist analyses samples of milk, and once a week the analysis is published in a leading city journal. The sheds and dairies are not only models of care and cleanliness, but the soil is also studied for the cultivation of the forage and the application of fertilizing agents. The scientific history of each field is kept and the special plant-food in which it is deficient, supplied. About 24 tons per acre of farmyard manure, specially azotised is the average applied. Vast quantities of cake are consumed. The action of each commercial manure on the various plants raised is recorded as well as the influence of the food on the general health of the stock, and in the production of milk. M. Nicolas keeps his farm expenditure with the same precision that he bestows on his wine transactions. The capital expended, represents about 480 fr. per acre, and the annual sales of the milk, amount to 350,000 fr.: that, which leaves a handsome margin for profit. M. Nicolas believed that with scientific aid united to ordinary commercial exactitude, it was possible to pursue practical farming economically and profitably, and he has succeeded.

Professor Holdefleiss of Breslau, makes cows contribute to their own dietary by employing skim milk in the rations to the extent of four to eight quarts daily even if the milk be acid. In distillery grains, cows absorb a much superior quantity of Gactic acid. The influence of this skim-milk diet tells most favorably on the richness and nutritiveness of the yield of milk. One-and-a-fourth quart of skim milk contains 46 grammes of albumen, 63 of carburets, and 3 of fatty matters. By judiciously combining the usual feeding stuffs the farmer in employing skim milk could economise in the matter of purchased food. M. Holdefleiss gives as a daily type ration, 8 to 11 lb. of hay; 40 lb. of sliced mangolds; 8 to 11 lb. of cut straw, chaff and issues; 5 quarts of skim milk and 2 lb. of oil cake. These proportions can be modified following circumstances.

The Comte de Bessenitz's experiments on fattening hogs, point to very practical conclusions. The animals were fed on crushed maize and cooked potatoes, made into a mess with boiling water and butter milk, but given cold. Others had crushed barley and rye, with cooked, mashed potatoes wetted with butter milk or scullery wash. The results proved that maize was more favorable to hog fattening than the same quantity of barley and rye; and further that it is more profitable to diminish the cereals and to augment the quantity of potatoes in the feeds.

Professor Wilckens of Vienna after a long series of interesting statistics, and Lootechnic comparisons, arrives at the following conclusions:—The age of a bull has no determining influence on the sex of the progeny. On the contrary, in the case of cows and generally young ones, their early calves are females, while with regard to older cows the contrary is observed; also rich feeding *tends* to produce female, and the poor dietary male calves.

It appears that the "Mistletoe bough," though pretty in song and story, is not at all popular in Normandy, where it is a veritable plague in the apple orchards, although it is profitably exported to England. A deputy is to introduce a Bill into Parliament, making the extirpation of mistletoe compulsory, as such also exists in the case of May bugs, &c. Birds and notably thrushes are very partial to the berries of the mistletoe and they are the agents which propagate the parasite. If the branch, on which the parasite commences to sprout, be not cleared effectually of the nuisance nothing can extirpate it later, save the amputation of the branch. A law-suit is pending to decide if a farmer who keeps poplars, on which to grow mistletoe for the London market, can be allowed to continue to keep up that nursery for contaminating orchards in his vicinity.

ANCIENT HINDOO PHARMACY.

From a paper in the *Archiv der Pharmacie* we extract the following interesting notes on medicine and pharmacy as practised by the ancient Hindoos. This race, it is well known, presented high intellectual attainments, which, together with the fact that Indian fauna and flora are peculiarly rich, is probably the reason why they have left in their writings distinct traces of intimate acquaintance with the science of medicine. In the Vedas, notably in Rig-Veda, Samu-Veda, and Atharva-Veda, we have many interesting facts regarding their modes of treatment, and these indicate, what we would expect, that much of the efficacy of the remedies employed was attributed to the religious and other ceremonies which accompanied the preparation and administration of physic. The holy Soma, (*Asclepias acida*), for example, had the credit of being the basis of the most efficacious remedies, and it was said to drop from the celestial fig-tree in the Himalayas. The physicians formed a distinct caste, called *Vaidya*, and were esteemed almost as highly as the Brahmins. Migasthems, ambassador of Silencus Nicator (300 B.C.), states, from personal observation, that the Vaidga method of treatment consisted as much in regulation of diet as in administering physic. It is not the case that they derived their knowledge from Grecian sources, for until 327 B.C. there was no direct communication between the two countries except isolated journeys by early philosophers (such as Scylax, about 515 B.C.). There is no mention of the Grecians in the Vedas; but it is possible that knowledge of Hindoo medicine may have come to the Grecians through the Persians. It is noteworthy, too, that translations from the Vedas exist in Tamul, Tibethan, Arabic, and Persian works; also through the Tibethan into Sanscrit, in which language medical literature holds high rank.

Pupils of the Vaidga were received at the age of 12, and their curriculum lasted for 5 or 6 years. Their admission, which took place in the winter season and at full moon, was attended with elaborate religious ceremonies. The instruction given consisted of lessons in minor surgery, such as bandaging and elementary anatomy, performed on dummies consisting of various fruits and wax-coated models; and the preparation and proper uses of medicinal agents, which we may put down as materia medica and pharmacy. Under practice of physic, such subjects as antidotes, mental diseases, diseases of women and children, and external treatment had a place; pathology and chemistry were also, to a limited extent, included in the required knowledge of the accomplished physician.

In surgery they were remarkably proficient and had as many as twenty different kinds of surgical knives. Cupping the actual cautery, and the clyster bag were familiar to them, as were also leeches, of which they had twelve varieties. The escharotics which they used appear to have been potash in different stages of carbonisation (*mite*, *mediocre*, and *acre*). These were prepared by burning various plants, such as *Butea frondosa*, *terminalia Bellerica*, &c., treating the ashes with urine or water and evaporating. Internal remedies were divided into the *mobile* and the *stable*. The former included all animals, and the latter plants, minerals, and earthy matters. These were further divided into 37 classes, according to the ailments for which they were used; the majority, over 600, were of vegetable origin, and asafœtida was the only imported remedy.

All plants were gathered, as they were administered, with definite religious ceremonies, and under certain rules and planetary influences. The list of crude drugs (roots, barks, &c.) used is too long for repetition here. It comprised most of the drugs which are described by Dr. Dymock in his able work on "Indian Materia Medica." There were also used gums, resins, and oils; prominent among them benzoin, bdellium, turpentine, ol. ricini, ol. lini, and other fixed oils. Expressed juices were rarely employed. The liquids obtained by fermentation and distillation are classified as *liquores spirituosi siceræ* (sicera was the sherbeth of the ancient Israelites) and *destillati*. The first were prepared from rice, barley, different varities of pepper, and Ceylon plumbago. The method employed was as follows:—2¾ parts of the liquid were powdered with 2 parts of jujube berries and two parts of myrabolans. The mixture was then placed, with 14 parts of water, 1 part of iron, and 24 parts of sugar, in a vessel previously coated internally with pepper, honey, and butter; closed, and the whole left for seven days in a barley-basket (*hordaceo corbi*). Sicera was prepared by boiling separately the juice of the *Dalberia sisu*, *Mimosa ferruginea*, *Fasineum auriculatum*, *Premna spinosa*, *Ruta graveolens*, and *Trichoranthes dioica;* diluting, mixing, and leaving them to ferment. Sicera were also obtained from *Ficus indica* or *Cassia fistula*. *Liquores destillati* are mentioned, but there is nothing said concerning the mode of preparation or the apparatus employed. From what we know otherwise of their acquirements, as well as of modern Hindoo methods, we may safely assume that the process of distillation and its applications were known.

The animal kingdom yielded several contributions to Indian pharmacy, notably the leech, the *Scincus officinalis*, a kind of lizard of which even now a species is used in Northern Egypt. Cantharides was also known to them. An insect called *fœtor* was used as a remedy against cepra; lizards and mice, against worms, cough, and catarrh. The milk of cows, goats, sheep, mares, elephants, and buffaloes, was held in high esteem; also cheese and butter, the latter being frequently used as an ointment. Butter made from human milk was used as *ambrosiæ similæ* in diseases of the eye. Animal fats, gall, and other animal secretions were administered internally and externally; and nails, skin, and hair were used as fumigants. Musk and similar substances were used as stimulants and for impotency. *Bezoar orientale* was also known to them.

Medicines derived from the mineral kingdom were comparatively numerous, and afford a proof of the acquaintance of the ancient Indians with alchemy. Amongst those employed were charcoal, sulphur, asphaltum (for diseases of the liver and of the urethra), gold and silver (for the prolongation of life), tin lead, copper, brass, antimony, spelter, and iron. Arsenic and mercury were known as the oxides and sulphides. *Ferri rubigo*, mixed with cinnamon and ginger, was given as tonic and antidote; *lapis magnus* as an antidote, and for gonorrhœa; yellow and red orpiment against leprosy; white arsenic with pepper and fragrant herbs for intermittent fever. Alum was used in the arts and in pharmacy, and salammoniac was also known. The following is the recipe for the preparation of ammonia, which was used as a local incentive in debility, fainting, and hysteria:—Dry carefully one part of salammoniac and two of chalk, mix, and sublime at high temperature. A very interesting description is given of the preparation of a kind of sublimate. Mercury was rubbed up with sulphur, and a layer of this "sulphuret" was placed over a layer of common salt in a vessel, half filled with bricks. Another vessel was inverted and securely fixed over the first, and the whole exposed to a strong fire for twelve hours. After cooling, the mercurial salt was found deposited in the upper part of the vessel. The ancient Hindoos were evidently acquainted with the preparation of acids, and they used vinegar, sulphuric acid, and nitric acid. The following is a specimen of the emetics which the Vaidgas employed:—Digest the ripe fruit of *Vangueria spinosa* in water, together with *Poa cynosuroides*, rub with cowdung, boil in rice or barley, then digest during eight days with *Terminiala Bellerica*, *Phaseolus mungo*, and rice. Next *Echites antidysenterica* and long pepper were added, and the whole dried in the sun. With the residue curdled milk, honey, and sesame were mixed, dried, and placed in suitable vessels. In the next stage a handful of the above mixture was digested for 24 hours in a hot decoction of *Saponanthus indica* and honey, then mixed with more honey or rock-salt, and administered by the physician, who looked northward, while the patient's face was directed towards the east. Hindoo pharmacy generally was somewhat after this fashion. Emetics of various kinds were employed in cases of poisoning. The Vaidga distinguished between animals poisons and those derived from the mineral and vegetable kingdoms. But the meaning of "poison" was somewhat wide, and we find *Calamus rotang* and *Piper nigrum* classed along with the juices of several species of Euphorbium; and amogst animal poisons we have "the evil eye," breath, claws of scorpions, and many nasty things, even a certain class of young females had the reputation of being highly poisonous!—*Chemist and Druggist*.

THE POTATO—SOILS SUITABLE AND THEIR PREPARATION.

(COMPILED FROM JAMES PINK'S WORK—"THE POTATO AND HOW TO GROW IT.")

The potato is one of the most convenient vegetable with regard to its culture, and will thrive on a greater diversity of soils than any plant in cultivation. There is no soil from the bog or peat earth, with its 70 to 75 per cent of organic matter and upon which no other plant can be made to produce a remunerative crop, to the clayey, with from only 3 to 5 per cent of organic matter, upon which the potato if properly cultivated may not be grown with more or less satisfactory results. The soil that is generally considered to be the best suited for the cultivation of the potato is a light sandy loam with a good natural drainage and with a gentle slope; but as all soils differ in their texture, and it is rare to find a soil just as we would have it, so we endeavour by tillage, by manuring, and by exposing the soil to the pulverising influence of the atmosphere, to improve its texture and thereby its fertility.

In preparing the land for the ensuing crop of potatoes it is especially desirable that the soil should be well pulverised, for tubers of first-class shape and quality are never taken from an unkindly soil, and if we wish to succeed at the exhibition table or to grow remunerative crops we must take advantage of every means of improving the texture and productive properties of the soil. To grow potatoes well the land should be prepared previously by deep culture of the soil. Of the several methods resorted to for this purpose double digging is the most preferable as it gives the advantage of improving the depth of the soil by placing the manure in the second spit and retaining the top spit, which is generally lighter and more friable, for the tubers to form in. Having selected the piece of ground upon which the potatoes are to be grown, the manure that is to be dug in

with the bottom spit should be spread over the ground. For this purpose the refuse of the garden is excellent; if farm-yard manure be applied it should be in a thoroughly decomposed state, for strong rank manures of animal origin should never be applied for the immediate crops of potatoes. Double-digging consists in taking out a trench 3ft. wide and one spit deep; the manure is then raked from the surface of the adjoining strip of the same width, and spread over the bottom of the trench. A shovelful of hot lime thrown in with the manure will greatly aid its decomposition and assist to eradicate vermin. The bottom spit should then be dug up to a depth of 12 in., well mixing the manure into the soil. The top soil of the second or adjoining strip of 3ft. should now be dug and thrown on to the just dug bottom of the first trench, and so on until the plot is finished.

This method of cultivation of the potato is specially suited to light sandy soils, which if the weather be hot and dry, part with their moisture too freely, so that the crop matures before the tubers have attained their full size. The manure that is placed in the bottom spit enters the rootlets downwards, for roots do not strike downwards into the earth by the force of specific gravity but by the power of nutritive attraction, and all plants possess the natural instinct of sending their roots in the direction that they can find nourishment most congenial to their wants. By placing the manure deep in the soil the plant has one uniform source of nourishment, and therefore receives no check from variations in the weather, during the growing season.

Notwithstanding the animal and vegetable manure placed in the bottom spit, should the land be poor and deficient in vegetable matter, a good dressing of well decomposed vegetable manure may be added. Poor soils never produce a good crop, neither are the potatoes of first-class quality, for vegetables, like the flesh of animals, are always deficient in flavour if they have been half starved. On stiff soils any substance that serves to render them less adhesive may be applied with benefit; such as old mortar, charcoal, burnt earth, ashes, lime, decayed leaves, &c. They should be applied as early as circumstances will admit and be well incorporated with the soil, which should be allowed to remain as rough as possible so that it may get the full benefit of frost, sun, and air.

Different kinds of plants take up in different proportions the various inorganic constituents of which they are composed. Thus we see the necessity for applying the special inorganic or mineral manures in proportion to the requirements of the plant. The inorganic constituents of the potato tuber, as contained in 1,000 lb. of its ashes are:—

	lb.
Potash	557
Soda	19
Lime	20
Magnesia	53
Oxide of iron	5
Phosphoric acid	126
Sulphuric acid	136
Silica	42
Chlorine	42
	1000

The above analysis shows the proportions that have been abstracted from the soil by the plant while growing. Potash, the principal alkali of land plants largely predominates; hence the special value of wood ashes as a manure for potatoes. Phosphoric acid is of animal origin, and is supplied to the soil in all bone manures; it is of special value when applied to cold wet soils, as it has a tendency to induce early ripening of the tubers. Caustic lime enters largely into the composition of the foliage of the potato, and independent of its food-giving properties. It is of great benefit to the land by improving its texture and dissolving vegetable fibre. Common salt should be used only with great care as a manure for potatoes; it may, however, sometimes be used with advantage on light dry soils, but it enters very slightly into the composition of the plant. Green crops ploughed under are a beneficial manure for potatoes on both stiff and sandy soils. They render the clays less adhesive, and add to their productiveness by allowing the rootlets freer access in search of food; while in sandy soils they attract and retain moisture. Artificial manures, when judiciously applied, are invaluable aids to the good culture of the potato, as well as of other crops. One ton of potatoes contains about 25 lb. of ash (which represents the inorganic or mineral food of the plant); supposing an acre to produce 10 tons of potatoes, there will be taken from the soil by the tubers alone 250 lb. of matter per acre in very nearly the following proportions:—

	lb.
Potash	141
Soda	5
Lime	5
Magnesia	13
Oxide of iron	1
Phosphoric acid	31
Sulphuric acid	34
Silica	10
Chlorine (salt)	10
	250

Some soils contain one or more of these constituents in abundance, so that it would be waste, and in some cases injurious, to add more of that substance; yet, being deficient of some others, it is impossible for the plant to arrive at perfection; so special artificial manures become a necessity for the success of every crop that depends on the presence, in an available form, of all the mineral constituents of which the plant is composed. Stimulating manures when applied to the potato in excess, are often injurious, for by inducing a strong rank growth of foliage the plant is rendered more susceptible to disease, and the quality of the tuber is never so good when stimulating manure has been applied to the growing plant.—*Queenslander.*

PACKING PEARS.—The French, who export more Pears than any other nation, cover the inside of the boxes with spongy paper or dry moss, which absorbs the moisture. Each Pear is then wrapped in soft paper, and placed in layers in the boxes, the largest and least mature in the bottom, filling all interstices with the dry moss. Thus, they will keep a month or more. They are so closely packed that though they cannot touch each other, all motion is prevented. If one decays the others are not harmed.—*Gardeners' Chronicle.*

THE PHILOSOPHY OF VINE PRUNING.—The production of grains of starch in the chlorophyll of the leaves when exposed to the sun is a well-established fact. This starch is subsequently dissolved, converted into sugar and other substance fit for the food of plants, and transmitted to the growing points or to the store-places, where it is again converted into starch. The production of starch in leaves is shown by immersing the leaves in boiling water, to which a little potash is added, and then plunging them for a quarter of an hour in hot alcohol. The leaves are by these means deprived of their green colour, and the starch in them is now easily rendered visible by the addition of tincture of iodine. By covering one-half of the leaf with some opaque substance, leaving the other half exposed to the sun, starch may be detected in the uncovered half, while none is to be found in that which has been shielded from the sun's rays. Signor Cuboni, who has made numerous experiments on the Vine, says that this production of starch increases gradually from the leaves at the base of a young shoot to the middle and as gradually diminishes from the middle towards the point, starch being absent from the very young leaves near the apex. These facts supply a reason for pruning, for the young leaves above the flower bunches, not producing starch, but on the contrary consuming it, in so far deprive the berries of their sugar.—*Gardeners' Chronicle.*

TOBACCO IN LOANDA.—Referring to the cultivation of Tobacco in Loanda, the British Consul reports that the plants are carelessly grown and gathered by the natives. When the leaves are sufficiently manured they are plucked from the stem, tied in bunches, and hung round the native huts to dry. No care is taken, no selection made, nor is any preparation resorted to beyond the bunching and drying.—*Gardeners' Chronicle.*

NOTHING will purify and keep a stable so clear from odours as the free use of dry earth, and every one keeping horses and cattle will find it pays to keep a heap of it on hand, to be used daily. A few shovelfuls of earth scattered over the floor after cleaning will render the air of the apartment pure and wholesome. The value of a season's manure pile may be largely increased by the free use of such absorbants. The strength of the gases and liquids absorbed is retained, and is the very essence of good manure.—*Queenslander.*

CINCHONA BARKS IN COLOMBIA.—In a recently issued report on the trade of Colombia, the Consul states with a view of illustrating the alarming depression of the export trade of Colombia, that the exportation of Quina bark, which was the staple article of Colombia, has greatly diminished in consequence of the competition of the Indian and Ceylonese growers, who produce an article which yields a far larger percentage of quinine than is obtained from the Colombian bark. In 1881 the value of the bark exported was about 5,000,000 dollars. It is estimated that since 1881 not half the quantity exported in that year has been shipped yearly.—*Gardeners' Chronicle.*

THE improved French method of preserving wood by the application of lime is found to work well (says the *Indian Forester*). The plan is to pile the planks in a tank, and to put over all a layer of quicklime, which is gradually slaked with water. Timber for mines requires about a week to be thoroughly impregnated, and other wood more or less time, according to its thickness. The material acquires remarkable consistence and hardness, it is stated, on beink subjected to this simple process, and the assertion is made that it will never rot. Beech wood prepared in this way for hammers and other tools for ironwork is found to acquire the hardness of oak, without parting with any of its well-known elasticity or toughness, and it also lasts longer.—*Queenslander.*

PEPPERMINT CULTURE IN JAPAN.—As an indication of the increased demand for Menthol in Europe the following extract from Consul Robertson's report on the trade of Kanagawa for the year 1885 will no doubt be read with interest:—"Peppermint oil has been an article that has attracted much attention in the past year because of its increasing importance as an article of export. The production has been steadily increasing for the past three years, and the latest crop has greatly exceeded those of previous year. This is principally due to the demand for crystals, a product of the liquid oil, and which are now largely used in pharmacy as a specific for neuralgia and other complaints. Japanese Peppermint oil is distilled from a species of Mint (Mentha arvensis) cultivated largely in the northern portion of the main island of Japan. Like the English Mint (Mentha piperita) there are several varieties of the Japanese plant, one only of which produces an article of good quality. The sudden and increased demand from abroad for the Peppermiut crystals has led to new plantations being formed, and these have, I am told, been for the most part laid out with inferior plants. The produce of these new plantations has been sold at very low prices, and the oil thus obtained is not likely to be of good quality. If this is sent to a foreign market, it will, perhaps, cause the Japan oil to be regarded with less favour, and thus damage the prospect of an otherwise promising export." Some blundering seems to have been made in printing this report which it would be well for the authorities carefully to look after in future. Though the report is issued under the authority of the Foreign Office, and is "printed under the superintendence of Her Majesty's Stationery Office," and is dated "Kanagawa, May 28, 1886," and further bears the word Japan on its title-page, the heading of every alternate page is "China, Kanagawa." Some one, therefore, whose duty it is to look after these things has apparently a hazy notion as to the country to which Kanagawa belongs.—*Gardeners' Chronicle.*

THE FOREST SPECIES OF JAPAN are thus noticed by a writer in the *Indian Forester*:—As far as I have been able to ascertain from personal observation and study of various books, the principal forest species of Japan appear to be as follows:—Metz (*Pinus Thumbergii* and *densiflora*), both of which species appear to be very common throughout the empire. Hinoki (*Chamæcyparis obtusa* and *pisifera*), both of which species form extensive forest in the Central and Northern islands. Suji (*Cryptomeria japonica*), found planted throughout the length and breadth of the country, and especially near villages and round all shrines and temples. Keaki (*Zelkowa Keaki*), kuri (*Castanea vulgaris*), much used for railway sleepers. 21 species of oaks, 25 kinds of bamboos, 30 species of cherries, many species being grown simply on account of their flowers. Numerous kinds of azalias, camellias, and laurels, besides various species of elms, maples, deutzia, hornbeam, viburnum, holly, olive, &c. As regards characteristic plants of Japan, they may probably be enumerated as follows:—Azalias, camellias *Cryptomeria japonica*, *Cydonia japonica*, chrysanthemums, Hibiscus, the Japan shrub peony, the famous water lily nasu (*Nelumbium speciosum*), asters, &c.The principal forest trees common to Europe, which are mainly confined to the northern islands, are elms, beech, larch, aspen, wild cherry, ash, yew; whilst amongst shrubs and other plants, the following are most common:—ivy, honey-suckle, lily of the valley, monkshood, marigold, wood sorrel poppy, chickweed, dock and dandelion. Palms are by no means common, and are confined principally to the southern portion of the empire.

TOMATOES AND VINES.—If science has its marvels which however well attested, often fail to convince, certainly ne-science has sometimes even greater marvels, which nevertheless are accepted as gospel by some folk. At one time, year after year, we received from a correspondent leaves of Violets affected with a fungus (Puccinia violæ). The leaves thus had a superficial resemblance to those of a Fern studded with spore-cases, and as the Violets grew beneath the shade of some Ferns was not that proof positive that a cross had been effected between the Fern and the Violet? It was no use appealing to structural and physiological reasons why such a cross could not be. Nothing could shake our correspondent's faith, and year after year, with an expression of surprise and pity at our incredulity, the specimens were sent. As we write a multiple Grape berry is before us such as often occurs at the end of the bunch, when two or three Grapes, from union in a very early stage of development, run together into a mass lobed like a Tomato. Now, as Tomatoes grew in the house, what more natural (?) than to infer that here we have a cross between a Tomato and a Vine? It would not be so unlikely as a cross between a Fern and a Violet, nevertheless we should be as incredulous in the one case as in the other.—*Gardeners' Chronicle.*

RAMIE FIBRE IN SPAIN.—Mr. Consul Wooldridge, reporting from Barcelona, refers to the opening in August last, near Gerona, of a manufactory, the first of its kind in Spain, for cutting and seperating the fibres of the Ramie, or Cunia-grass plant (Bœhmeria nivea). This establishment is described as the property of a French company, styling itself the "Compagnie Ramie, Française." This plant was introduced into the country as far back as 1870, and its cultivation proving a success, the above manufactory has been erected. There are three machines at present, of French manufacture, at work, which decorticate some 450 kilos of fibre per day, and the thread is said to be much cheaper, finer, and stronger than either hemp or jute, and produces a rich, glossy textile, and the refuse is used in the manufacture of paper.—*Gardeners' Chronicle.*

CINCHONA CULTIVATION IN JAVA.

A report by Mr. N. McNeill, Her Majesty's Consul at Batavia, which has just been published, affords a good deal of important information upon the Quinology of Java, and we extract the following as including the points likely to be of interest to our readers. The second table shows that the large and continuous fall in prices has been experienced quite as severely in Holland as elsewhere. The best method of cultivation does not seem to have yet been quite decided upon, as Mr. McNeill deals with it in the following manner:—The cinchona tree is found to flourish best at an altitude of from 4,000 to 7,000 feet above the sea-level. The seeds are planted in nurseries, well shaded from the sun, and transplanted when they are about six weeks old, and placed at distances, varying with the species, of from 4 to 9 feet apart, the ground between the plants being well drained by narrow channels. Grafting has lately been practised to a large extent with very satisfactory results, and seed planting has given place greatly to it. The names given to the different species of the genus cinchona, all of which are planted by the Government, are:—

(*a*) Ledgeriana. (*e*) Calisaya Anglica.
(*b*) Succirubra. (*f*) Hasskaliana.
(*c*) Calisaya Javanica. (*g*) Officinalis.
(*d*) Calisaya Schuhkrafft (*h*) Lancifolia.

Several different methods are employed by Government and managers of private estates for harvesting the bark, and it has yet to be decided which method gives the best result with least injury to the tree. Which course is adopted depends greatly upon the hardiness of the tree, this quality varying in different species. The bark obtained from the roots is generally found to contain the greatest percentage of quinine, that from the trunk coming next, whilst the percentage obtained from the bark of the branches is so small that it is not worth while collecting and exporting to Europe. The accompanying statistics show, as far as I can ascertain, the extent to which cinchona has been cultivated in the last few years on Government and private estates. The area of land planted in 1883 by Government with cinchona was about 1,800 acres.

CINCHONA STATISTICS.

Year.	Government Crop.	Private Crop.	Amount realized for Government Crops.	Plants in Nurseries.	Plants in Open Ground.
	Lb.	Lb.	£	No.	No.
1881	179,520	25,290	18,204	736,600	2,036,480
1882	275,264	35,259	28,036	1,205,800	2,099,400
1883	453,424	172,733	28,915	1,333,000	1,966,500
1884	380,800	275,62	30,000	1,516,500	1,753,900
1885	458,728	—	—	1,390,000	1,567,000

AVERAGE PRICES OBTAINED AT AUCTION IN HOLLAND FOR GOVERNMENT CINCHONA CROPS.

Sterling Price for lb. English.

	1882.	1883.	1884.
	s. d.	s. d.	s. d.
Calisaya Ledgeriana	..3 1½	1 10½	2 3
Calisaya Javanica	..1 6	0 9	0 9
Calisaya Schuhkrafft	..1 5	0 10	0 8
Calisaya Anglica	..1 3	1 2	0 9½
Hasskaliana	..2 1½	0 7	0 4½
Succirubra	..2 0	1 0½	0 11
Officinalis	..2 10½	2 4	2 0½
Lancifolia	..1 8	1 0½	0 8

—*The Planters' Gazette.*

A WEST AFRICAN SUBSTITUTE FOR COFFEE is thus noticed by the *Pharmaceutical Journal*:—The root of Banta mare (*Cassia occidentalis*) is used as a preventive of fever, a decoction being taken every morning, and the leaves are applied in erysipelas and local inflammation. As much as fifty tons of the seed are said to have been exported from Senegal as a coffee substitute.—*Pharmaceutical Journal.*

COFFEE: PROSPECTS OF PRICES VERY BRIGHT. POOR CROPS IN BRAZIL: DISEASE PREVALENT.

[Here is a very important Circular, Coffee Planters will yet be happy—*Cor.*]

(I. A. Rucker & Bencraft's Price Current, Nov. 11th)

The statistical position continues as strong as ever. During the first nine months of the current year we have delivered in Europe 363,000 tons against 360,000 tons same period last year, and this notwithstanding the important advance established in value. During October we delivered 34,500 tons, 35,500 tons being the average delivery per month last year, and 42,500 tons the actual delivery in October last year. Stocks continue to decrease, and if our information be correct, this feature will be very marked in the summer. As regards Rio and Santos receipts on the 5th they totalled 2,535,000 bags against 2,500,000 bags same time last season. In the bulk of the circulars issued the present Rio crop is taken at 3,500,000 bags, Santos crop at 2,500,000, or together 6,000,000 bags, and many assert that all their calculations are based on this figure. The probability that these estimates are excessive must not be lost sight of. The reports that the prospects of the blossoming Rio crop are unfavourable are maintained; as regards the Santos crop, it is still too early to say anything. The Havre market maintains itself on a basis of 65 francs, and this notwithstanding the fact that unusual efforts have been made to get rates down. Current gossip asserts that many are out who would like to be in, and hence a great deal of the wire pulling.

The key to the problem, however, is not in Havre, but in the Brazils. The immediate future depends on the course of receipts in Rio and Santos, November being, perhaps, the most important month in the crop year. Our information continuing unchanged, if anything more favourable, we maintain our opinion that as time goes on the visible supplies of Coffee will get smaller and smaller, and that prices must rise in unison. Extract of a letter from Messrs. Andrew Muir & Co., dated Rio de Janerio, 20th October 1886:—"1886-87 Crop.—We are now feeling the weight of the crop, and all the more so at the present time because of the accumulation of Coffee up-country, caused by three months of constant rainy weather. We look for a very marked falling off in supplies, however, in a short time. Many districts are already bare of Coffee, having marketed their crops. The Serra Abaixo crop has been a complete failure this season. We expect then to have a very limited supply of Coffee to deal with during the first six months of 1887, and as the Americans will require all, or nearly all, of that supply, there should be a lively competition for it. We do not think the export for the current crop-year will exceed *three and a quarter million bags.* 1887-88 Crop.—We must inform you that the prospects for the next yield are so far anything but bright. During August and September it rained almost without interruption, and even during the present month we have had very little fine weather such as would favor the blossoming of the plants. Refreshing rains, followed by intervals of bright sunshine, is the kind of weather required to produce a 'bumper' crop, and this season the rainy part of the programme alone has been carried out. The result is that the trees do not seem to have had sufficient strength to put forth the usual preliminary flower during the month of August, where any appeared it was promptly washed away by the floods. We have been anxiously awaiting the appearance of the second flowering which invariably takes place in September and October, and forms the basis of the crop, but up to the present, over very extensive and important districts, no blossom whatever has been seen. News has just come to hand that in some parts a blossom is now commencing to be formed, but at so late a period it is extremely unlikely that such a flowering can produce a satisfactory result. The old trees are as a rule entirely bare, and the appearance presented by the new plants is very unsatisfactory. We have not had so poor a prospect for a crop

since 1861/1862. The state of cultivation now, of course, is very different from what it was in those years, and the vast area covered by the plantations almost preclude the possibility of an absolute scarcity in the production of the bean. On the other hand, we are assured that there is a disease at work among the Coffee trees, which has already caused considerable damage, and which must be carefully watched. An Imperial Commission has been appointed to inquire into this all important matter. The only chance for a moderate crop would be a luxuriant blossoming now, but even this would hardly be sufficient to save the situation, because before the cherries could be thoroughly formed, they would be assailed by the strong sun of November and December, we fear, with terrible effect.—S. Mansfeld & Co. London, 11th November 1886."

MANILA NEWS:—KAPOK, SUGAR, RAILWAYS.

(Translated from "Straits Times.")

The advantages of growing Kapok or silk cotton has so far attracted attention in the Philippines that, according to the *Comercio*, the authorities there have decided upon taking measures to further its cultivation. It is their intention to secure seeds or young plant of that useful produce articles. The object in view will be to experiment with its cultivation in those islands to find out the possibility of acclimatising it. Should the trial planting succeed, the Philippines will be the gainer by the consequent increase in the tale of export articles sure as it is to thrive in the country, and yield handsome profits indeed to enterprising cultivators.

The local committee for ensuring a suitable display of Philippine products at the coming Madrid Exhibition have so slackened their energies, that the Central Committee in Spain have been obliged to stir them up to increased activity by means of circular letters.

The handicapping of Philippine sugars and produce generally by heavy import duties in Spain to the great detriment of trade between the two countries, has been at last remedied. The Home Government has decided upon lowering these duties considerably, and admitting into Spain sugar from the Philippines duty free when borne in Spanish vessels.

After four fruitless calls for tenders to construct a railway from Manila to Dagupan, an important seaport, an English firm sent in the only tender opened at the last call. Should the firm secure the concession it is by no means sure whether the venture will pay. The expected passenger traffic will it is said, not pay expenses. The goods traffic has no prospect of expending sufficiently to yield a high income.

HUNASGERIYA TEA COMPANY, LIMITED.

At the annual general meeting of this company, held in London on the 26th ultimo, the Directors presented the following report:—The total value of produce secured during season 1885-86, amounted to £1,558 9s 5d. This sum has been deducted from the cost of planting, upkeep, &c., and the balance of £2,189 6s 10d has been carried to Property Account, so that the Estate now stands in the Company's books at £21,509 13s 3d.

As stated in last report, the planting of a large acreage of Tea was accomplished at the beginning of the season now under review, and besides the expenditure on this and the upkeep of the former clearings, the Ceylon expenditure includes outlay on machinery, tea houses, &c., and also the cost of seed, nurseries, and general preparation for the planting of further 75 acres; this latter clearing has now been planted up, making the total area under Tea 585 acres as under:—

AREA UNDER TEA.

Planted July—October,	1882	...	25 acres
Do do	1884	..	188 „
Do do	1885	...	297 „
Do do	1886	...	75 „
Total under Tea at this date		...	585 acres.

The weight of Tea manufactured on the Estate for the season amounted to 12,527 lb.

The yield per acre is considered very favourable as the leaf was secured almost entirely from the 25 acre clearing, only a small plucking being taken from the 188 acres towards the end of the season.

It will be seen that the average price of the Tea sold in London was 1s 0½d per lb. Although the Tea market was ruling very low during last season, a higher average price would have been secured had the quantity coming forward from the Estate been larger.

The small area yielding leaf, and the consequent minute daily pluckings during the early part of the season, made it necessary to retain the manufactured Tea on the estate longer than is usual, so that parcels large enough for shipment might be sent off, and this, to some extent, caused a loss of flavour. Even then the breaks of Tea were not of sufficient size to command the full competition of the trade, and from these causes the Tea realised a lower price than would otherwise have been obtained.

Now that the plucking is being carried on over a much larger area, these disadvantages are disappearing, and good saleable breaks will now come forward with regularity. The market for fine Ceylon Teas has also improved. The returns given by the other minor products were in accordance with the expectations. As stated above small pluckings of leaf were being secured about the end of last season from the 188 acres planted in 1884, and as the yield is rapidly increasing, it is thought that between 40,000 and 50,000 lb. of Tea will be secured during the current season, viz.: 1886-87, and this, with the returns from the other products, should very nearly meet the year's expenditure. Looking at the age of the Tea, and the small area yielding leaf, such a result would be deemed most favourable, and the prospects for the following season, 1887-88, are very encouraging as that will be the first season during which any applicable area will be old enough to yield a considerable crop of leaf. A reference to the planted area, as given above will at once show that there will then be 510 acres of Tea giving larger or smaller supplies of leaf. With these facts before them the Directors cannot but feel that it would be greatly to the advantage of the Company if from 100 to 200 acres of Tea could be planted up each season, until a total of 1,000 acres is reached; but with the capital at present subscribed the Board do not feel justified in sanctioning any further extension. They would, therefore, strongly impress on Shareholders the desirability of at once subscribing Shares to the extent of £4,172, thus bringing the capital up to £25,000, so that the further planting of Tea may not be delayed. A clearing of 25 acres of Cardamoms has been planted up during the season, making a total of 33 acres under this product.—*Planters' Gazette.*

TEA HAIR.—We have received from Mr. Gow a small tin of this curious product of our tea with the bright colour which indicates tannin and golden tip. Under the glass the fine hairy particles of the mass are readily discernible. The sample can be seen at our office.

THE LUMINOSITY OF LEAVES.—Dr. Gorlam has discovered that the light reflected from green leaves consists chiefly of red and green rays, and by ascertaining the proportions of these colours reflected from leaves, and taking a revolving ring with the like proportions of colour on it, he has been able to mix these colours as it were in the eye and reproduce the tint of the leaves. He found during the enquiry, however, that the simple colours did not exactly reproduce the colour of the leaf required, but that a certain admixture of black was necessary to this end. Black, it may be remarked, is well known to exist in the cellular structure of leaves in the form of carbon. It is deposited there, as is believed, from the absorption of carbonic acid gas from the atmosphere by the *stomata* or mouths on the underside of the leaf.—*Indian Gardener.*

A CORRESPONDENT from Uva writes:—"I send you by parcel post three fruits that I think are unmistakebly *lemons* (Malta or any kind you like to call them.) I found a tree laden with these fruits in a village garden near here, and the villagers treating them as *wild limes*, using them only while bathing and washing their hair with them. They can give me no account how this lemon tree got into the village. Can it be possible that a native lime seed sported into a *lemon* tree? not unlikely I should think." The fruits sent are undoubtedly citrons of a very good kind.

BONDED TEA WAREHOUSE ACCOMMODATIONS.—The Wholesale Tea Dealers' Association have memorialized the Lords of the Treasury in regard to insufficient accommodation for the proper storing of tea. They say, also, "We are informed on the best authority that the complaints from country grocers as to spoilt tea owing to careless warehousing are more numerous this year than ever. The tea comes in the months above mentioned in immense quantities, and warehouse keepers, whose hands are full to overflowing with work, allow the chests to remain for months uncovered without even the lids being put on, and thus teas, especially the finer sorts, are greatly damaged."—*Indian Tea Gazette.*

COCAINE (CRUDE).—A case, containing 3,765 grammes just arrived from Lima, was offered in sale. The analysis was given as follows:—

Crystallisable cocaine	91·4
Ash	5·0
Moisture, &c.	3·6
	100·0

The whole was bought in at 10d per gramme. We understand that one of the principal English makers offered 4½d per gramme, but this bid was declined. We have described this cocaine, which is extracted from the leaves in Peru, and of which frequent shipments are received at Hamburg, in a recent issue. COCA LEAVES remains quite neglected, 47 bales offered in sale this day found no purchasers.—*Chemist and Druggist.*

KAINIT AS A FERTILIZER.—The following deserves your consideration at this period of the year, (say Messrs. Samuel Downes & Co., Liverpool, writing on September 30th). Intending users will please to observe that it should not be applied to stiff but light sandy soils and mossy lands which are deficient in potash:—The late Dr. Voelcker wrote:—"By far the best mode of applying kainit to light or to heavy land is to sow broadcast in *autumn* or early *in winter*, both for wheat and potatoes. For winter wheat on heavy land the kainit may be mixed with dissolved guano in the proportion of 2 cwt. of kainit and 3 cwt. of dissolved guano (8 per cent quality dissolved guano), and sown broadcast, either before sowing or soon after the seed has been sown. For potatoes it is best to sow broadcast 3 to 5 cwt. of kainit per acre early in winter, and to plant the potatoes with 4 to 6 cwt. of 6 per cent quality dissolved guano diluted with ashes or burnt soil, or any similar bulky material, which has the effect of spreading the dissolved guano more freely upon the land, and preventing the concentrated manure coming into direct contact with the seed potatoes. Kainit should always be sown in autumn or early in winter. For rather heavy land 2 to 3 cwt. are sufficient; for light soils 3 to 5 cwt. per acre may be applied with advantage.—*Agricultural Gazette.* —[Has any one tried kainit with dissolved guano, or with white castor-cake as an application to tea?—Since writing this, we have learned that Messrs. Freudenberg & Co. have been appointed Ceylon Agents; and the proprietor having got samples from them, some experiments with kainit for tea are to be made on Abbotsford, and the results carefully noted for publication.—ED.]

CEYLON PLANT IN REQUEST.—Says a correspondent of a home medical journal:—"I hear tha the leaves of a Ceylon plant, the *Michelia nilagerica*, have been found by a foreign medical authority to possess great antipyretic properties, a decoction of the drug acting in this respect better than one of cinchona bark. A peculiarly bitter principle is also said to have been extracted from these leaves."—From the "Treasury of Botany" we take over all under the heading of Michelia, as follows:—

Michelia. A Florentine botanist of the early part of the eighteenth century is commemorated by this genus of *Magnoliacæ*, which consists of lofty trees, natives of India and the islands of the Eastern Archipelago, and is nearly allied to *Magnolia*, but distinguished by the axillary flowers, the looser arrangement of the carpels, and the more numerous ovules.

M. Champaca, the Chumpaka of the Hindoos, is cultivated commonly in India for the powerful fragrance of its flowers, which, indeed, according to Sir W. Jones, is so strong that bees seldom if ever alight on them. The tree is sacred to Vishnu, and is therefore an object of superstitious regard on the part of the Hindoos, who adorn their dark hair with the rich orange-coloured flowers. The root, like all parts of the tree, has bitter properties, and is used medicinally. There appears to be some difficulty in defining the species; or probably that just mentioned, having been ong cultivated, has originated numerous varieties which are mistaken for species; thus *M. Rheedu* is referred to *M. Champaca* by Hooker and Thomson. The timber of *M. Rheedu* is employed in Bombay for cabinet work, and has been tried in ship-building, while various parts of the tree are used medicinally as stimulants, &c. *M. Doltsopa*, anotl er variety of the Champaca, is mentioned as furnishing a fragrant wood used in house-building in Nepal. Lindley mention the bark of *M. montana* as having proprieties like those of cascarilla, but milder, and that of *M. gracilis* as having the odour of camphor. *M. Champaca* is cultivated as a hothouse plant in this country, where, however, it does not appear to be as great a favourite as its Indian reputation would lead us to infer. [M. T. M.]

A FEW NOTES ON THE SOIL OF CEYLON.—As to the soils of Ceylon, that of Colombo consists of either sea sand or of laterite, locally called *cabook* or a mixture of the two. It is a pretty well established fact that the sea in former ages covered the present site of Colombo and the Cinnamon Gardens, hence the sea sand deposited there. Further inland we have the large expanse of paddy-fields—cultivated by the natives who have been for ages experts in terracing and irrigating their lands—may be said to be a deposit principally of gneiss—still further on the slopes of the hills of the Central Provinces, the soil, where wonderful crops of coffee were in former days made, is anything but rich, being of a loose, friable, gravelly nature, very apt to get washed into the paddy terraces of the Cingalese Gova below, a circumstance which "Apaswammy" thoroughly appreciates. In fact the wonderful returns of various tropical products from the soils of Ceylon is more due to the climate than to the richness of the soil. When we arrived at Nuwara Eliya we exclaimed what grand black soil. To our astonishment we were told by a friend that this black deposit on the plateau of Nuwara Eliya is utterly worthless, inert stuff, being simply peat in a high state of decomposition, and which would burn as peat cut from the bogs of Scotland. On the slopes of the hills of Nuwara Eliya the soil is of a better character and grows good tea and chinchona the latter however suffering somewhat from the hoar frosts in January, February and March. Notwithstanding the poverty of the soil of Nuwara Eliya wonderfully good English vegetables are raised by an enterprizing Scotch-man, Mr. White, who has a large garden within the grounds of the Grand Hotel, Nuwara Eliya, and from which he supplies people in that station, planters in the district and hotels and steamers at Colombo. W. M. R. —*The Indian Planters Gazette.*

REPORT OF THE DIRECTOR OF GOVERNMENT CINCHONA PLANTATIONS, NILGIRIS, FOR 1885-86.

1. SEASON AND RAINFALL—(*See Statement No.* 1, *a*) *Dodabetta.*—The season for the past year was very favourable for carrying on all works connected with the upkeep of this estate. The total amount of rain registered during the year was 53·25 inches, spread over 154 days. This was about 8 inches less than what fell during the previous year, but it was spread over 154 days instead of 123 days, showing an increase during the past year of 31 wet or cloudy days over last year. Very little rain fell during the early part of the year; indeed the spring showers failed almost entirely, and it was not till the breaking of the monsoon, which began early (3rd of June), that the earth got at all wetted. The monsoon broke very gently, and continued with hardly any intermission for nearly six weeks, after which the weather continued very favourable till the end of the year. The wind was never furious, and with the exception of one storm in November, the rainfall was never excessive. On the 17th and 18th of this month, 4·30 inches of rain fell, but nothing more than a little wash on the steeper and more exposed parts of the plantation was experienced.

(*b*) *Naduvatam.*—The quantity of rain which was registered on this estate during the past year was 90·40 inches, spread over 132 days; this being very nearly the same amount of rain and the same number of wet days which occured during the previous year. The season was good for all kinds of work, and the new plantings on the old plots which had been made during the last three years, are looking very well.

(*c*) *Pykara.*—This estate now comprises the two which were formerly known under the names of *Hooker* and *Wood.*

(1) *Hooker.*—The rainfall for the year on this plantation was 90·77 inches, spread over 134 days. Last year the amount of rain was 104·27 inches, spread over 136 days. With the exception of a storm in November, when 10·1 inches of rain fell in two days, the weather during the season was all that could be desired. On the occasion of this storm some damage was done, by reason of the great wash which took place on some of the slopes which were exposed to its full blast. Considerable damage was also done at the same time to several of the roads and paths on this estate, owing to drains and culverts becoming choked. The damage done, however, was not more than might have been expected from so violent a burst of wind and rain. The general appearance of the plantation is good and the younger plantings are much improved.

(2) *Wood.*—On this estate 74·18 inches fell during the year, and were spread over 129 days, the amount which was registered during the year before being 86·06 inches, which was spread over 139 days. Some damage was done to a portion of the coppice of 1884, which lies just below the water-course that runs from the Pykara river to the coffee estates in the plains, owing to the bursting of the bank of the water-course during one of the heavy storms which occurred during the autumn. The water-course has now been repaired and there is no further apprehension of the accident occurring again.

III. PERMANENT PLANTATIONS—(*a*) *Dodabetta.*—The condition of the estate is much the same as when I reported upon it last year. The coppice and interplantings are doing very well. All these were manured and will, I have no doubt, show the result of this liberality by an increase in the vigor of their growth. Statement No. 8 gives calculations of the number and the different sorts of plants growing at present upon this and the other estates.

(*b*) *Naduvatam.*—The general condition of this estate has materially improved during the last year. All the young plantations were highly cultivated and many of them freely manured, the result of which and the favorableness of the season is a fine vigorous growth of all the young plants. A considerable amount of the land, which in former years had been pitted for planting, but which had either never been planted at all or where the plants had died out, I planted up during the past year, chiefly with *Cinchona magnifolia.* Most of the remaining pitted land lies on slopes which are too steep for convenient cultivation or on poor soil or on places too much exposed, and all this land I propose to abandon.

The shelter belts which I have put up round many parts of the estate are doing well.

Santa Fé.—In my last year's report I mentioned that I had very nearly lost my only remaining specimen of cinchona *Santa Fé,* but that it had been saved by the skill of Mr. Jamieson; and I am happy in being able this year to report that not only is the old plant living, but that Mr. Jamieson has been able to raise between 20 and 30 new plants from it, most of which are now well rooted and will be ready for putting out in the plantations during the present season. Four hundred and twenty plants of *C. Carthagena* raised in the Government Gardens, Ootacamund, from cuttings were planted out on the Naduvatam and Pykara estates, the lower elevation of which seems to suit them better than that of Dodabetta. As I mentioned in my last year's report those at Dodabetta are not doing satisfactorily.

The *Remijias* which I mentioned in my last report were planted out during the autum on this estate; they have as yet made little or no progress, but they look perfectly healthy and will, I have no doubt, begin to grow during the warm season after the rain. On the same plot of ground adjoining the land on which the *Remijias* have been planted, I have put out specimens of several species of cinchona, and this year I shall put out all the remainining species which we possess. These are not intended for commercial purposes, but by their being placed side by side and allowed to grow in a free and natural manner, it is hoped that they will enable those, who are interested in the subject to examine the characters of the different kinds with greater readiness than can be done when they are scattered, not only over different parts of the same estate, but even over the different estates themselves as occurs at present.

(*c*) *Pykara*—(1) *Hooker.*—This plantation has greatly improved during the past year. The young plantings have been highly cultivated, the whole of the ground which they occupy has been deeply pitted and the greater part of it manured. The remaining portion of the estate requiring renovation is but small, when compared with that which has already been carried out during the last two years, and I shall, I hope, be able to complete it during the present season. The sambur are still troublesome on some parts of this plantation, but as barbed wire has been ordered from England and its arrival is now being daily expected, I hope that I shall be able before long to put up such a fence as will effectually keep out these intruders.

(*c*) *Pykara*—(2) *Wood.*—This Plantation is hardly in a more satisfactory condition than it was when I reported upon it last year. Some of the succirubra coppice has done well and some of the planting close to the lines and the head overseer's dwelling, where the sambur dare not come, are also doing well, but in all the other parts of the plantation which lie at a distance from human habitations the young plants are destroyed as much as ever and no hope of any improvement can be expected until a substantial fence has been erected. Some underwood consisting chiefly of strobalanthis which was encroaching upon the plantations, I ordered to be cut during the winter as that tended to harbour the sambur, and I regret to say that towards the end of the dry season this brushwood caught fire during a high wind and that the fire spread through a portion of the shola which surrounds the Pykara falls and has seriously injured, if not killed, many very fine trees. In a former report I recommended to Government that they should give up the cultivation of the Wood plantation altogether, but Government at that time

thought my experience was of too short a duration to admit of their rashly adopting the suggestion, and I was desired to do my best to put it into repair; but my experience of the past three years makes me doubt if it will ever be very profitable to Government to retain it. The soil in many parts is poor and stony, other parts again are exposed to devastating blasts, and it is in bad weather difficult of access. At the best it will cost a large sum of money to repair the plantation, and it will be many years before it yields any reasonable returns to the money invested. If the greater part of the Wood plantation was abandoned and the few acres of land round the head overseer's bungalow and the drying sheds only were kept, the Pykara head overseer would be able to pay more attention to the Hooker plantation, which is now becoming a very valuable property. This would save nearly the whole of the expense of the upkeep of the Wood plantation or about R8,000 per annum.

IV. UPKEEP.—The maintenance of the buildings, roads, drains, bridges, &c., with one exception has been well attended to on the Dodabetta, Naduvatam and Hooker estates. The exception is the Mucroochy bridge which spans the river crossing the road which leads from Naduvatum to Hooker.

V. MANURE—(*a*) *Dodabetta.*—I have been able during the past year to obtain abundance of manure for this estate from purchases made in the town of Ootacamund, and on this account I have transferred the greater number of the Dodabetta cattle to Naduvatam.

Cattle.—Many of the draught cattle belonging to the Dodabetta estate are very old and several of them died during the past year. These I propose replenishing by young ones which may be obtained at a resonable price during the fairs which are held yearly at Murally at Mysore: The great want on estates and indeed in all farms of this country is the want of a sufficiency of manure. Almost every estate has cattle upon it, which may be regarded purely as manure-making machines, but these machines are worked at very great waste, because owing to the cost of storing up fodder they are obliged to be sent out during the day on the hill sides to graze where all the manure which they make during the day is lost; but if a sufficiency of fodder could be stored in stacks or silos, these cattle might be altogether stall fed, with the result that there would be an immense increase of manure coming into their owner. At the same time, they would become much fatter and therefore saleable for the purposes of the butcher. During the past year very considerable economy has been effected by using more largely than had hitherto been done the Government carts and bullocks for the transportation of bark to Mettupálayam and for the carriage of supplies to the estates.

(*b*) *Naduvatam.*—Owing to the transfer of the Dodabetta cattle and the purchase of the few additional animals, this estate has been much better off for manure during the past year than it had ever been before.

(*c*) *Pykara.*—Both the plantations of Hooker and Wood continue to be well supplied.

VI. HAYSTACK.—During last autumn, I made a large haystack of grass obtained from the hills on the Government estate at Naduvatam at a cost of R109; the grass was cut by sickles and was well dried before being stacked. The hay turned out very fair and sufficed to keep in good condition all the cattle on the estate during the five dry months of January, February, March, April and May. I made another smaller stock on the Dodabetta estate consisting entirely of *Briza maxima* commonly known as *Jacobs' tears*. This grass completely covered may of the plots and often grew to the height of nearly two feet. The hay was not very well got on account of the weather being wet at the time it was harvested. Nevertheless it proved very nutritious and horses and cattle took to it readily. Dr. Shaw, Inspecting Veterinary Surgeon, Madras Army, to whom I sent some of these hays for experimentation, has been good enough to send me the following very interesting report on their quality, and the suggestions which he makes with regard to the other kinds of grasses, which may be used as hay, will be attended to during the present year:—

Adverting to my letter, No. 45-86, Ootacamund, 10th April 1886, I have the honor to report on the two samples of hay forwarded with your letter, No. 38, of 10th April.

2. The Naduvatam sample (name unknown) did not prove a success. It was in the first place coarse and wiry in its nature, and I should say over-dried, being crisp and crumbly when rubbed, and fracturing into small particles. It had little or no aroma and was here and there mouldy as if it had been exposed to dry on damp ground. The horses I tried this sample with, did not evince any keenness to eat it, and two out of five absolutely refused it for some days, after which it was only sparingly partaken of.

3. No. 2 sample (*Briza maxima*) or Jacob's tears was better saved, had an aroma of hay and, I think, if it had been cut a little earlier, or when more succulent, it would have afforded a better sample. Four horses partook of this sample, and kept in fine working condition on it. The fifth (a horse I had in training) being at the time on an allowance of oat hay, occasionally nibbled at it only.

4. As regards the feeding properties of the two samples, I do not think sample No. 1 is good enough to persevere with as a horse fodder; at the same time, I think it far preferable to the bad grass which is brought in during the dry months and which forms the bulk of stable supplies up here from November to May.

5. The question of stable fodder as an industry on these hills is one, I think, capable of great extension and would prove a remunerative investmeut to the agricultural classes if they could be encouraged to grow them. The cultivation of oats by General Morgan and Mr. J. Sullivan has proved that three crops can be produced from one tillage. The first and second crops can be cut as green fodder and the third allowed to go to ear and made into hay. I am using such now with the greatest success. The soil and climate of Ootacamund are particularly favorable for the cultivation of oats; the stalks of which attain a great size; and I have seen it growing with the ear just budding though seven feet high. I have no experience with the "Bromus" or South American oat grass but General Morgan tells me it has taken favorably to the soil and has proved a valuable fodder.

VII. SILOS.—In my last year's report I stated that I had made silos on the Dodabetta and Wood estates for the preservation of fodder during the wet weather. The silo on the Wood estate was never utilized, as a heavy storm flooded it before it could be properly roofed; but on the Dodabetta estate I made six silos, all of which have been successful, and I will describe their structure and the mode of filling them.

No. 1 was a brick-built pit lined with cement the internal measurement of which was as follows:—Fifteen feet long by ten feet broad by twelve feet deep; the walls from top to bottom had a slope given to them inwards of six inches. This pit was roofed with zinc so that no rain could by any possibility get into it. The cost of building the pit was R206. I began filling this pit on the 14th of October and finished on the 19th idem. The plants used for filling the silo were very numerous; indeed, almost everything was put in which it was known the cattle would eat in a green state such as *maize, cholum, ragi, lucerne, Spanish needle, Polygonum nepolense, Jacobs' tears*, grass from the lawns of Government gardens, hill grass, swamp grass, &c., &c. All these with the exception of lawn grass, which had been cut by mowing machines, were passed through chaff-cutters and cut into pieces not bigger than an inch in length. As this was cut, the mixture was thrown into the silo and when a stratum of about two feet in thickness had been put in, it was trodden well down. This was repeated until the silo was completely filled when mats were placed on the top, then planks of blue gum and then two feet and-a-half of moderately dry earth. In the course of a week the earth sank exactly one foot, after which there was no further subsidence. During the subsidence the earth cracked around the edges of the pit and it was necessary to dig up the earth about these cracks with a fork and then tread it down again, to prevent the access of air to the fodder below. It was opened on the of April in the presence of His Excellency the Commander-in-Chief, Brigadier-General Elles, C.B., Adjutant-General, Dr. Shaw and others who had experience in the making of silos. The fodder on

being uncovered had lost its bright green color, owing to the partial decomposition of its chlorophyl, but with this exception it differed little in texture and appearance to what it had presented when first put in. On weighing a portion of it each cubic foot was found to contain a little over forty-seven pounds. The smell was exceedingly offensive, especially the upper layer of about half an inch in thickness. His Excellency the Commander-in-Chief, Brigadier-General Elles and Dr. Shaw pronounced it to be good, and on its being given to some of the bullocks it was at once greedily eaten by them, and since that time they have been fed upon nothing else, and they are said by Mr. T. Narrainasawmi Nayudu, the Assistant Superintendent, and Mr. McDonald, the Sub-overseer, to be generally in better condition than they have ever known them to be before at this time of the year and this in spite of their having done, at least, double the usual amount of work. Besides this silo which was both costly in its construction and in its filling, I made five others of a much cheaper description and which turned out ensilage, every bit as good as that from the big pit. These consisted of pits six feet cube dug in the earth in a place where there was no fear or springs or stagnant water. The fodder was put into them as it came from the field, that is without being cut up, and after it had been well trodden down mats were placed on the surface, and on the top of these two or three feet of earth, which was heaped up and slope like a grave, and over these mats, thatch or plates of galvanized iron were placed to shoot off the rain. The ensilage in these pits shrank more or less, according to the particular plants which composed it. In one instance the earth sank as much as three-and-a-half feet, and it was necessary, during the first few days, to fill up the cracks which were made in the soil by this shrinking. In one of these pits I stored up *Jacob's tears* separately, in a second *Spanish needle*, in a third *Polygonum nepolense*, and in the two others a mixture of plants. The fodder, which was turned out from all of them, proved, on experiment, to be everything that could be desired, although during the time that they were being filled, it was raining hard and the stuff saturated with moisture. I shall in the future make no more costly silos, but use these earth-pits, only making them of larger dimensions, and covering them with a roof of thatch. The estates, hills and sholas of the Nilgiris and the Wynaad must possess an enormous amount of nutritious fodders which grow readily in the wet season, but which cannot be preserved for future use except by means of silos, and I look forward to the time when knife-weeding upon a cinchona or coffee estate will be regarded no longer as a disagreeable necessity.

VIII. NURSERIES.—The demand for seed is still decreasing and that for plants and seedling also. Most of the applications which I received during the year were from the planters in Ceylon.

IX. CROP.—The total amount of dry bark produced by the estates during the past year was 113,366 lb. In addition to this, there remained on the 31st March 1885, 125,663 lb., making a total of 239,029 of all sorts. Of this quantity, 113,940 lb. were disposed of during the year, so that the balance in stock at the end of March last was 125,089 lb.

XIII. COPPICING.—Several questions having been addressed to me during the year relating to coppicing, I have carefully attended to this matter, and, so far as my experience goes, I believe (1) that it is immaterial at what time of the year the trees are cut down; (2) that they should be cut quite close to the ground for then the shoots have a better chance of making roots for themselves, and so becoming independent trees, than if they are allowed to spring from a point at a distance from the ground; shoots springing immediately from the ground are much less liable to be blown down by the winds; (3) the number of shoots which should be allowed permanently to remain will depend entirely on local circumstances. If the shoots are far apart, then two or even three may be allowed to grow, but if the shoots are close then one will, as a rule, be sufficient. No fixed rule, however, as to the number which should be left can be given; but if it is borne in mind that wood and bark are the result of the activities of the leaves, it will be readily understood that those trees which have the most leaves exposed to the light will produce the thickest stems and the largest amount of bark. The planter should therefore see that his coppice is not so thick as to prevent each individual shoot having its fair share of light.

XIV. GRAFTING.—The nearly allied species of cinchona seem to lend themselves, rather readily, to being grafted; but the labour entailed in grafting is so great that I do not believe it will ever pay to do this on a large scale.

XV. QUINOLOGIST'S DEPARTMENT.—Mr. Hooper in accordance with the instructions issued in G.O., No. 550, of 12th May 1885, Revenue, went down to Madras to start the manufacture of 1,000 lb. of *De Vrij's Cinchona Liquida*. Of this amount, however, 500 lb. only were made and for some reason or other the manufacture of the febrifuge did not turn out quite satisfactory. So I asked Government that Mr. Hooper might be allowed to make the remaining 500 lb. in Ootacamund. Government accorded their sanction to my proposal, and Mr. Hooper has just completed his task. The febrifuge which he has turned out seems to be in every respect excellent, and will, I hope, prove a cheaper and at the same time as efficacious a drug as any that has as yet been made. Should the febrifuge prove acceptable to the poorer classes of natives, not only will all the bark which can be raised on the Government estates be required to meet the demand, but a very great deal more.

XVI. OTHER MATTERS connected with the chemical aspect of quinology, I leave Mr. Hooper to speak for himself, whose very interesting report I enclose.

XVII. URGENT NEED FOR A CHEAP FEBRIFUGE.—I am indebted to Surgeon-General G. Bidie for the following statistics. The population of the Madras Presidency was 29,000,000 at the last census. The total number of deaths during the last year from all causes was 615,449 as detailed below:—

Deaths from undescribed causes ...	260,960
Fever	218,786
Cholera...	58,109
Small-pox	34,726
Bowel complaint	31,209
Injury	11,659
Total	615,449

From these figures it will be seen that nearly one-third of the total number of deaths are due to malarious fever. A proportion which must be regarded as too high when it is considered that we have a specific medicine for this fatal disease.

XVIII. PROSPECTS OF THE CINCHONA MARKET.—So long as the cinchona alkaloids are produced chiefly for the European and North American consumption (non-fever stricken countries) the supply will always be in excess of the demand and the present low prices will continue to exist; but if a market can be found for the alkaloids in the malarious tracts of the tropics, this state of things would be reversed and the price of bark would go up.

Dr. Bidie tells me that he believes every one in the Presidency would be benefited by taking quinine in more or less quantities during certain seasons of the year, and he does not think that forty grains per head would be a high figure at which to place the yearly requirements of the country. If this be correct then close upon 2,000,000 pounds of bark averaging 6½ per cent. of total alkaloids will be required for consumption in this Presidency alone.

ENCLOSURES.

Letter from D. Hooper, Esq., F.C.S., Government Quinologist, Ootacamund, to M. A. Lawson, Esq., Government Botanist and Director of Cinchona Plantations, Nilgiris, dated Ootacamund, 6th July 1886:—

I have the honor to present the following report on the analytical work conducted in the Government Laboratory for the year ending March 31st, 1886.

2. The report includes a valuation of the cinchona bark sold by auction in Madras during the year, and

complete analyses of all the different species of bark which were sent to the Colonial and Indian Exhibition in London. Some experiments in renewing bark and manuring trees are recorded; and tables are given showing the increase of alkaloids by growth, and the deterioration of alkaloids by age and other causes. The liquid cinchona which was partly made last year has been completed. Most of the analytical work has been done for Government, but several barks have been received from private parties, and I have to thank some of these gentlemen for information respecting samples they sent, as this enabled me to summarise results which are of general usefulness to planters.

3. There have been six sales of Government bark in Madras during the year, viz. September, October, November, December, 1885, January and February 1886. Samples of the various kinds have been valued, which has given a reserve price to the auctioneers, but the competition being so brisk at each sale, these prices were exceeded.

I append a statement showing the qualities of barks disposed of, their value in sulphate quinine, and the value of the unit in pence.

Description of Bark.	Sulphate quinine. Per cent.	Value of unit. d.
September 1885.		
Dodabetta Natural Crown ...	4·18	4·06
Naduvatam Root „ ...	4·46	4·90
October 1885.		
Dodabetta Renewed Crown ...	4·06	5·85
„ Mossed „ ...	4·70	5·48
Naduvatam „ „ ...	4·05	5·37
„ Root „ ...	4·46	5·38
November 1885.		
Dodabetta Natural Crown	4·18	6·70
„ Branch „	1·17	7·90
„ Root „	4·33	6·93
Naduvatam Natural „	3·52	7·10
„ Renewed „	4·22	7·52
„ Branch „	2·16	7·06
December 1885.		
Dodabetta Natural Crown	3·10	6·69
„ Mossed „	4·73	5·55
„ Renewed „	6·56	5·49
January 1886.		
Naduvatam Natural Red	1·56	4·97
February 1886.		
Naduvatam Renewed Red	2·54	4·62
„ Root „	1·38	5·25

4. These barks are, on the average, of the same value as those sold last year, but with regard to the value of the unit it will be observed that the market has experienced a great fluctuation during the year. In September the unit being 4·48*d*, October 5·52*d*, November 7·20*d*, December 5·91*d*, January and February 4·94*d*.

BARK SENT TO INDIAN AND COLONIAL EXHIBITION.

	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.	Amorphous Alkaloids.	Total.	Sulphate Quinine.
C. Officinalis:							
Natural ...	2·77	1·57	·16	·39	·50	5·39	3·72
Mossed ...	3·40	1·50	·20	·45	·62	6·17	4·57
Renewed	4·20	·85	·22	·65	·70	6·63	5·66
C. Angustifolia:							
Natural ...	3·97	1·32	·12	·12	·87	6·40	5·34
Mossed ...	5·60	1·41	·33	·04	·97	8·35	7·53
Renewed	4·91	·89	·38	·19	1·14	7·51	6·60
C Succirubra:							
Natural ...	1·91	2·11	...	1·14	·88	6·04	2·57
Mossed ...	1·69	2·03	...	1·68	·98	6·38	2·27
Renewed	1·84	1·48	...	1·25	·71	5·28	2·47
Branch ...	1·38	2·28	...	1·59	1·16	6·41	1·85
Root ...	1·24	·77	·41	1·43	1·27	5·12	1·66
Renewed shavings	2·30	1·16	...	2·06	1·45	6·97	3·09
C. Robusta:							
Natural ...	1·43	2·08	...	1·58	·31	5·40	1·92
Mossed ...	1·92	3·16	...	·77	·35	6·20	2·58
Renewed	4·40	2·54	...	·51	1·65	9·10	5·92
Branch ...	1·64	2·71	...	1·17	·50	6·02	2·20
Micrantha:							
Natural ...	...	...	...	1·92	·40	2·32	...
Renewed	tr	2·45	...	1·12	1·02	4·59	...
Branch ...	...	...	...	1·60	·45	2·05	...
Calisaya:							
Natural ...	1·21	2·32	...	2·13	·29	5·95	1·62
Branch ...	·59	·73	...	1·93	·48	3·73	·79
Anglica:							
Natural ...	·81	·88	·29	1·49	·44	3·91	1·09
Branch ...	tr	tr	·25	2·04	·36	2·65	....
Ledgeriana:							
Natural ...	5·49	1·33	...	·81	·88	8·52	7·38
Branch ...	2·21	·49	...	1·07	·50	4·27	2·97
Javanica:							
Natural ...	...	...	1·32	2·64	·48	4·44	...
Branch ...	...	...	1·43	1·49	·45	3·37	...
Humboltiana:							
Natural ...	2·24	1·55	tr	·49	·90	5·18	3·01
Renewed	1·28	·64	...	·43	1·07	3·43	1·72
Pitayenses:							
Natural ...	2·34	·56	1·10	1·93	·39	6·32	3·14
Mossed ...	3·81	·95	·63	1·91	·37	7·67	5·12
Renewed	2·50	·52	·78	2·33	·55	6·68	3·36
Pahudana:							
Natural ...	·04	·10	...	·39	·43	·96	·05
Renewed	·51	1·19	...	·28	·87	2·85	·68

5. *Renewal by shaving.*—Shaving cinchona trees has been for some years a method of harvesting bark which in some districts works better than that of stripping and mossing. The cellular and richer portion of the bark is removed in this way and the fibrous portion is left. The bark thus treated thickens again, and the shavings taken from it are found to be richer still in alkaloids. The analyses of some succirubra shavings taken from trees grown in the Ouchterlony Valley will show to what an extent trees may be improved by this method. The renewals had been taken after intervals of twelve months; the experiment, therefore, has lasted over three years.

	Quinine	Other Alkaloids.	Total.
Original Bark	1·35	5·87	7·22
Once renewed	2·46	4·22	6·68
Twice renewed	3·60	3·99	7·59
Thrice renewed	3·87	3·71	7·58

6. The increase in quinine during the first and second year by renewing is most satisfactory; the increase is not so prominent in the third year, but the bark is good, and indicates that shaving for at least four years might be permitted. The trees upon which these experiments were made were six years old, when the original bark was taken. If at this comparatively early age they are not injured by shaving, and renew their bark so well, it is not desirable to wait for the trees to become more matured.

7. When trees are allowed to grow until they are over 12 years of age and then shaved, the renewal sets in more slowly, and the resulting bark does not compare more favorably with the original bark than if the trees operated upon had been half that age. This may be instanced by quoting some more analyses. Last December some interesting samples were sent by the Manager of the Glenrock Company, South-East Wynaad, consisting of some natural and renewed shavings of succirubra taken from trees of 6 and 12 years of age.

The following is the analysis of four of the samples:—

	Sulphate quinine.	Total.
Red bark, 6 years natural... ...	1·34	5·00
„ „ renewed, 2 years... ...	2·54	6·95
„ „ 12 years, natural... ...	2·43	7·41
„ „ renewed, 2 years... ...	2·71	7·01

8. Thus it is seen that by renewing a 6-year-old tree 90 per cent more of sulphate quinine is obtained, and by working on a 12-year-old tree, only an increase of 12 per cent takes place during the same period of two years. With regard to the total alkaloids, it should also be noticed that the shaving has made an increase of 39 per cent in the younger tree, while the older bark has somewhat deteriorated. One of the most important features in these results is that the renewed bark from the 6-year-old tree is superior to the natural bark from trees of twice that age.

9. I have had very few opportunities of observing the effect of shaving on pure Ledger barks, containing little, if any, alkaloid besides quinine, but it appears that hybrid Ledgers of the broad-leaved variety holding cinchonine, are capable of great improvement by the shaving process as the following renewals of 11 months will show compared with the natural bark of 6-year-old trees:—

	Sulphate quinioe.	Total.
Ledger bark, narrow leaf, natural 1885	4·09	5·97
„ „ „ renewed, 1886	6·62	8·49
„ „ broad leaf, natural 1885	2·90	6·61
„ „ „ renewed, 1886	5·19	8·51

10. The sulphate of quinine in the narrow-leaved Ledger had increased 62 per cent and in the broad-leaved Ledger 79 per cent the greater increase in the latter variety is due to the presence of other alkaloids which appear to develop quinine in the growth of the tree.

11. Shaving old trees has certainly not had a beneficial effect from some trials made on Government estates. Both red and crown trees from 16 to 21 years of age cannot well bear the removal of the bark in this way and the renewal takes place slowly and is impoverished instead of being enriched. A crown bark was taken from Dodabetta aged 20 and shaved. The shavings gave 3·66 sulphate of quinine; after six months some renewed shavings were taken and found to yield only 1·85 per cent sulphate of quinine, the bark then was commencing to decay and the tree has since died.

12. *Experiment in manuring Cinchonas.*—The effect of manuring cinchona trees in order to stimulate their growth and produce a greater yield of alkaloid has been tried recently at Naduvatam. The first experiment was made upon a succirubra of 7 years growth. Cattle manure which had been previously kept for some time in closed pits was applied some six months before the bark was taken for analysis. A sample of bark from a tree in the same plot, but which had not been manured, was collected at the same time for comparison. Two samples of magnifolia bark were taken from trees which had been manured in a similar manner to the succirubra; the first was 17 years, the second 20 years old, and samples from unmanured trees were taken for comparative analysis at the same time.

13. The results of the examination are tabulated below:—

	Quinine.	Cinchonidine.	Cinchonine.	Amorphous alkaloids.	Total.
Succirubra manured	2·29	3·78	1·94	·52	8·53
„ unmanured	1·51	4·13	2·03	·32	7·99
Magnifolia 1 manured	3·78	3·90	·28	·82	8·78
„ „ unmanured	3·13	4·39	·56	·39	8·47
„ 2 manured	2·59	3·49	1·21	·53	7·82
„ „ unmanured	2·62	2·67	·67	·56	6·52

14. It will be seen that the manuring has had the effect of increasing, in each instance, the amount of total alkaloids in the bark; and the quinine, the most important feature, has received a gain of 52 per cent. in the succirubra, and 20 per cent. in the first magnifolia. In the older magnifolia bark the quinine remains about the same in quantity, and if no other influences were at work, it might be inferred that older trees are not so sensitive to the action of manure as younger and vigorous-growing trees which have not reached maturity. The food of such plants as cinchonas which yield alkaloid in large quantity must of necessity contain some nitrogenous element, and as this must be taken from the ground it is only fitting that a manure of this kind which contains some constituents which are similar in their nature to alkaloids should be supplied periodically to soils. Regarding the question from a commercial aspect the higher value of the bark would cover the expense of the manure and the cost of its application to the land. The succirubra bark mentioned in the first experiment, if the market price of the unit of quinine were 4d, would realize eight pence per pound, whereas the bark of the manured tree would be more than one shilling per pound. I believe the effect of manuring would be more apparent in Crown and Ledger barks with large proportions of quinine in the total alkaloids; in such cases, the extra outlay on manurial agents, compared with the additional value of the bark, would be much more remunerative.

15. *Increase of Alkaloids with the age of trees.*—A question of much importance in cinchona cultivation is the age to which trees should grow before the bark can be profitably taken. To settle such an inquiry, a large number of analyses of barks taken from trees of all ages should be available, and in the following tables I have made a selection of both Ledger and red barks and have arranged them according to age. Some of the figures are average of two or more analyses, and as the two lists represent some forty samples, I hope it will help to throw some light on the subject.

16. The first list comprises natural barks of the narrow-leaved variety of *C. Ledgeriana*, and with one exception, they all come from the Wynaad district.

17. The second list is by taking from my laboratory journal all those red barks whose ages have been determined, whether they come from the Government Plantations at Naduvatam or from private estates in Wynaad, Coorg or Travancore.

Ledger Barks.

	Quinine.	Cinchonidine.	Other alkaloids	Total.
20 months ...	1·68	·66	2·77	5·11
2 years... ...	2·18	·65	2·69	5·52
3 „	3·28	·55	2·90	6·82
3½ „	4·73	·93	1·81	7·46
4½ „	4·97	·79	1·78	7·54
5 „	4·57	1·02	1·46	7·05
5 „	5·09	1·06	0·55	6·70
5½ „	7·54	·31	1·15	9·00
6 „	6·52	·76	·88	8·16
6½ „	5·97	1·18	1·00	8·15
8 „	7·59	1·16	1·45	10·20
20 „	5·58	1·24	·83	7·67

Red Barks.

	Quinine.	Cinchonidine.	Cinchonine.	Amorphous alkaloids.	Total.
2 Years	·55	·72	1·20	1·22	3·69
3 „	·85	1·75	1·67	·99	5·26
3½ „	1·08	1·65	1·15	·64	4·52
4 „	1·13	2·03	1·79	·58	5·53
4½ „	1·02	2·64	1·78	·50	5·94
5 „	1·23	2·72	2·36	·52	6·83
5½ „	1·32	2·15	3·11	·63	7·21
6½ „	1·31	3·22	2·18	·71	7·42
7 „	1·70	2·69	2·28	·93	7·60
7½ „	1·78	3·18	1·97	·53	7·46
12 „	1·81	2·62	2·08	·90	7·41
16 „	1·08	·94	1·04	1·57	4·63
20 „	·78	1·13	1·37	·97	4·25

18. In the Ledger barks it will be noticed that there is a steady rise of quinine up to the age of between

five and six years, after which there is no apparent increase.

19. In the second table of red barks, the same fact is shown that the bark has attained its maximum content of alkaloids when between 5 and 6 years of age. The quinine increases up to 12 years, but, as pointed out before, the renewed bark of the younger trees would much exceed the slightly increased value of these older barks. The trees of 16 and 20 years show a marked deterioration in alkaloids, although the bark is often in large thick fibrous pieces similar to the drug that was originally exported from the South American forests.

20. *Effect of Mould on Bark.*—It has been stated that bark loses much of its virtue when allowed to get mouldy or when kept in a damp atmosphere. I was asked more than a year ago to analyse some mouldy bark to obtain its value but not knowing the composition of the fresh bark the result would not have been very useful. I have, therefore, made an experiment which shows that little if any effect is produced by prolonged contact with mould. A sample of powdered bark of known composition was taken in December 1884 and kept in an open dish on the floor of a dark damp room, a fungus (Penicillium) set in in a fortnight, and spread itself over the surface of the powder, and slightly increased its weight. The bark was constantly stirred so that fresh bark from beneath might be influenced by the fungus. It was mixed occasionally for 10 months and as the mycelium had by then penetrated to every particle of the powder it was analysed in October 1885, with the following results:—

	Original bark.	Mouldy bark.
Quinine	2·82	2·80
Cinchonidine	1·22	1·25
Quinidine	·18	·11
Cinchonine	·90	·87
Amorphous	·31	·45
Total...	5·43	5·48

21. It is thus manifest that the analyses, being almost identical, moulded barks of 10 months are not necessarily deteriorated.

22. *Liquid Extract of Cinchona.*—At the suggestion of Dr. Cornish last year, I prepared a sample of liquid cinchona which was reported upon most favorably by several medical officers in the Presidency and called forth an order from Government for the preparation of 1,000 lb. (G.O., No. 550, 12th May 1885). In August last, 1,000 lb. of bark were supplied to the Medical Stores in Madras, and resulted in the manufacture of 595 lb. of liquid extract (*vide* demi-official letter from Principal Medical Storekeeper, dated 10th September 1885.) As a loss must have taken place in this outturn I received orders to produce another batch immediately under my supervison in Ootacamund (G.O., No. 55, 25th January 1886). 500 lb. of bark was powdered by the Medical Store Department, the maceration with the necessary chemicals and percolation was conducted in my laboratory, and the evaporation was made in ordinary chatties in an adjoining out-house: 340 lb. of liquid cinchona of the prescribed strength, 40 grains to the ounce, were thus made in two months at a cost of R211 as detailed below:—

	Rs.	A.	P.
Grinding 500 lb. of bark	4	0	0
Glycerine	52	0	0
Acid	9	0	0
Fuel	24	0	0
Labor	20	0	0
Chatties	3	8	0
500 lb. of branch succirubra bark estimated at 3 annas per lb. (taken the current value of the unit of quinine)	94	0	0
Rent	5	0	0
Total ..	211	8	0

Allowing for the high cost of buying the chemicals in Madras instead of from London direct, and taking into account the special expenses of this experiment, I consider that if made on a large scale and continuously, it should not cost more than R7 or R7-8-0 for an amount of liquid extract containing 1 lb. of solid ferbrifuge.

APPENDIX.

Analysis of Cattle manure stored in covered pits on the Government estates.

Water	7·9
* Organic matter	61·1
† Ash soluble in acid	12·7
Siliceous residue	18·3
Total...	100·0

Analysis of sample of Peat from the Dodabetta Plantation and used for burning at the drying sheds.

Organic mater	86·8
Siliceous ash	13·2
Total...	100·0

STATEMENT showing the Quantity of Seed, &c., sold to the Public during 1885-86.

Particulars.	Seed. lb.	Seed. oz.	Plants.
Cinchona Condamenia... ...	21	3	...
Do. Magnifolia	32	11½	15,000
Do. Succirubra	22	8	...
Do. Pubescens	14	8	...
Do. Verdes	...		151
Do. Moradas	...		1,876
Do. Ledgeriana	...		800
Total	90	14½	17,827

CHICKMAGALUR COFFEE PROSPECTS.—The rains have been timely and mother earth very prolific. The berries on coffee plants set well and have developed nicely, in some quarters of the district where the temperature rises very high during the day, the berries are ripening and picking will soon commence, and the cry for labour is beginning to rise. There are planters who, owing to one reason and another, are always able to command sufficient labour, but there are other unfortunates who can never get sufficient, in consequence of which, fine estates are overgrown with weeds, and useless suckers have to be allowed to drain the plants of their very life-sap, and thus the quantity of berries is injuriously affected. Those who look for labour only within the district generally meet with disappointment; others import their labour from South Canara and more distant parts.—D. P.—*Madras Weekly Mail.*

HOW TO BULK TEA.—A gentleman, some years in the China Tea trade, gives the following method as being the simplest and least expensive: Four square and wooden posts grooved on two of the adjoining sides, and several planks of say, 18 inches in breadth are all that are required. These should be made into a pit or large box, the posts forming the corners and the planks the sides. The pit should be built raised some 4 feet from the ground, the bottom being made of having a sliding trap-door in the centre, so made that the outlet can be enlarged or reduced according to the size of the leaf to be bulked; when the pit is being filled with tea the trap-door remains closed. The tea to be bulked should be spread out in layers as thin possible, one quality on top of another, until all the tea required to be bulked is inside the pit. Now open the trap-door, and the tea will run out from the top, taking a little from each layer in its downward course, the result being a *perfect bulk.* The bottom of the box should be made slightly on a slope from the sides to the centre near the aperture, so that the tea may get away equally. By means of a zinc tube the current of tea leaf can be carried direct from the pit into the package standing on a lever scale. A sand-glass will illustrate the above on a small scale. Tea is bulked in China on the same principle as the above, but there, one side of the pit is drawn away and packages filled from the tea that collects at the foot of the pile.—"Ceylon Advertiser."

* Containing Ammonia 2·15

† Containing Tricalcic phosphate 3·50.

MR. G. H. D. ELPHINSTONE ON RUSSIA AS A MARKET FOR CEYLON TEA.

Russia being, next to Britain, the largest consumer of tea of any nation in the world, our readers will peruse with interest the graphic letter in which Mr. Elphinstone records his experiences in the modern and ancient capitals of "the White Czar's" vast dominions. What he says about his sufferings from intense cold will cause our readers to appreciate the desire of the Muscovites to

"—— see before they die
The groves and temples of the south."

The cemeteries and mosques of Constantinople being, however, substituted in Tennyson's lines. The instinct which drives the northern hordes southwards is next to irrepressible, and we suspect that do what England, Europe and the world may, the banner of "Holy Russia" will yet float over the mosque of Sophia, in its new character of a cathedrial of the Greek "Orthdox Church." The Russians may then, like the Turks take to coffee, but meantime we have to regard them as incessantly engaged in brewing tea in their samovars to keep out the bitter cold, which Mr. Ephinstone, though a Scotchman, found too much for him. But the tea the inhabitants of St. Petersburg drink, is of a peculiarly delicate quality and has artificially imparted to it a special flavour. Then there is a "ring,' such as we had to do battle with in Melbourne, and such as exists also in the United States, who are determined, if possible to, keep out a new thing calculated to interfere with their vested interests. But the crusade against monopoly commenced by an energetic Ceylon planter will be carried on by others, and long before the Russians are sitting in "the Sublime Porte," they will be delighting in the consumption of large quantities of Ceylon tea, unadulterated and of unsophiscated flavour. The battle against vested interests, custom, habit and taste, may be severe and long protracted, but Ceylon tea which has conquered the markets of Britain, will yet triumph in Russia and in the United States. Mr. Elphinstone tells us in a private letter that he will send out to Mr. Rutherford the samples of tea he brought from Russia, and he promises to let us have the opinions of London brokers on those samples. We cannot doubt that the movement thus initiated by our good friend "Logie" will be followed up by the Planters' Association of Ceylon and by individual planters. If so much tea is drunk in Russia, burdened as the article is with a duty equal to 1s 6d per lb., we may look forward to an enormous increase when a less onerous tariff is adopted by the Russian Government. Not much in this direction, at an early date, however, is to be hoped for from a Government which discredits its own depreciated paper money by refusing to accept its promissory notes and insisting on gold and silver payments. Still reform *must* come, even in Russia. Even as matters stand, her tea market is worthy the careful attention of our planters and merchants.

MR. ELPHINSTONE ON RUSSIA AS A MARKET FOR TEA.

To the Editor,

London, 18th Nov. 1886.

DEAR SIR,—I have for long believed that one of the best markets for our Ceylon Tea could be found in Russia and I accordingly made up my mind to visit St. Petersburg and ascertain for myself what chance there would be for the sale of Ceylon Tea, either by wholesale or retail agency. Through the kindness of a friend of mine, one of the largest merchants and shipowners in the Leith and Petersburg trade, I was enabled to do my journey at a nominal cost and I am satisfied that my fortnight in Russia gave me more *bona fide* information as to the requirements of the trade than any amount of letter-writing would have done. Thinking a short account of my trip may be of interest to some of your readers, I send you a few notes of what I saw and ascertained while in Russia.

I intended leaving Leith by the S. S "Petersburg" but was unable to leave London the day the steamer started and fortunate it was for me as after leaving Leith she had to lay two whole days in Aberleddy Bay, and after that had a fearful passage across the North Sea, arriving fully four days to five days late at Cronstadt—I went *via* Flushing, Hanover and Berlin to St. Petersburg by train. At Cook's office I got a second-class ticket for £9 10 10 which took me right through, and after a most comfortable journey, extending from 8-30 Wednesday evening till 6-15 Saturday evening, I arrived in St. Petersburg. The journey from London to Petersburg is full of interest to anyone who has never travelled that way before, for besides the charm of novelty, there is so much to be seen of real interest.

The well-cultivated canal-divided Holland has much sameness, but is of great interest. Then in Germany one passes through varied scenery, and none of more interest than the Black Country where the coal and iron industries are carried out. This is entirely between Hann and Hanover; Berlin is reached 24 hours after leaving London, another 24 hours brings one to the Russian frontier, and another 24 hours St. Petersburg.

Once into Russia the temperature was sensibly a great coat colder and at St. Petersburg with ordinary English winter clothing the cold goes right through one.

On my arrival I was fortunate enough to secure a most comfortable hotel, the Hotel de France. On the following morning, Sunday, I started with a guide to find the S. S. "Petersburg," as she had then ample time to have arrived, but I had a wild-goose chase, for, after 4 hours' cruising up and down the river among the shipping, I ascertained that she would not come further up than Cronstadt. I can tell you I had a good taste of Russian cold, 15 degrees of frost in St. Petersburg in an open boat with no furcoat is no joke, and I was right glad after cruising about for some time to see "Dundee" on the stern of a steamer. I promptly called on the Captain and experienced not only his kind hospitality in the way of a good hot Scotch dinner, but he also gave me a lift down to Cronstadt, as he informed me none of the Leith vessels came up further. Cronstadt is 23 miles down the river, the Naval Arsenal and the harbour where, until the completion of the canal, all steamers were unloaded and loaded, the river not having deep enough water for heavy draught before the completion of the canal. Cronstadt is the key of St. Petersburg, and in addition to the real island there are several artificial islands on which fortifications are built. From what the older English inhabitants say, Cronstadt ought to have been taken in the Crimean war, but by some mismanagement it was not. I did not find the "Petersburg" and was informed she would not arrive till Monday, so I returned by one of the river boats. Next day I returned to Cronstadt and found the "Petersburg" had arrived. I was thus able to get my box of samples. It would take longer than you would care to read, to narrate all the trouble I had to clear my box of samples. The difficulty lay in my hav-

ing booked the box as passengers' luggage, and not having accompanied the box myself. However, I did at last get the box passed and I do not grudge the time spent, as I ascertained fully all the intricacies of the working of the Custom house. The duty on tea amounts to about 1s 6d (English money) per lb. Russian. A Russian pound is 10 per cent less in weight than an English pound. The duty *must* be paid IN GOLD. The authorities will not accept their own notes, not even if you offered lemon may be added, and all the teas have a more or less artificial aroma, which must have been added by either dried Gardinia flowers or dried Lime leaves. As I said, I cannot speak with certainty, but I believe our inferior tea would suit Russia well, and the flavour now in their teas could, I believe, be easily added in Ceylon if requisite for their disposal. I enclose memo. of samples brought from Petersburg with prices attached. Next mail I will give you London values. It is extraordinary, the quantity of tea which is drunk in Russia and the tea shops in Petersburg and Moscow are as numerous and well distributed as the Public Houses in London. I visited Moscow, but having only one day there I could not find time for seeing the Cremlin and other objects of interest. However, I found out all I wanted about tea. Already some Indian or Ceylon tea has been sold in Moscow, imported by a young Englishman and with a mixture of China has sold well. I mention Indian or Ceylon as he was not certain which it was. He bought it in London from a firm I know. The translation of the Russian advertisement with reference to the tea is as follows:—

Newly Received
Tea from India
The crop 1886
Commenced to be sold at
ROUBLES 2 per lb.
2·20 Koopecks *
3· sold in 1 lb., ½ lb. and ¼ lb. packages.

Indian Tea under the name of Kakwyan (a place in India) is distinguished by its aromatic and soft taste and surpases the Chinese.

Customers outside the town may buy through the post office. All orders executed by

P. Bycloff & Co.,
Moorsuskeen,
Moscow.

Of course, there will be for some time a prejudice against Ceylon and Indian Tea, but that will soon be overcome as in England. A good deal of tea comes from China overland to Moscow and with that means of transport we can certainly compete.

List of prices of teas I brought as samples :—

Petersburg Teas.		Moscow Teas.	
No.	Roubles.	No.	Roubles.
1	8	1	2·68
2	5	2	2·20 (o)
3	4	3	2·
4	3·01	4	2·
5	2·64 x	5	1·80 (oo)
6	2·40	6	1·40
7	2·24		
8	2·		
9	1·84		
10	1·60 xx		
11	1·20 Brick Tea, not much used.		

12 Spurious tea made from a shrub growing in Russia used for mixing, 10 k. per lb. Not allowed by Government.

x xx These teas in principal use in Petersburg.

(o) (oo) These teas in principal use in Moscow.

I returned by sea from St. Petersburg ; stormy accross the Baltic, but fine in the North Sea.—Yours faithfully, G. D. ELPHINSTONE.

* A koopeck at present exchange is about 1s 4d ; it is really 100 of a rouble.

TEA PLANTING MANUAL.—In closing a review of *Owen's Manual*, the *Straits Times* says :—"These bright prospects speak volumes for the energy of the Ceylon tea planters who, taking every advantage of the favourable conditions enumerated above, have lifted the Colony out of the slough of depression, into which it had fallen on the collapse of the coffee enterprise. The Manual itself bears every mark of painstaking care. It is full of information on every subject connected with tea planting. Intending tea planters in this quarter will never regret the money spent in procuring copies for their behoof. To them it will prove indispensable indeed."

TEA IN WESTERN DOLOSBAGE is flourishing apace: we have just heard so good a judge as Mr. Gow speak in high terms of the Ardross and Glenalla estates as including some of the most vigorous tea he has seen in the country. On the latter property there is a field of 38 acres planted with seed at stake in 1881 and consequently about five years old, which has given this year so far, close on 1,000 lb.—certainly over 900 lb.—per acre and the tea has had no manure nor does it appear to suffer. Mr Drummond's Gangwarily is also doing well and he has got a splendid crop of cocoa this season; while it is needless to say that Mr. Blackett's far-extending tea fields are cropping. Some experiments in Dolosbage made by Mr. Gow in tea-making—improved fermentation —have resulted very favourably, to judge by the prices got in Mincing Lane for sample invoices.

THE USE OF COFFEE appears to be rapidly declining in England. The reduction of the duty to three-half-pence a pound has had no effect on consumption, and in the year ending 31st March 1886, some 314,000 lb. were consumed less then in the previous year. "The decline is attributed," "says the *Spectator*, "to the comparative difficulty which the poor find in making coffee; but it is quite as likely that the true causes are the declining use of alchohol, and the cheapness of tea and sugar. The bulk of the people prefer tea to coffee. If tea were ever to become really cheap—say, sixpence a pound—nothing else would be drunk ; and it would be drunk all day, cold as well as hot. The taste for it is becoming universal, and distinctly increases with the admixture of the Indian teas, which are rougher, and develop the special 'teacy' flavour."—*Madras Mail.*

ORNAMENTAL TREES AT HAKGALLA.—The following list of ornamental plants supplied by Mr. Nock from Hakgalla to a recent purchaser (R30 cost of all) for planting on a piece of ground at Nuwara Eliya, is of interest as showing what can be procured at the Gardens for a very moderate charge:—

		Height
Conifers or Fir tribe.	100 Frenela rhomboidea—Australian Pine	50-90ft.
	25 Pinus longifolia—Chir Pine ...	60-100ft.
	18 „ sinensis—Chinese Pine	30-40ft.
	6 „ massoniara from China)	30-40 (?)
	18 Cupressus macrocarpa—Citron Pine	150ft.
	18 „ tournefuti looks as though it would be large)	
	12 „ torulosa—Bhootan Cypress	180ft.
	6 „ Lawsoniana—Port Oxford Cypress	100ft.
	6 Thuja Orientalis—Chinese Arborvitæ	18-20ft.
	6 „ Nepalensis	12-20ft. (?)
	12 „ aurea-semper-aurea ...	3-6ft.
	6 „ conpacti	(?)
	6 Tristanea conferta—Queensland Box	50ft.
	6 Fraxinus Americana—Am: White Ash	60-80ft.
	2 Quailaja Saponaria—soap-bark Tree	60ft.
	12 Tecoma velutina—Velvety trumpet flower	12-20ft.
	6 Psidium montanum—(Hard-wooded Jamaica tree)	30-60ft.
	12 Leptospermum scoparium—Broom Tea Tree	12-20ft.
	6 Callistemon rugulosum (Bottle-brush)	10-20ft.
	18 Salix Babylonica—Weeping Willow	40ft.

Correspondence.

To the Editor of the "Ceylon Observer."

COFFEE AND GREEN BUG.

DEAR SIR,—If this bug is more to be feared than leaf-disease, or any other previously known coffee-pest, the different Planters' Associations would do well to collect all the information available with regard to its increase, decrease or stationary character, and publish the same periodically. Coffee is now, or soon will be, so valuable that it is worth even this attention yet. If it is retiring all along the line, I should not be surprized to see a little coffee planting started again in favorite localities

PROPRIETOR.

COCONUT FIBRE DUST.

Colombo, 2nd December 1886.

DEAR SIRS,—Will any of your numerous correspondents give their experiences with that curious substance which we call coconut fibre dust, which comes away from the dry husks of the coconut in the proces of extracting the fibre.

The absorbing properties of this substance are well-known and it is for this reason that I presume it is so extensively employed in gardening.

It would, however, appear that it is applicable to other, and probably more useful purposes, for a young French Chemist, Mr. P. Germain, has brought it to notice in connection with Primary and Secondary Batteries. M. André Reynier, the Electrician to the Société Générale des Téléphones has investigated its uses in connection with electricity.

From a report which has been written by M. Reynier for *L'Electricien*, we gather that "sporique," as its finer variety is termed, is prepared from the husks of the coconut; it has the colour and aspect of coco powder.

The extraordinary properties of this substance arise from its extreme lightness, its specific gravity being represented by the abnormally low figure of 0·08. Under the simple pressure of the hand its volume can easily be reduced to one-third, and even then its density is only about one-fourth that of good sponge. Its absorbing power surpasses that of all other known materials. A given volume of "sporique" can easily be made to take up a volume of liquid equal to itself, without any perceptible increase in the total volume; or, in other words, the volume occupied by "sporique" in the combination is *negligible*.

A good sponge will absorb seven times its own weight of water: "sporique" absorbs 12·5 times its weight of water. The substance has hitherto been found to be insoluble both in acids and in alkalis and in solutions of salts. It is, therefore, evident that it will thus readily lend itself for use in primary or secondary batteries. M. Reynier states that the resistance of the battery is not perceptibly increased by its presence, and it is suggested that by saturating two slabs of the substance it may be employed in two fluid batteries, thus doing away with the porous cell. Not only are liquids thus kept separated and preserved from accidental spilling, but it is also found that the loss from evaporation proceeds much more slowly. It would appear that the substance is certainly worth a trial for the purpose indicated, and I hope the day is not far distant when the heaps of refuse coconut fibre dust now looked upon as worthless may possess a commercial value sufficient to make the export remunerative. Whatever the results, I trust this brief notice of a substance so well-known to us may stimulate enquiry.—Yours faithfully,

ED. B. HURLEY.

58

TIMBER FOR GUNSTOCKS.

Haldummulla, Dec. 2nd 1886.

DEAR SIR,—I enclose a cutting from the last *Field* on the subject of wood for gunstocks. Perhaps, your botanical correspondent may know whether the tree in question (Orcodaphne bullata) grows in this country. I have myself seen in the Kegalle district trees which emit a sufficiently villainous odour to merit the epithet applied to Orcodaphne; and whilst living in Badulla, I had a gate made of a heavy white wood which always smelt very unpleasantly after a shower of rain. If the Orcodaphne is found in Ceylon it might pay to export the timber for the purpose indicated by the *Field* correspondent.—I am, yours faithfully,

EDWARD F. HOPKINS.

STINKWOOD (ORCODAPHNE BULLATA) FOR GUNSTOCKS.

Sir,—The subject of this excellent wood being used for gunstocks made in this country has recently been mooted in the leading daily paper. As it is of consequence to sportsmen in India, South Africa and its interior, or other parts of the world where climatic influence or rough wear may have to bear on the gunstock, to know the most serviceable, I ask your permission to give in *The Field* a few particulars respecting the Orcodaphne bullata, a wood that cannot be too highly recommended. The orcodaphne is of two shades of colour, a lighter (sometimes almost approaching Hungarian ash), and the darker, ordinarily selected for gunstocks. This has been compared to mahogany, but perhaps it more resembles something between rosewood and American walnut. It is decidedly a handsome wood, and in grain is firm, close and tough; it is not given to warp when seasoned, nor snap across the grip like walnut; in fact, it possesses every merit almost desirable, except being heavier than walnut. In its seasoned state it has not the slightest disagreeable odour. Botanically the tree has been thus described in Hooker's "Botan. Mag." t. 393 l.:—

Orcodaphne bullata, Nees ab E. (stinkhout, stinkwood), much branched, branches divaricating, smooth; leaves, alternate, leathery, elliptical, veiny, netted, glabrous, attenuated into a chanelled stalk, and having at the axils of the lower costals veins, on the underside, deep hollows, ciliated at their edges, and showing on the upper surface corresponding blister-like protuberances; flowers, small, racemose; racemes, lateral or exillary; perianth, 6 parted; lobes, obtuse, deciduous; corolla, none; stamens, 9; grands of the outer stamens large, capitate; style, tapeling; stigma, peltate; berry surrounded at base by the enlarged, thickened, cup-shaped tube of the perianth.

Though this wood was the African oak of Barrow, Dr. Pappe has stated, in his "Silva Capensis" (Cape Town, 1854), the real African oak of commerce is "Oldfieldia africana." I would strongly recommend the leading English gunmakers to have a supply in stock of Orcodaphne bullata, and to suggest its adoption by any customer about to proceed to a hot climate, or requiring a gun or rifle stock for rough work; but it must be observed that the wood has become scarcer, it appears, and is therefore probably dearer than it used to be some years ago.

In a memorandum on the Crown forests of the Cape Colony, published in the *Times*, September 25th 1885, it was stated: "The two kinds of timber most sought for in these forests are "stinkwood" (Orcodaphne bullata) at the Knysna, and "sneezwood" (Pleroxylon utile) in the eastern districts, and these two kinds have been fast disappearing." It is also stated in that memorandum that the Orcodaphne bullata, when cut, possesses the singular property of throwing out from the stump shoots, which again throw out roots descending (*sic*) the old stump.

FREDERIC R. SURTEES.

Boxley Abbey, Sandling, near Maidstone, Oct. 26th.
—*Field*.

[The Ceylon "stink-tree" is thus described in *Ceylon Timber Trees* :—

"Celtis dysodoxylon," Thwaites En. p. 267. *Goorenda*, S. Moon's Cat. p. p. 26 and 32, Nos. 418 and 531 pt. 2. *Urene*, S. ex Ainslie 2 p. 317 *Poodacarapan Puttay* (its bark,) *Tamil*. *Pau de merda*, and *Pau sujo*, Port. A middle-sized tree in the Central Province up to 5,000 feet. This is a notorious tree from the fact that I believe its freshly cut wood has the most abominable and disgusting odour of all plants in the vegetable kingdom. Hermann wrote about it upwards of 200 years ago, but mixed it up with the *Wel-boorenda*, S. ("Clerodendron inerme,") and misled Linnæus and Burmann by so doing. His explanation of the Sinhalese name, and other remarks I give in his own words, as no doubt applying to this tree :—"Ghu stercus humanum notat. *Rhœnda* fœtorem stercoris. Est et alia species arborescens. Alias *Rhœnda* notat proprie lignum sublato cortice cæterisque." Mus. zeyl. p. 23. Thunberg when in Colombo in 1777, gave the following account of it :—

"The stink-tree was called by the Dutch *Stinkhout*, and by the Sinhalese *Urenne*, on account of its disgusting odour, which resides especially in the thick stem and the larger branches. The smell of it so perfectly resembles that of human ordure, that one cannot perceive the smallest difference between them. When the tree is rasped, and the raspings are sprinkled with water, the stench is quite intolerable. It is nevertheless taken internally by the Sinhales, as an efficacious remedy. When scraped fine and mixed with lemon-juice, it is taken internally, as a purifier of the blood in the itch, and other cutaneous eruptions, the body being at the same time anointed with it externally. I was at great pains to procure some blossoms of this tree, in order to ascertain its genus, but was constantly disappointed. Of the Sinhalese, whom I sent out for that purpose far up the country into the woods, I could only obtain some branches without any blossom; from which, however, I could perceive, that the tree was neither the *Anaygris fœtida* nor the *Sterculia fœtida*. I had likewise set some live, but small, plants of this tree in boxes, and carried them with me alive quite to the English channel, where they were totally destroyed, together with several other scarce trees and plants, by cold and storms. Of the wood, I carried with me some pieces to my native country, which, however afterwards lost their scent to that degree, that now not the smallest trace of it can be perceived."—Travels 4 p. p. 234—5. "What this tree absolutely is, becomes a subject for future research. Ain 2 p 318. For Thwaites, therefore, remained the privilege of naming this tree Botanically.]

TEA HAIR.—No. I.

SIR,—This is nothing more than the "fluff" from the pubescent tips of the tea buds, the hairs from the fine pekoe or orange pekoe. It is a provision of Nature for the protection of the young leaf when in embryo. All plants are provided with a protection to the young or embryo leaf or fruit bud. With coffee a resin or gum, coats the blossom and many think when the blossom buds or "spike," as we call it, is burnt it is simply the resin or gum exuded from the plant: a wise provision of nature to protect it from the hot sun. The first fall of rain or genial shower at once dissolves the gum, the burnt blossom bud opens and the snowy white of a beautiful plant in full bloom replaces the burnt spike. All plants have some protection and in many cases the leaves, as with several varieties of cardamoms, retain their pubescence, but the tea shrub throws it off as the leaves develope. This fluff has been shipped from Ceylon as "bloom," it is practically worthless and has never found a market; let the curious try it in the cup. One thing is certain, however, this pubescent fluff is so fine that it will permeate the whole of a tea factory and lodge on every beam and corner and it is not only easily ignited by a match or light carelessly thrown down, but like "punk" or German tinder, once lighted it will smoulder for days and when least expected will break out in a red glowing mass, never flame, but quite sufficient to burn down the factory. The smell of the burning fluff, however, is so pungent that it is readily detected. A few drops of coconut or kerosene oil dropped on the tea hair will or may create spontaneous combustion, like cotton waste it might be in a few hours; therefore, keep your tea factories and especially your machinery and sifters, where there is both oil and fluff, thoroughly clean and free from red dust and the risk of fire will be greatly reduced.

If you have to pluck "banje" you will have proportionately more hair, fluff, pubescence, red dust or bloom, because the "banje" tip the effect of a cold wind or other cause is so tightly wrapped up in its warm pubescent covering, that it is nearly all fluff and only genial showers and a rush of warm sap will set free the imprisoned bud.

J. IRVINE.

P. S.—I may add the tea hair is both interesting and very beautiful under the microscope.

No. II.

December 3rd 1886.

DEAR SIR,—Your article on above subject in paper of 30th is very interesting.

I sometime ago tasted tea hair but did not repeat the experiment. Liquor was very thin in appearance and had no strength, whilst flavour was awful and *nose* of cutturn almost did for me—it was just exactly like something I never heard or thought of before. I tasted it with a view to ascertaining whether or not it could in any way add to strength or flavour of tea, and I came to the conclusion that it did neither. In my opinion it spoils the appearance of finer teas and I have in consequence, ever since trying above experiment, carefully extracted it from my teas and —thrown it away. But if there be a market for it at home, the sooner our Colombo brokers take it up the better. Just fancy having a "tea hair sale"! Of course it's hard rolling that brings out the hair and I have seen so much of it that the sifting cooly was glad to put his head out at window to get a mouthful of fresh air. And I may say in conclusion that if "tea hair" manipulation is to be successfully gone about, Barber's Rollers will yet cut a way for themselves like—Yours truly,

OLD HA(IR)RY.

COCONUT DUST.

Colombo, 8th Dec. 1886.

DEAR SIR,—Referring to your remarks on Mr. Hurley's letter on the question of utilizing coconut fibre dust for scientific purposes, I may mention that about three years ago I made some experiments to ascertain its fertilizing value. I got some from Horrekelly and put it into forty cement barrels. I mixed the coir with liquid manure in varying quantities and allowed the barrels to stand for a year until the coir decomposed. After the expiration of that time I planted vegetables in the barrels, they grew pretty well, but not altogether satisfactorily. I therefore turned out the contents of one of them, and found it full of large white grub. I then turned out all the others and I should say there was a hundred in each barrel. The crows had a jolly feast of them.

This facility for breeding grubs appears to me to be a great objection to the use of coir in bulk as a fertiliser, when it is formed into one. It can, however, no doubt, be used very advantageously

by horticulturists in those cases where the use of decayed leaves or wood is beneficial especially with ferns.

At the present moment I have ten large pots filled with coir, mixed with liquid manure, in which brinjals are planted; they are growing fairly well, but nothing like as well as those in pots with sandy soil and the same quantity of manure. The objection to the use of coir as a top dressing for coconuts, is, that it retains the moisture, and thus draws up all the young roots to the surface and finding no sustenance in it, they die off especially in dry weather. Simply put on the surface, it appears to be very injurious, indeed, in a dry climate like Horrekelley, all surface manuring, which draws up the roots, instead of allowing them to seek the moisture lower down, must in the *long run* be injurious.

If the coir is put into holes, the remote benefit from it, when it becomes humus, does not compensate for the immediate expense of burying it.

What the late Mr. D. Wilson contended for was, I believe, that the coir dust without being mixed with manure, was not of any immediate value as a fertilizer, and that the Horrekelley sand was a better and cheaper medium for applying manures than coir, with fewer drawbacks.

No one who knew Mr. Wilson's inventive genius, and mania for experimenting almost equal to my own, can doubt, that every method of utilizing the vast mounds of coir at Horrekelley was employed, and when such a man came to the conclusion that the Horrekelley fibre dust could not be beneficially used, it is a good excuse for his successors, not doing more than experiment with it; whichI believe they have done.—Yours truly, C. S.

TEA-MAKING AND TEA PRICES: LARGE AND SMALL BREAKS; USEFUL HINTS.

Nahalma, 13th Dec.

DEAR SIR,—I have read in your paper of 8th, Messrs. Forbes and Walker's letter anent tea prices; also your footnote, in which you remark "how easy it is especially when dealing with small quantities, to show exceptional rates. Averages for large quantities are doubtless the true test." Seeing that so many, even when dealing with small quantities, fail to show exceptional rates, it would be a great boon were you to point out the very easy way you allude to. Nahalma tea goes forward in small quantities, because it is found convenient to dispatch it weekly, by coolies going for their rice; but as every sale so far, has proved that buyers appreciate this tea, I cannot see how the "small quantities' has anything to do with it. If it has, the Brokers would only be doing their duty if they advised all local sellers to send in their teas weekly.

But granting that larger quantities are a better test of value, I send you my average for the month of November. Messrs. Lee, Hedges & Co. sold for me in that month 4,242 lb for R3,437·77, or an average of over 81 cts. per lb. If Kaluganga, Glentaaffe and G. V. (in dia:) have done better, I congratulate the owners.

I note Messrs. Forbes & Walker say, "moreover Kaluganga, and G. V. breaks contain everything made, we do not think the others do." That the Colombo world may be furnished with proof of the great penetration and astuteness of these gentlemen of the hammer, I admit that my last break did not contain everything made. Messrs. Wilson & Co., sold 30 lb at 90 cts. and I sold 20 lb. damaged dust at 30 cts! But including those large outside sales, Nahalma average for Nov. is 81 cts. Of course, I agree with what Mr. Forbes has assured many of my friends, that the tea sold much in excess of its value,

I hope you will give this opinion of our leading Colombo broker publicity in your *Overland*, as I see by your issue of 10th that London buyers are also labouring under a delusion with regard to this tea. Nahalma average, you give in the London sales as highest, except that of Riverside; and in the grades sold from Riverside, Nahalma prices are considerably higher than those of that estate! —Yours &c. WM. MACKENZIE.

[We learn that all Mr. Mackenzie's tea is sold in Colombo, that is all made at Nahalma since they began to manufacture their leaf, with the exception of a small quantity of tippings taken after pruning which is sold to a native. In Nov. Mr. Mackenzie made at the rate of 550 lb. per acre from 80 acres two years and four months old. Quantity and quality are due to good work in opening those 80 acres, good jât and good soil. The credit for choice of land, seed and work are due to Messrs. Forsythe and Bett; but Mr. Mackenzie is responsible for the manufacture and he may well be congratulated.—ED.]

TEAS FOR THE AMERICAN MARKET.

SIR,—I have just received the accompanying samples of Oolong from Foochow that planters may see the class of tea required for the American market.

Planters wishing to examine these teas for practical purposes can do so at my office.

Kindly return samples at your convenience.

At foot I give report.—Yours faithfully,

FRANCIS F. STREET.

Colombo 14th Dec. 1886,

The following is the report alluded to above:—

Box No.	Grade	Character of leaf	Liquor	About value per lb.
43	Fully fair cargo	Blackish, rather stalky and yellow	Fair brisk	20 dollar-cents
170	Fully good to Superior	Good blackish	On fine	28 ,,
62	Fully fine	Fragrant blackish little stalky	Fine flavor	36 ,,
89	Finest to choice	Fine fragrance blackish even wiry little stalky	Choice	50 ,,

These teas are grown in Saryune country.

The export of Oolong to America to 12th of last month was 15,630,000 lb. against 17,250,000 lb. same date last year, the former being more than three times the export of Congou—the consumption of which is comparatively small—the figures from all China this season only reaching some 5 million lb. to same date, against 3½ previous season. To the above has to be added the export of green teas from China and Japan, some 34 million lb. to 12th November.—Yours faithfully,

FRANCIS F. STREET.

RICINUS COMMUNIS CULTIVATION IN THE UNITED STATES.—According to the *Oil, Paint, and Drug Reporter*, there is a belief among American commerical men that there are millions in cultivating the *Ricinus communis* and extending the castor oil industry. Two new companies for this purpose have been started in the south, and there are many inquiries for particulars regarding the culture of the castor plant. It is claimed in the South that the farmer can cultivate the castor seed on his poorest land and make more money than with cotton on the richest bottom lands, and at the same time command cash for every load. In Texas, twenty-five farmers were furnished with seed this season and guaranteed the full St. Louis price for the seeds, which to-day is $1·70 per bushel. Some years ago castor oil was so abundant in the South, that it was principally used for illuminating purposes, but other more profitable crops gradually displaced it, and the revival of interest in the article may be a repetition of history, as larger production means lower prices,

THE DRY ROT FUNGUS.

MERULIUS LACHRYMANS.—The dry rot fungus is one of the most widespread and destructive of all fungi. It is espe ially common and well known on the squared timber of ill-ventilated buildings, and from dressed wood it will quickly spread to walls, whether built of stone, brick, or concrete; it will often grow through the mortar of a thick wall, and perfect itself on the bricks both outside and inside. We have seen it growing on damp concrete between the girders of iron fire-proof floors, and seen it spread from wood on to plate-glass, and perfect itself on the latter substance whilst drawing its nourishment from the wood. In wine cellars it will spread from the wood work and walls to the bins and even to the corks of wine bottles. The mycelium of the fungus will luxuriate between the cork and the neck of the bottle; a slight attack of this sort is said to make the wine "corky."

The dry rot fungus prefers the squared unpolished wood of coniferous trees as a substratum on which to luxuriate, but we have seen it on polished Mahogany, and it will spread from other woods to Teak and destroy Teak-built ships. It is not uncommon on the fallen timber of Pine woods, but, like some other plants, it has long been peculiarly associated with man and his dwellings. It destroys churches, houses, ships, bridges, railway sleepers, telegraph poles, and many other objects. It must not be assumed, however, that the true dry rot fungus is the sole, depredator. There are twelve British species of Merulius, inclusive of M. lachrymans, and several of these appear at times in our houses. We have seen M. coriun almost as destructive as M. lachrymans. In addition to the dry rot fungi, it is by no means uncommon to find buildings destroyed by different species of Polyporus, Lentinus, and other fungi.

Merulius was so named by Fries on account of the shallow pores or wrinkles of the spore-producing surface, and lachrymans on account of the drops of moisture, like tears, which stud the fruiting surface of the fungus when growing in full vigour.

The upper part of the accompanying illustration (fig. 125, p. 629) shows a small plant of a dry-rot fungus; the circumference is white or livid in colour, and thick and fleshy. The whole plant is fleshy and almost meaty when cut. The odour is very strong and Mushroom-like. The livid rim consists of transparent interwoven fungus tubes and cells as illustrated, enlarged 400 diameters at C; tubes of this nature and size also form the entire base of the fungus. The fungus cells or tubes break down the substance of the wood upon which they grow and transport the juices of the wood to the fungus for nourishment. The central part of the surface of the Merulius is rich reddish-brown in colour and indented with coarse shallow pores or wrinkles, as illustrated in the upper figure. A reddish livid juice is exuded from all parts of this fungus; this juice stains every object with which it comes in contact. A section of the wrinkled surface is shown natural size at A. Every part of the reddish wrinkled surface produces spores, the same portion distills drops of moisture, chiefly derived from the wood upon which the fungus grows. By breaking down the substance of the wood and extracting its juices, the timber is ultimately left in a state little better than dry sawdust or powder, hence the popular name of "dry rot," a curious name for a naturally wet or "weeping" fungus. If a very small fragment is cut from the wrinkled surface of an example of Merulius lachrymans, and a very thin transparent slice is then removed from the exposed surface and examined with a microscope it will be seen, if enlarged 400 diameters, as at B. The coarse transparent tubes of the base of the fungus become much narrower as they gradually grow up towards the brown wrinkled surface, and in the latter position they support tall colourless cells or bladders as shown; each tall bladder throws out four minute horns or spore-supporters at its apex, and on each horn an ovel spore of rich brown colour is borne, as illustrated. When the ripe spores fall from their supports on to damp wood in close confined air, they germinate and throw out fine mycelial tubes, the tubes penetrate the sweating wood and soon produce a perfect dry rot fungus by drawing from the wood the material necessary for the life and well-being of the fungus. The fungus continues to grow till the supporting timber is completely exhausted and reduced to tinder or dust; the fungus itself now perishes, but not before it has produced myriads of spores which have probably been carried away by currents of air to destroy other damp wood, or wood in damp places. The dry rot fungus will under favourable conditions attain a very large size, its dimensions appear, in fact, to be only limited by the size of the object or material on which it grows; we have seen huge thick growths, like large pancakes, a yard or more in diameter. As the growth of the fungus is as rapid as it is exhaustive, it follows that when dry not once gets a footing in an ill-ventilated building the work of destruction is rapid and complete. Floors rot, roofs fall, galleries collapse, and window sashes turn to powder and drop out. As the air of the infested building is full of dry rot spores it is useless to replace old wood with new, for new wood merely supplies fresh food for the fungus. Sometimes improved ventilation is beneficial but it is impossible to really cure dry rot, and almost if not quite impossible to stop its progress when once well started, as the fungus is always ready to invade various other materials in addition to wood. To keep well clear of dry rot its attacks should be prevented.

Petroleum will quickly destroy the dry-rot fungus, and prevent its reappearance, but it is so extremely dangerous to thoroughly soak a building or ship with petroleum, that the remedy is as bad or worse than the disease. Burnett's mode of preserving timber is by the application of chloride of zinc; this, without injuring the wood, has a tendency to protect it from destruction. Kyan's method (hence the term kyanising) consists of the use corrosive sublimatic, but this material can only be applied effectually on dry (as opposed to wet or damp) timber. Margary's method (hence the term margarising) consits in the application of the sulphate or other salts of copper. Bethell's method, which is the best, consists of "creosoting" the wood, by the application of coal tar or oil of tar. This substance does not get driven out of timber by moisture, whereas all the salts of metals fail in this direction. Coal tar, a material which looks like treacle, is derived from coal in the process of gas-making. When coal tar is distilled, light oils, heavy oils, and pitch (the residuum) are produced: the oils heavier than water are the "creosote" of Bethell. The most effective heavy creosote for timber preservation is derived from the best Newcastle coals, a less valuable material is distilled from Midland coals. A good deal of our knowlege of wood preservation, as possessed at the present day, seems to have been known in part at least to the ancient Egyptians, who filled the pores of their wooden statues, columns, &c.,—to say nothing of the grand-mummies (!),—with oils and bitumen.

Mr. Boulton states that Fir timber is capable of taking up from 60 to 150 gallons of water to the load of 50 cubic feet, he also states that he has extracted 50 gallons of water from a load of railway sleepers. In the process of creosoting the timber is first made quite dry and the extracted water is then replaced under heavy pressure, by oil of tar. More than one patent has been taken out for "creosoting," and the efficacy or otherwise of creosoted timber depends on the quality and constituents of the oil of tar and the method of forcing it into the pores of the timber.

The proper antiseptic treatment of wood is a subject of the highest importance when studied in reference to the preservation of telegraph posts, railway sleepers, piles for harbours, ships' timbers, and to cases where wood must of necessity be exposed to the action of water, damp earth, or moist air, but in buildings which are designed to be constantly kept dry no creosoting is necessary. In horticultural

buildings, however, where the contained air is always moist, the dry rot fungus, or one or other of its allies, often makes sad havoc. Tiles, iron, &c., are now so much used in greenhouses that wood often only occupies a minor place in their construction.

Without some antiseptic treatment it is impossible to prevent the decay of wood when as in ships it is placed in water or as in posts, and piles, buried in the ground, but there is no reason why our public and private buildings should be so constantly destroyed by the dry rot fungus. Without damp stagnant air and wood saturated with moisture, Merulius lacrymans cannot exist; keep these evils away, and no dry-rot will be seen.

It is very necessary that foundations should be well built with cement on concrete or rock, that all the basements should be thoroughly well ventilated, so that currents of air may be able to pass through windows or other openings. The timber used for building purposes should be perfectly sound and dry. All good builders are aware of the best methods for preventing damp rising from basements, or passing up or through walls; and it is only by the culpable neglect of well-known commonsense precautions that so many public and private buildings are destroyed by the dry-rot fungus.

We are being constantly asked for a "cure" of dry-rot, and we often find ourselves without patience to write a reply. It is as impossible to "cure" rotten timber as to "cure" a rotten animal; when advanced in decay both are too far gone for cure. commonsense must be used in the prevention of the attacks of the dry-rot fungus.

Dr. J. Gwyn Jeffreys says (*British Conchology* vol. i., p. 130, under "Limax") that slugs in cellars will eat the dry-rot fungus. WORTHINGTON G. SMITH, Dunstable.—*Gardeners' Chronicle.*

CULTIVATION OF TEA IN FORMOSA AND CHEHKIANG.

Tea cultivation in North Formosa is chiefly confined to the hills, and though a good supply is grown within three miles of Tamsui, the main centre of the production is in the hills some twenty miles to the south. The soil there is generally a kind of reddish yellow sticky clay, in wet weather resembling cream, and extremely slippery; this is on the lower and middle slopes, that of the upper is inferior, and these slopes are often so steep that it is difficult to understand how it is possible to till them. The Commissioner of Customs at Tamsui says that everywhere one is struck by the amount of new ground which is being broken up in order to set more tea. The first thing is to clear away the long grass and brushwood, cutting down the trees, digging up the roots, burning them, and planting indigo. When this plant has run for some little time it is replaced by tea, and in the matter of planting, the plan adopted in Formosa differs very considerably from that followed in many of the other tea districts. There a large quantity is produced by means of slips or cuttings, as well as by seeds, and no manure is used, while in the Ningpo and Tientai districts seeds alone are employed. In the latter district several holes are made, and five or six seeds are dropped into each and covered up, and liquid manure or wood ash is then applied. During the following three years the ground is carefully weeded and manured; at the end of this period the young plants are separated from the older ones. If carefully tended and pruned of the old wood, a bush will last many years. The first picking takes place generally in February, and the second in May. The soil is light and friable, being composed of a mixture of sand and vegetable mould. In the Ningpo district the most luxuriant tea is that of the alluvial plain, and is grown between rows of mulberries. At Tientai, in the province of Chehkiang, Commissioner Hancock states that the finest tea is grown, the soil being light and sandy, corresponding in a great measure to that of the Bohea mountains. The following is the method of cultivation practised:—Pieces of bamboo about six inches long are placed in holes made in the ground, and about fifteen seeds put into each tube, the tubes are then filled up with earth; this operation being performed in the month of September. In the following June some of the seeds having germinated, appear as small plants at the top of the bamboo which is then removed. The growth is at the rate of about four inches a year, and the first picking takes place four years after planting. There is only one picking each year, in April, but lower down on the mountains the first takes place when the plants are three years old, and there are as many as three in the year. The plants are not considered to have attained maturity until they are ten years old; they are never changed, but from time to time the decayed wood is cut away. In the Formosa tea plantations little attention appears to be paid to drainage on the steepest slopes; the furrows, instead of being run in a slant, are generally carried horizontally, in consequence of which a more direct barrier is placed against the descent of water during heavy rains, so that in some places where the soil is stiff, the water remains, while in others the soil is swept away. The distance at which the plants are set apart differs very considerably, according to district—in some places they are placed at intervals of thirty inches, which, allowing for the spread of each bush and the necessary ploughing between the rows, is as close as practicable. In Formosa the advantages of soil and climate are so great that there are often no less than seven pickings in the course of the year, the three first being the best, while in the Ningpo district there are never more than three.—*Journal of the Society of Arts.*

NOXIOUS INSECTS.

Every person of observant habits who has had opportunities of watching fruit trees during spring and summer must have noticed that the benefits which they afford are not at all confined to the service of man, but extend also to the provision of homes and nutriment for a great variety of insects, which as a rule, are hatched from ova deposited in the flower buds when these are scarcely formed, and devour the fruit before it comes to maturity. Every schoolboy who has gone in quest of black-berries or nuts, is aware that the former are scarcely ever free from maggots, and that the proportion of nuts spoiled in like manner is very appreciable; but an adequate conception of the importance of fruit-destroying insects, of the numbers in which they exist, and of the extent, measured by a pecuniary standard, of the damage which they inflict, is quite a recent addition to the sum of human knowledge. At the same time, it has been made apparent that fruit-growing is an industry which may become extremely helpful to the depressed agricultural interest; and many landowners, among whom Lord Sudeley holds a prominent place, are endeavouring, alike by precept and example, to direct the attention of their tenants to the profits which may be thus obtained. The number and vitality of living organisms will always be in proportion to the abundance of their food supplies; and hence it can be no matter for surprise if fruit-growing, as it is rendered a more and more important branch of agriculture, should be more and more liable to the attacks of creature whom we, in our cynical indifference to their comfort and welfare, are wont to describe as "pests;" while they, it may be hoped or imagined, return good for evil to the extent of recognizing the fruit-grower as a benefactor. However this may be, it is at least certain that ravages, which may be only annoying and disappointing when they are confined to a pleasure-garden, or to one which, although worked for profit, is little more than an ornamental appendage to the serious business of a farm, may become almost ruinous when the garden itself constitutes the farm, and when the crops which the insects destroy are those on which the hopes of the cultivator are based. In view of these considerations, the Agricultural Department of the Privy Council, has acted

wisely in devoting special attention to the insects which are injurious to crops, whether of hops, corn, or fruit; and we have before us today the third of a series of reports upon the subject, prepared for the Privy Council by Mr. Whitehead, and dealing specially with the enemies of fruit. We also publish a letter from the same eminent authority, in which he warns farmers of the injury likely to be produced by the attacks of the "Hessian fly" upon wheat. It is very evident that the enemies to agriculture which are thus described, although individually insignificant, are really very formidable from their numbers, their voracity, and their power of reproducing their kind as an affliction for future seasons; and that no care or pains should be spared in the endeavour to compass their destruction. In the attainment of this end, the science of entomology is calculated to render most important help; since a knowledge of the aspects, the habits, and the metamorphoses of the peccant insects is plainly essential to the conduct of a campaign against them.

In a general way, it may be stated that the life history of an insect destructive to fruit is, that the adult female deposits an ovum in the young flower bud, at such a time that the larva may emerge when the germ of the fruit is in course of formation, and fit to furnish a nutritive and succulent meal. The larva pursues its depredations with great caution and judgment, not killing the goose which lays for it the golden eggs, but carefully abstaining from any attack upon the actual germ, the vital portion of the immature fruit, as long as there is anything else to be consumed. When the germ itself is devoured, famine may be said to impend over the larva, but by that time it has attained a considerable growth and an enlarged capacity for independent action, and it seeks new worlds to conquer. When, as in the nut tree, the once tender fruit husk has become hard, and encloses the maggot in a shell, the maggot is provided with jaws of corresponding strength and sharpness, insomuch that it can gnaw a hole through the covering and thus make its escape. It is almost annoying to read that, in the majority of cases, the creature has become so fat as to experience some difficulty in squeezing its body through the aperture which is gauged by the diameter of its head; but this difficulty seems usually to be overcome. In fruits which have the eatable portions unprotected and external, as in the raspberry, strawberry, and blackberry, the satiated maggot has only to drop off when its larder shows signs of exhaustion; and in almost every case it seems to reach the ground, sometimes having but a short distance to fall, sometimes lowering itself cautiously by the aid of a silken thread. On reaching the ground, it seldom travels far, but usually buries itself at the foot of the plant on which it has been fed, and awaits the transformations which will convert it into a winged insect, when it will rise again, prepared either to deposit the ova which will produce a fresh generation upon the same hapless tree to which it was itself indebted for food and shelter, or to go further afield in search of another victim. In some cases the larvæ do not reach the ground at all, but take refuge in chinks of the bark, and there undergo their changes; and in some their attacks are not directed to the fruit, but roots are gnawed and injured by larvæ which have sprung from ova originally deposited in the ground, and have always been subterranean in their habits. In every case, however, it seems to be the ground, and especially the ground close to the stem of the affected plant, which affords the chief harbour for these insidious and formidable enemies.

In order to minimize the evils produced by these creatures, it is in the first place necessary that fruit-growers, and farmers generally, should learn what it is that insects do, and should no longer attribute to unknown cause the mischief which they so constantly produce. Not only the Privy Council, but also the Royal Agricultural Society, has taken much pains to spread abroad the required information; and the writings of Miss Ormerod, for the latter body, cannot be passed over without appreciative notice. Thanks to her and to Mr. Whitehead, as well as to the labours of American and other entomologists, there is now but little excuse for any faliure to recognize the attacks of insects; and considerable progress has been made in the direction of measures of prevention. All authorities agree in attributing to certain small birds, especially to titmice, an excellent appetite for the destroyers, and a remarkable faculty for discovering them; and it is also said that they are a prey to various other enemies, even to parasites, who live upon their small bodies, and inflict upon them, it may almost be hoped, something of the annoyance which they cause to others. Agriculturists, however, have but a restricted confidence in small birds of any kind, and would generally be more disposed to apply them to culinary uses than to preserve them in their fields or gardens; and, in support of this almost instinctive feeling, it must be admitted that even a titmouse, when searching for a delicate morsel within the folds of a half-expanded blossom, would be likely to handle it with an amount of roughness which might well prove detrimental to its future prospects. On the whole, the best hope of dealing successfully with the "pests" seems to be derived from the *habitat* of the larvæ in the earth, where they are more or less accessible to mechanical and chemical treatment. To this end it is recommended that they should, as much as possible, be deprived of intervening or neighbouring harbour—that is to say, that all grass and herbage around the roots of trees or plants should be kept closely cut, or, what is still better, eaten down by sheep, and that no straw or farm litter should be placed upon the ground even in strawberry beds—to the abandonment of the custom, which prevails in many places, of putting down straw to preserve the berries from being soiled by contact with the earth. On the same principle, cover for the larvæ is to be destroyed as far as possible by scraping or almost grooming the trunks and larger branches of trees so as to remove cracked and rugged bark; and, when these precautions have been adopted, the ground at the foot of the trees should be loosened and turned up by forks and the soil saturated with various unsavoury mixtures, ranging from soap suds to petroleum. Compounds destructive to insect life or comfort may also be applied to the upper parts of large trees by various mechanical means; due care being taken, in the use of hellebore or other active poisons, as well as in the use of petroleum or other strongly flavoured liquids or mixtures, that they are not applied in such a manner as to adhere to the fruit and to render it either hurtful or nauseous. By such means as these, used with due care and circumspection, there seems to be no doubt but that much good may be effected, of course not from the point of view of the insects; and it is further probable that great importance should be attached to the employment of all possible precautions in small gardens, where all sorts of measures hostile to insects can be conducted more efficiently than is possible on a larger scale, and from whence it may fairly be surmised, fresh generations of destroyers may not unfrequetly take their flight in order to extend their destructiveness to localities far beyond the narrow limits of their original birthplace.—London *Times*.

MANURING.

All attempts to improve the nature of a soil should have for their object *the bringing it to a state of loam*, by the addition of those substances which are deficient. A loamy soil requires less dung to keep it in heart than either clay or sand; for which it is favourable to the process by which organic matter buried deep in the soil is converted into *insoluble humus*; it also permits that part of it which is nearer the surface, to attract *oxygen* from the air, and thus it is converted into a *soluble extract*, which is to the roots of plants what the *milk of animals* is to their young, or ready-made food easily converted into vegetable juices.

The mineral elements of soils become parts of plants, *Life modifies chemical laws, and converts inorganic matter into organic.*

The fertility of a soil is dependent on other things besides its chemical composition. We must consider the office it performs is twofold, namely, (1) to retain the plant firmly in the position most favourable to its growth, and (2) to supply a certain amount of food. Hence *mechanical texture* becomes a matter of great importance; it must be *firm* enough to afford the proper degree of *support*, and at the same time *loose* enough to allow the delicate fibres of the rootlets to extend themselves and also access of air to take place, without which the plant cannot live. It must be of such a texture as to retain, for a cosiderable period, the water which falls on it and at the same time *porous* enough to suffer the excess to *drain away:* otherwise the roots of the plants will rot. It is for these reasons that the nature of the solid substratum at some depth beneath the soil must be borne in mind. These and other things, such, for example, as the condition of the surface with respect to its *absorbent* power for heat, all tend greatly to complicate the subject, and render decisions concerning the comparative value of different lands, founded on merely chemical evidence, exceedingly prone to error.

The great essential principle to be sought for in manures is this great law of nature, that *substances strengthen vegetation mainly by their contents of nitrogen.*

In *dung* and in *liquid manures*, the *nitrogenous* matter is partly combined with *hydrogen*, and has thus become *ammonia.* Farm-yard dung contains *all* the principles withdrawn from the soil by the growth of plants: the decomposed *straw* furnishes *silica* in a minute state of division, still having with it a little *potash* and various *saline* substances. The *solid animal extrements* contain abundance of earthy *phosphates*, while the *urine* gives up by its putrefaction at once *carbonate of ammonia* and *more phosphate*, besides smaller portions of other principles. The only thing at all *defective* is *potash*, and that frequently exists plentifully in the soil, and is gradually liberated by disintegration.

Solid animal manures should not be allowed to putrefy in heaps *above ground*, because a great portion of the manuring matter, in that case, assumes the *state* of *gas* and is *wasted.* In the heap, previous to fermentation, the nitrogen, the essential element of ammonia, and of supreme value to the planter, is variously combined with carbon, oxygen and hydrogen; but when it leaves its former arrangement in obedience to the action of decaying bodies, it uniformly adapts one and only one, new one. *Every nitrogenous compound exposed to air and moisture liberates its nitrogen to unite with free hydrogen and form ammonia.* This is a *principle of fermentation* which admits of no exception. The true economy of farm-yard manure may be thus indicated; *nothing must be allowed to run away in the form of a fluid, or to fly away in the disguise of a smell.* Therefore, we must store the dung daily in proper pits under shelter.

The cow-sheds, of whatever material the walls and roof may consist, as long as ventilation is ensured, must be floored with *pucca* terrace flooring, paving stones, tiles, bricks, concrete, and Portland cement, or planks, and must have a gentle slope towards a gutter running down the centre. In this manner not a particle of dung or drop of urine and *washings* can run to waste. At a convenient distance, though as close as possible, let the manure pits may be made. The best plan is to have the manure shed parallel to the cow-shed, on the slope of a hill immediately above or below it. The pits, arranged side by side, should if possible be floored and lined with masonry, if not possible with hard moss, being previously well puddled. They should be made as water-tight as possible. The cowherds should daily collect the dung and litter, and spread it evenly in a pit, also spreading a few inches of *dry* earth, of which a heap should be collected and stored in an adjoining shed in dry weather, over the mass, then tread it well down. The gutter running down the middle of the cow-shed, should either be connected with the manure shed or end in a spout, under which tubs, or large earthen bowls should be placed. The urine and washings, thus collected, should be poured over the dung and litter previous to the dry earth being stamped in. If no litter is used, any grass will do, though paddy straw is the best. When one pit gets filled up with these daily layers of dung, litter, and earth, cover all up with another good layer of earth and turves, and commence filling up the next pit. These pits should be *emptied* in the *same order* they are *filled*, and only *wooden* rakes and implements should be used.

Every description of sweepings, stable litter, elephant's dung and litter, and all the ashes from the factory and cooly lines should be carefully collected and immured in the manure pits along with the dung from the cow-sheds. Dead bodies of animals, and excrements objectionable to the caste prejudices of the coolies, can well be disposed of by being burned anywhere about the plantation among the bushes with a good sprinkling of *lime* if possible.

Ashes.—The really enormous amount of this valuable manure daily prepared in the factory, engine-house, cook-room and, last but not least, cooly lines, and generally wasted or frittered away, is lamentable on most plantations. Every particle of ash should be carefully collected, stored along with the charcoal dust and sweepings of the charcoal godowns in a convenient, *water-tight* shed, for manurial application during the cold season. All the wood of the tea prunings should be gathered and burnt in bare patches all about the plantation, and applied to the neighbouring bushes. This is really *returning the actual elements* of which the tea bush is composed.

Lime is abundant and cheap in some tea districts as Sylhet, Cachar, and the Darjeeling Terai, and is a most valuable manure. Soils and sub-soils, far below the reach of ordinary cultivation, always contain a very sensible quantity of *ammonia.* The action of lime, in the presence of water, is to set free from the soil as nearly as possible one-half of the ammonia. The application of lime on cold, spongy marshy soil is most profitable. The chemical action of lime, and the effect which it produces as a manure, appear to be of two kinds. On the one hand it acts upon vegetable mould, accelerating its decomposition and rendering it soluble and then fits it to enter the roots of plants. Lime deprives some mould of its *acidity*, and renders it fertilizing. But, on the other hand, there is every probability that, by means of its *carbonic acid*, lime produces some other effect, and furnishes the plants with some nutritive matter. The roots of certain plants, specially tap-rooted ones like the tea plant, appear to have the faculty of depriving lime of its carbonic acid, which it immediately *re-absorbs* in equal proportion *from the atmosphere*,—boring through limestone in its hunger for lime.—*Indian Tea Gazette.*

DAVIDSON'S No. 1 AND T "SIROCCOS."

To the Editor of THE HOME AND COLONIAL MAIL.

SIR.—In the issue of *The Indian Planters' Gazette* of 19th Oct. ult., there appears a letter signed "Cor," in which my No. 1 "Siroccos" are highly praised; but in referring to the T shaped "Siroccos," "Cor" says that, "although they (the T "Siroccos") do more work, they do not do as good work as the No. 1;" and he goes on to say that he thinks the causes for this are, that in the T "Sirocco" the top row of trays being exposed to the air, their temperature in consequence of this remains comparatively low, and, therefore, the damp leaf coming freshly into the machine does not receive a sufficiently sharp heat to promptly check fermentation.

Although I do not quite agree with "Cor" as to the particular causes he assigns for the effects described, probably those of your readers who have an interest in the subject, and who may have seen his letter, will be further interested to know that the objections to the T "Sirocco" therein cited are now altogether disposed of in my present make of the apparatus.

The top of the drying chamber is now closed in with perforated plates, and a portion of the fresh hot air from the stove is, in the large size of the

apparatus, now delivered *direct* to the upper tier of trays, without having to pass at all through the lower trays, so that all the top trays receive a very sharp heat indeed, and a prompt and effective check to fermentation is given the moment the fresh tray of leaf goes into the drier. In this respect the new T "Sirocco" has a considerable advantage over the original No. 1, for in them the whole of the air has to pass through three trays before reaching the wet roll on the last tray put in.

The perforated cover is so adjusted that it regulates effectively the passage of the hot air up through the trays, and an exceedingly equal distribution of the heat from end to end of the drying chamber is the result. It required a series of carefully worked experiments extending over several months to get at the proper adjustment of this cover and its perforations, for no cover at all gives better results than one wrongly placed or with an incorrect arrangement and area of perforations.

When I at last got the cover correctly adjusted it proved highly beneficial to the apparatus, not only by increasing the evaporative power, but by enabling the stove to keep up the requisite temperature for the drying with about half the fuel that is necessary when no cover is used, and as the stove is constantly being worked at a greatly reduced temperature, the castings in it suffer so little from the effects of the fire, that they will wear three or four times longer than formerly.

The perforated covers can, with great advantage, be applied to existing No. 3 and T "Siroccos," as well as to No. 1's, altered to T shape; but for particulars of these, and the other very considerable improvements made in the apparatus this season, I must refer your readers to my new advertisements and circulars, as this letter is only intended as a reply to the particular objections raised by "Cor" to the T "Sirocco" of last and previous seasons' make.—Yours faithfully, S. C. DAVIDSON, "Sirocco" Works, Belfast, Nov. 15th, 1886.

[In reference to the above letter, we would call our readers' attention to Mr. Davidson's new advertisement in this issue. A very perfect little working model of the new type is now on view at the offices of the Planters' Stores Agency Company, Limited, 1, Great Winchester Street, E. C., and will, doutless, create quite a sensation among those interested, as the recent improvements, when added, are said to double the outturn of the "Siroccos" now in use.]

BRICK TEA.

Elsewhere will be found an extract from the *Englishman* of 24th November on the brick tea of Szechuen, largely used in Thibet. The writer of the article has nothing new to say regarding the brick tea: in fact, he simply quotes Mr. E. Colborne Baber's description of its manufacture, and does not quote Mr. Baber's equally valuable account of how the Thibetans prepare their tea, nor the very important statement that Chinese brick tea prepared for use by Thibetans is an infusion difficult to characterise. Baber describes it as "like English tea with rich milk, but without any sugar or *tea*," and "yet," he adds, "nobody would mistake it for milk and water; for the tea principle affects the flavour, while itself becoming modified into some un-tea-like astringent. It is evident that astringency is the property desired, seeing that the many thousand Thibetans who cannot afford tea use oak bark." The only point of interest in the article is the statement that Thibetan coolies laden with tea from Szechuen are disposing of their loads in the Darjeeling Bazaar "at higher prices than the best Indian tea can command.' The writer states that "it seems almost incredible that our planters should allow such a state of things to continue under their very noses," and, again, the article goes on, "Meanwhile our planters, who are now allowing the prunings of their gardens to be taken away and used as fuel, might make a few experiments, in brick tea manufacture, with the immediate object of displacing the Chinese article that is now consumed in the midst of their own gardens; and with the further view of being in a position, when the time arrives (safe reservation) to supply the vast market north of the Himalayas with Indian tea suited to the palate of the Thibetans." We do not say that Darjeeling and Assam planters should not, when time and means afford opportunity, experiment in brick tea; but the writer, in common with others who at intervals urge the Indian planter to plunge into this hypothetical brick tea trade which is conveniently and clearly described as a "vast market north of the Himalayas," does not seem to realize that the manufacture, of brick tea by the Indian planter practically implies a new process of manufacture, new apparatus, new appliances, new methods, in short everything new; and that the knowledge on which this new brick tea industry is to be built up is of the vaguest and most meagre kind. It seems to us that the immediate business of the Indian tea planter is to avail himself of the experience he has already gained in growing and manufacturing tea for the European and Colonial markets, to beat the inferior qualities of the China article out of the field. In America and the Colonies, and even in Great Britain, there is considerable room for the displacement of China tea by Indian; and the Indian article is slowly gaining acceptance everywhere. When Indian tea has attained its true position in the markets of the world, it will be time enough for tea planters to reconstruct their methods of culture and manufacture, import new machines and appliances of sorts and bend their energies to the task of ousting China brick tea from that delightfully well, defined tract of Asia spoken of so familiarly by the writer in the *Englishman* as "the vast market north of the Himalayas."—*Indian Planters' Gazette.*

TEA OF ASSAM.—The *Bengal Hurkaru* says that the Assam Tea Company propose to send to England samples of the indigenous and cultivated Tea of Assam, in a raw state. The leaves to be packed as taken from the trees, after being dried, and the subsequent preparations of the tea for use, to be left entirely to parties at home where, it is thought there would be no difficulty in preparing it for consumptiou. The party from whom our contemporary has derived his information, seems confident that the experiment will prove successful if acted upon: and among the advantages which would follow its realization the foremost are,—India would in short time be able to supply the demand of Great Britain for Tea—the leaf in its raw state might be compressed into less bulk than at present, and by the exclussion to a much greater extent of the atmospheric air, reach England with a higher and purer flavour. And further, it is probable that the Tea introduced into England in its raw form for manufacture would be exempted from the duty imposed upon manufactured Tea. We trust that the trial may be made, and that the success, the attempt deserves, may result.

THE USE OF SUGAR IN CEMENT.—On this subject Dr. Wray writes to a contemporary as follows:—"The combination of sugar with *chuna*, or lime, in mortar has been used in India from time immemorable. This mortar is so tenacious that when, in Calcutta, the remains of the Old Fort (in which was the site of the infamous Black Hole) had to be removed, some thirty years ago to make room for the new Post Office, the mortar proved to be as hard as the bricks which it bound together, so that it was impossible to separate them. The best *chuna* is made of calcined sea-shells. Another remarkable cement used in India for wood, called *soojee*, is made from dough of fine flour, kneaded in water until gluten only remains. To this gluten is added a small quantity of *Chuna* these combine and when mixed together form a cement (of the nature of bird-lime) as tenacious for wood as the other for brick-work. This *soojee* is used in India by the makers of musical instruments, and resist damp. The objection to its use for European viols is that they could not be taken to pieces but there must be many other uses to which it might be applied instead of glue, which will not stand damp."—*Planters' Gazette.*

THE PLANTERS', ASSOCIATION AND "COLIND" EXHIBITION.

Ceylon Commission, Colonial and Indian Exhibition,
South Kensington, S.W., 19th Nov. 1886.

The Secretary, Planters' Association of Ceylon, Kandy, Ceylon.

On 9th November I was asked to attend a meeting of those interested in the coffee adulteration and admixture question, and I was appointed one of a provisional Committee the other members being Messrs. Clifford and Pasteur, and Dr. Watt (India) to draw up a scheme for the formation of an Association. Ceylon and the Planters' Association have always been in the van in the discussion of this question and though it is unfortunately now but of secondary importance, I felt that I could not ignore it. My hope is that as soon as coffee has been placed on an equal footing with tea a joint Association for the trade protection of both articles may be be formed. To those interested in the question, the P. A. report for year ending 17th February 1883, conveys much information and further analyses and the reports of the local Government Board and the Board of Customs have greatly strengthened our case. The Mysore P. A. have placed £100 at the disposal of their London representative towards the expenses required, and I think a Bill will be introduced during next session of Parliament. Should the parent Association or any of the branches see its way to contribute moral or pecuniary support, the representation of the case and the chance of success will be strengthened thereby.

I attended by invitation an interesting meeting of the Pharmaceutical Society on 17th instant, where a paper was read upon the drugs in the Exhibition by Mr. Holmes. There were several references to Ceylon drugs but I was too late to hear what the speaker had to say about cinchona. In remarks which I was called upon to make, I pointed out how much the growers suffered by the maintenance of high price of quinine by retail dealers and how much consumption must be checked in consequence.

The Bark market has risen a little lately, but there are large stocks, and a broker told me a few days ago he had sold 2,000 bales of S. American at 9d per lb. for which 5s per lb. had been refused two years ago. Coffee is very firm and rising steadily, and a continuation of good prices may be looked for. "Ceylon teas remain firm and are much wanted," is Messrs. Gow, Wilson and Stanton's report of 10th. My firm yesterday purchased Nahalma, Hardenhuish, and Avisawella teas: all good teas, and at prices which must be pleasant to the seller. When I write to you next I expect to be able to tell you that I have wound up the Exhibition work.—Faithfully yours.

(Signed) J. L. SHAND.

P. S.—I enclose an explanatory letter from Messrs. Davidson & Co. on the subject of "The Tea Plucker," and I heard yesterday from the Patent Office that my application had been refused. Messrs. H. S. King & Co. have converted the good will they gained at the Exhibition into a Company for the sale of Indian and Ceylon teas and coffees, and have opened new premises in Gracechurch Street. Other new Companies are springing up all round.—(Initialed) J. L. S.

Sirocco Works, Belfast, 8th Nov. 1886.

J. L. Shand Esq., c/o the Ceylon Commission, Colonial Exhibition, South Kensington, London, S. W.

Dear Sir,—Your favour of 3rd instant was not received here before we left off business on Saturday, 6th instant. We wrote you on that day to know if a letter addressed to the Ceylon Court would find you as we wished to communicate with you in reference to the subject of the "Leaf-gatherer" trade mark. We are very sorry that our having adopted this mark has in any way conflicted with the interests of your Syndicate but we do not see that it is possible to abandon the "Leaf atherer" as our mark (having used it now in our extensive tea business for a year and a half) while it is quite possible for your Syndicate to adopt another one for theirs. We received the Photo from a friend who arrived home from India in January 1885. It was simply one of a large collection of similar subject purchased and brought home by the gentleman in question. At this time our retail tea business was just developing into pretty considerable dimensions; and as we considered a trademark, which would be illustrative of some process in the manufacture of tea desirable on our packets, we applied in April 1885 to the Patent Office to have registered as our trademark a representation of a girl plucking leaf from a tea bush, and the sketch which we handed in with our application was, in fact, copied from the photo above referred to. There was no name, or description on the photograph as to where, when or by whom it had been taken, and it had no intimation whatever on it as to copyright or other reservations, so that we considered ourselves at perfect liberty to illustrate the subject as our registered design, by copying this photograph. Had we had the slightest idea that it was private property, or yours in particular, we would have communicated with you before copying it for our illustration. Our application, however, was in the first instance refused by the Examiner at the Patent Office, owing to a Mr. John Stalkart of Darjeeling having previously registered as *his* trademark a "representation of tea plucking," and as ours was a similar subject; the Examiner informed us it could not be allowed unless Mr. Stalkart's consent was obtained to our registration of this trade mark, and provided Mr. Stalkart was not actually using his. We thereupon communicated with Mr. Stalkart, and as he was not using his mark, he kindly gave his consent to our adopting the design submitted to the Examiner. We may here mention that Mr. Stalkart's design was as unlike our sketch as it well could be (to be classed under the same heading), but a difference in the delineation of the picture was, the Examiner said, of no importance in the matter. Having obtained and produced Mr. Stalkart's consent our design was duly passed and registered in August 1885, and we have been using it ever since on our tea packets."

We saw a picture in the *Graphic* some months back entitled, we think, "Leaf gathering at Strathellie Tea Estate, Ceylon" and at once saw the similarity between it and our registered mark, but, until then we had no idea as to what particular place the picture emanated from. We are sorry that in this matter we should now find ourselves in collision with the claims of any of our planting friends, but trust the explanation above given will be considered by you and the Ceylon Tea Planters' Association as satisfactory.

Our Mr Davidson hopes to be in London by end of next week and would be pleased to meet you if you would kindly let us know at what address he would find you there.—We are, dear sir, yours faithfully,

(Signed) DAVIDSON & Co.

COFFEE ADULTERATION:—DRAFT REPORT OF PROVISIONAL COMMITTEE.—The Provisional Committee appointed at a meeting of Coffee Producers, Merchants and others, held at South Kensington, on Tuesday, November 9th 1886, beg to submit the following recommendations:—

1. That an Association be formed to be called "The Coffee Association."

2. That the Association be formed for no purpose of trade whatsoever, and that none of its members be allowed to use its name, directly or indirectly, for any such purpose, but that it have for its sole end the protection of the coffee producer and consumer.

3. That with a view to these objects the aim of the Association be to prevent the sale of adulterated coffee or coffee admixtures, promote the consumption of pure coffee, and compel vendors to sell separately any chicory or other ingredients which may be required by consumers.

4. That having regard to the declining consumption of coffee in the United Kingdom, and the consequent loss of revenue a result attributed by the Board of Customs "in a great degree to notorious adulteration," such an Association may properly claim the support of producers, merchants and dealers; while the shameful frauds which are committed upon consumers of coffee, especially among the poorer classes, make the objects of this Association of public interest and advantage.

5. That according to the annual reports of the Local Government Board and the Board of Customs, the existing law has been found wholly ineffectual to protect either the consumer or the revenue, and, therefore, stands in urgent need of amendment.

6. That, besides endeavouring to amend the law in the directions indicated, the efforts of the Association be directed, through the various temperance organizations, or otherwise, to stimulate the public taste for infusions from pure coffee, and encourage attempts to supply cheap and easy methods of coffee making.

7. That representatives of India and the Colonies now in this country be requested to communicate with Planters and their various Associations, and invite co-operation and subscriptions.

8. That donations and subscriptions be also invited from all other persons interested in the proposed Association. An annual subscription of 1 guinea for each member, and of 2 guineas for each firm, or a donation of £5 5s to constitute membership.

THE NEW DIMBULA COMPANY, LIMITED.

DIRECTORS' REPORT AND ACCOUNTS, SEASON 1885-86.

Directors.—Herbert Brooks, Esq., Chairman, W. S, Bennett, Esq., W. J. Carver, Esq., J. B. Morphew. Esq. Manager in Ceylon—Mr. F. R. Sabonadiere. Agents in Colombo—Messrs. J. M. Robertson & Co. Chief Estate Superintendent—Mr. J. E. A. Dick-Luder. Solicitors—Messrs. R. S. Taylor, Son & Humbert. Auditor—Mr. G. Sneath (Messrs. Price, Waterhouse & Co.) Bankers—The New Oriental Bank Corporation, Limited. Secretary—Mr. J. Swan.

The directors have pleasure in presenting their First Annual Report for the season ending 30th June, 1886. This comprises the period from the formation of the Company on the 15th March, 1885, to the above date. Referring to their circular of the 11th January last, they have to mention that no additional shares have been issued, and that the list has been closed.

The prime cost of the estate has been £20,938 4s. If to this is added the £64,120 of Bonus Shares, issued in terms of the prospectus, the nominal cost of the property will then be £85,058 4s. The "working account" for the season shows a balance at credit, transferred to "profit and loss account," of £1,610 1s 8d. To the former has been debited all expenditure in Ceylon on upkeep and crop, and charges in London; also all expenses incurred in the formation of the Company. It will be noticed that two-thirds of the value of the Cinchona Bark have been deducted from the proceeds and transferred to a "Tea Extension Fund," the Directors, after mature consideration, being of opinion that the whole of the said proceeds could not justly be considered as belonging to income, inasmuch as the capital value of the Cinchona plantations has been depreciated by somewhat extensive felling. This balance of £1,610 1s 8d. will suffice to provide for the full dividend of 8 per cent. per annum on the A Shares, leaving a small balance to be carried forward to next account. The Directors will propose a resolution to this effect. An interim Dividend at the above rate for the period ending 31st December last has already been paid. The "Tea Extension Fund" has been created for the purpose, mainly, of planting a considerable portion of the estate with tea in place of Coffee. The expenditure already incurred in this direction, amounting to £3,545 2s 1d., has been debited to this account. The property now consists of 700 acres of coffee in bearing; 1,204 acres of Tea, of which 50 acres are already in bearing; 255 acres of Cinchona; and 966 acres of forest, &c.—Total 3,125 acres. The Directors are of opinion that the considerable measure of success which has attended the first year's operations of the Company is, to a large extent, due to the careful manner in which their interests have been watched over by their Manager, their Agents, and the Chief Estate Superintendent, and to the zeal and ability displayed by their Secretary. The Director who retires by rotation is Mr. W. S. BENNETT, who, being eligible, offers himself for re-election. By order of the Board, J. SWAN, Secretary.

52, Gracechurch Street, London E. C. Nov. 5th 1886.

WORKING ACCOUNT 1885-6, for the Season ending 30th June, 1886.

Dr.

	£ s. d.	£ s. d.
To Expenditure in Ceylon—		
Ordinary expenditure on Crop—		
Coffee	5,039 6 7	
Tea	612 16 5	
Cinchona ...	1,875 11 11	
		7,527 14 11
,, Expenditure, including interest, in Ceylon and London attending the purchase of the Estate and the formation of the Company ...		1,358 3 6
,, Expenditure in London—		
Directors' Fees, Secretary and General Office Expenses ...		670 9 11
,, Balance carried to "Profit and Loss Account		1,610 1 8
N. B.—The Expenditure in Ceylon is for thirteen months, and in London for fifteen months		
		£11,166 10 0

Cr.

	£ s. d.	£ s. d.
By net proceeds of produce sold in London—		
Coffee	6,011 4 0	
Tea	815 13 2	
Cinchona Bark ...	10,940 0 8	
	17,766 17 10	
Less two-thirds of value of Bark transferred to "Tea Extension Fund	7,293 7 1	
		10,473 10 9
,, net proceeds of produce sold in Ceylon—		
Coffee	48 12 6	
Tea	12 11 3	
Cinchona Bark ...	88 3 1	
		149 6 10
,, Commission on Sales of Produce &c.		481 16 11
,, Balance of Interest		61 15 6
		£11,166 10 0

Dr.

TEA EXTENSION FUND.

	£ s. d.	£ s. d.
To Expenditure in Ceylon, in replanting and improving the Estate, viz.:—		
Coffee	412 14 0	
Tea	3,035 5 3	
Cinchona ...	97 2 10	
		3,545 2 1
,, Balance carried to next Account as per Balance Sheet		3,748 5 0
		£7,293 7 1

Dr.

BALANCE SHEET, June 30th, 1886.

	£ s. d.	£ s. d.	£ s. d.
To Capital Unissued—			
1,792 A Shares	17,920 0 0		
429 B ,,	4,290 0 0		
2,159 C ,,	21,590 0 0		
		43,800 0 0	
,, Capital Subscribed—			
2,208 A Shares	22,080 0 0		
,, Bonus Capital—			
5,571 B Shares	55,710 0 0		
841 C ,,	8,410 0 0		
		86,200 0 0	
In all 13,000 Shares.			86,200 0 0
Total Capital		130,000 0 0	
To Sundry Creditors—			
Acceptances outstanding		6,761 0 5	
Accounts do		132 18 7	
			6,893 19 0
,, Amount of Tea Extension Fund, as per Account herewith			3,748 5 0
,, Balance (as per Profit and Loss Account)			900 8 11
			£97,742 12 11

Note.—The Cumulative Dividend of 8 per cent per annum, payable to the B Shareholders out of future profits, amounts to £4 110 3s 4d.

Cr.

	£ s. d.	£ s. d.
By Prime Cost of the Estate including Coolies' Pay in Arrear	20,938 4 0	
,, Amount of Bonus Capital as per Contra ...	64,120 0 0	
Total Nominal Cost of the Estate		85,058 4 0
By Cash at Bankers—		
Deposit and Current Accounts	9,789 13 4	
Amount of Petty Cash...	5 16 7	
		9,795 9 11
,, Office Furniture		35 0 0
,, Produce on hand and in transit, 30th June, 1886, since realized ...		2,708 19 0
,, Unpaid Calls, since paid ...		145 0 0
		£97,742 12 11

Dr.

	£ s. d.	£ s. d.
To Interim Dividend at the rate of 8 per cent per annum, for the half-year ending 31st December, 1885, on A Shares		709 12 9
,, Balance carried to next Account as per Balance Sheet		900 8 11
		£1,610 1 8

TEA-BUYING BROKERAGE IN CALCUTTA.

The following letter was addressed to the Calcutta *Englishman* in September last, and attention is drawn to it by a Calcutta correspondent, who thinks it necessary to point out to Indian Tea importers anxious to reduce the cost of their Teas, that the payment of the Calcutta buying brokerage is quite optional with themselves. It is to be supposed that in these days of abolishing middlemen's charges, this payment will be swept away if, as implied, no service is rendered for it:—

To the Editor of the "Englishman."

SIR,—A committee is sitting with the laudable purpose of placing Tea brokerage on a satisfactory footing. The committee has assumed a very responsible task, and will doubtless be glad to be helped to a wise conclusion. Under the present system the seller entrusts his Tea confidentially to a broker for sale at the highest obtainable price, and the buyer entrusts his order confidentially to the same broker to be implemented at the lowest possible price. Clearly, if the committee be men of commonsense and if they really mean to do honest work, this feature will at once be disposed of. In support of the above indicated system certain curious arguments have been evolved. To justify the payment of brokerage by the buyer (who in nine cases out of ten does not want a buying broker at all, and is seriously hampered in his purchases by having to employ him), the following considerations are put forward :—

It is said that the buying broker guarantees the seller against loss by failure of the buyer, so that the seller takes the risk of the selling broker, the selling brokers guarantees the buying broker, and the buying broker takes the risk of the buyer; an ingenious chain constructed to afford some kind of *raison d'etre* for the buying broker.

It is said that the buying broker is to guarantee the buyer against false packing,—another instance of the anxious search for some ground on which to justify the buying broker's existence. Can any one divine on what principle these two responsibilities are to be taken from the selling broker, on whom (if not on the seller himself) they naturally rest?

Another benefit to be derived from the buying broker is accommodation for a day of two for the packing, which is done in the selling brokers' godowns. A note of admiration is the only comment that is here required.

It is alleged that the buying broker refuses orders from London for the benefit of the Calcutta buyers. If this means restricted competition, it calls for instant remedy. The trade wants the freest competition without fear or favour. If it is not a broker's business to act as agent of a London house, to decline so to act is no favour to the Calcutta buyers.

The fact is plain that the only duties which can reasonably performed by a buying broker are to place his valuations and his knowledge, his services in the sale-room and possibly during delivery, at the disposal of the buyer who pays him. The aggregate imagination of the trade cannot add to these duties without dressing the buying broker in plumes kindly lent by the selling broker for the purpose of giving him an imposing presence.

When the Port Commissioners' Tea warehouses are completed, all the Tea that passes through Calcutta will be accommodated there. The trade will then want a selling broker (or, brokers), whose duty will be to taste garden musters, to value for sale, to give advice, to act as auctioneers, and to collect proceeds. There need be no *del credere*, because an impecunious buyer would have no difficulty in getting for a mere Bank commission the assistance of a good firm to father his purchases between the signing of a delivery order and the bill of lading, If there be a buyer so untrustworthy that even this cannot be done the sooner the trade is rid of him the better.

Let buying brokers be paid by those who ask their services. We want open auctions, with full publicity and the widest competition, and we wish the present brokers to be relieved of the painful and embarrassing double functions under which they now groan. When the trade is put upon an intelligible and self-working basis, I expect to see the gardens avail more freely than hitherto of the nearest market for their roduce. A PROPRIETOR.

—*Produce Review.*

CEYLON UPCOUNTRY PLANTING REPORT.

CACAO CROP AND PREPARATION—NEW VARIETIES—TEA AND TRADE MARKS—HOW TO GAIN REPUTATION FOR WISDOM WITH COOLIES.

6th December 1886.

The Cacao crop which is at present being gathered still keeps up its fair promise of being a full one.

The new system of drying the beans unwashed is, judging from Mr. Shand's letter and the reports of some of the London brokers, not finding that favour at home which some of us would like.

Still the sale of 50 cwt. unwashed and unassorted, which is reported to have got 78s would lead one to conclude that the condemnation of the system may have been somewhat hasty, and that the expression of opinion against the new mode, might have been modified with a fuller knowledge. Even if the price were not so good for unwashed as for washed, it has to be remembered that the former has a considerable advantage in weight—as much as 20 per cent some say, although that does seem an outside figure—and then the risk of damage to the bean is lessened, as also that of moulding. For while the outside skin of the nib remains uninjured, the chance of its getting mouldy inside is reduced to almost nothing. The exterior may mould, but a rub on a mat or sack will remedy that, whereas if the mould gets into the inside of the bean, it is hard then to know what to do.

While on this subject I may say that I saw a pod taken from one of the new variety of cacao trees growing in the Peradeniya Gardens which contained as many as 40 nibs, and these too, large and plump. To have a decent acreage planted with trees of that variety and doing well, would give a handsome return and as far as I could learn it was quite as hardy a variety as any of the others. So many of the stronger type of cacao certainly do not turn out the kind of nib which fetches the big price in the London market, the beans being flat instead of round, that when there is one to be found which comes up to required conditions it is well to know of it. The cacao being harvested just now seems to me, from what I have seen, to be fuller, rounder, and bigger than what usually obtains, the result doubtless of the fine season we have been having.

In these days when an effort is being made to reach the consumers of Tea direct, the subject of Trade Marks is not an unimportant one. A neat packet which takes the eye has much to do with success, and an attractive trade mark is not without its effect.

A friend suggested to me the other day "The Bishop's Brand"—a bishop in full canonicals,—holding that Ceylon and her bishop were well-known at home, and this more especially in religious circles where tea drinking represented at times devotional feeling. I think the suggestion is a valuable one, and might make the fortune of a pushing Company, skilled in the arranging of tea fights. As a motto for "The Bishop's Brand" what could be better than the off-quoted hymn of Heber's, those two lines, at least, but slightly modified, which too often represent the knowledge of the civilized world in regard to the island and ourselves :—

"Where every *product* pleases
And only man is vile."

To have a bishop in full war paint, in a trade mark of pure Ceylon Teas, coming before the British public as a type of Heber's "man" would certainly remove all doubt as to our belief in the doctrine of general depravity; and our strong, fine-flavoured teas as the latest specimen of our newest "product," would in time gain such favour as to call for a revision of the hymn books, and all new editions would eliminate

"Where every *prospect* pleases.

for the new reading of "The Bishop's Brand"

The story is told of a Planter who just returned from a trip home, incidentally letting out to his tea-maker the extent of his knowledge of manufacturing tea. During his absence, his property had come into bearing and the tea-house was in full swing when he arrived on the estate from his home trip. He had made up his mind to go in for the kind of reputation which can be won by silence: feel his way, and speak only when he felt he knew what he was talking about. Accordingly in his walk through the tea-house there was a "cock in his beaver," a repose in his manner, and a solemnity of silence which might have imposed on the most skilful, and have sat becomingly on the highest authority. There was, however, a tray on the fire, and when with a fine gravity he proceeded to stir gently the tea therein, smell it, and look wise, alas! alas! for his reputation, even the humblest cooly in the firing squad, knew that "someone had blundered."

Since then I hear he has recovered the good opinion of his subordinates. He stuck up a thermometer in the factory, hung up a slate with a pencil below it, had a look at the degree of heat registered from time to time, jotted them down on the slate, put on the look of wisdom, and kept silence. This little game I fancy he will keep up until he feels satisfied he knows what is what, and then he will speak to the purpose. It is strange how the cooly is so easily imposed upon in this way! I had a kangani, the most suspicious Tamil I ever had to do with, but he told me one day of a wonderful native doctor whom he had consulted, and who had promised to cure him. "Has he done you any good," I asked him later on, "that you should think so much of him?" "Well no, but he's a good physician, for he sat for a whole day turning over the leaves of his books to find what ailed me and how I could be cured." He never cured him, but yet the kangani never lost faith in the man.

PEPPERCORN.

TEA ROLLERS AND DRYERS.

In the following article, which appears in their advertising organ, Messrs. Davies & Co. combine public information and indications of altered business arrangements after a pleasant manner:—

The well-deserved and pronounced success of the Roller of the day, "Barber's," bids fair to far exceed the expectations of its enterprising inventor. The unavoidable delay in its introduction in the Indian market, caused by Mr. Barber's absence in England, is much to be regretted, but the reputation it has established will speedily result in its universal adoption in that country. That we are justified in forming this opinion must be admitted when we state that last month, November, we wired to the manufacturers in England confirming an order received for India for no less than Sixty Barber's Rollers. This, we think we may venture to assert, is the largest order for Tea machinery ever secured.

Intending purchasers in Ceylon will do well to order in sufficient time, to prevent disappointment, as the execution of the above commission will necessarily occupy the attention of manufacturers for a considerable time. As the fortunate Agents of this desirable machine, we cannot feel very much regret at losing the Agency for Lyles's Roller. Last month, in accordance with instructions from the proprietors of Lyles's Patent, the Calcutta Planters' Stores and Agency Coy., we formally transferred the Ceylon Agency to Messrs. Mackwood & Co. From the fact of our utter inability to dispose of any of the Lyles' rollers during the two years we have acted as Sub-Agents in Ceylon, we must candidly admit the justice of the proprietors' action in effecting a change, but whether such change will prove of advantage to them or their new Agents is very questionable. This machine necessitates the employment of bags, against which system (so far as our experience teaches) there has been, and still is, the very strongest objection. The change, therefore, is required in the machine itself. To ensure business by agents or principals it is necessary to produce a durable machine, simple in construction, giving the best description of work in the shortest time, and easy of manipulation, at a fair and reasonable price.

In anticipation of our becoming Agents for Barber's New Dryer, and at the request of Messrs. Davidson & Co., we have likewise transferred the Sirocco renewed parts to Messrs. Mackwood & Co. In this Agency Messrs. Mackwood & Co. have more reason for congratulation than in the case of Lyles's rollers, for with the increasing number of Siroccos brought into use, and the great susceptibility to wear and tear of parts in the Sirocco, the constant demand for the renewal of such parts must prove a source of great profit alike to manufacturer and Agent. As a Tea Dryer, however, there is no doubt Davidson's Sirocco at present stands first on the list, and knowing this we are fully alive to the task Mr. Barber has before him in perfecting a Dryer to beat the Irish Machine. Under the circumstances, it would be somewhat premature for us to enter upon the merits of Barber's Dryer, but one leading feature which has been kept constantly in view by the inventor is that the annoyance, trouble and expense to which Planters are now frequently put in providing new parts to the Dryer should be as much as possible, if not altogether, avoided. Messrs. Ruston, Proctor & Co., of Lincoln, have had the Machine in hand for some time past, and before this is published we expect the first one will be on Blackstone Estate for trial.

WEST INDIA PRODUCE.—A series of interesting articles on the West Indian products at the Colonial and Indian Exhibition, which has lately appeared in the *Sugar cane* magazine, concludes with remarking that, on the whole, these attractive and nicely decorated courts give one a very satisfactory idea of the products and capabilities of our West Indian colonies. The survey is, however, not altogether satisfactory at the present moment. These islands are certainly not developed at all as they might and ought to be. Much capital has, no doubt, been spent upon them, and the results have not been always satisfactory to the investors. Assuredly this is not because the West Indian islands are incapable of producing ample high returns. The bulk of the land is at the present time purely waste, and probably the main difficulty is the actual impossibility of procuring sufficient labour. The islands, we are told, in spite of the large commerce in drugs, fruits, &c., are certainly now suffering, most of them, from their exclusive devotion to sugar culture. But if the labour difficulty could be met, and a judicious variety of products could be introduced, there seems little doubt that the return would be nearly as profitable as of old, if not still more so. The papers to which we have just alluded conclude with the following:—"Since most of them [the islands] are Crown colonies, surely it behoves the Home Government to stir in the matter, and see whether it cannot help these once favourite colonies to help themselves."

THE QUININE MARKET.—A London Correspondent who has been consulting a large dealer in quinine and an authority who carefully watches the market, sends us the following result of enquiry:—"The general opinion in the trade is that this article has touched the bottom. Its downward course was determined by the following reasons:—1. Larger exports of bark from Ceylon. 2. The frantic efforts of the fraudulent Milan Factory who made millons of ounces annually which they deposited with Bankers to draw against, when the crash came. This quinine was forced on the market, lot after lot, as fast as possible, prices falling with every sale. 3. This affected the trade of regular makers who bought less bark, the smaller demand again brought bark (and quinine) down. It will probably experience a steady rise for:—1. Low prices have stimulated consumption. 2. Makers are again at legitimate work and the Milan Factory has gone. 3. Smaller (probably) import of bark. The bark market is all ready

better; and quinine has risen 4d per ounce, and makers are selling carefully." A home journal which refers to the correspondence and discussions in the *Observer* says :—

"If the statement made by a leading firm of London brokers that 'the price of cinchona bark depends entirely on the shipments from Ceylon' be well founded, it certainly seems desirable that the Ceylon planters should take suitable steps for regulating their supply more in accordance with the natural demand."

THE QUINOLOGICAL LABORATORY established at Harlem (Holland in 1884 by the late Mr. J. C. B. Moens will be continued by Messrs. N. van def Sleen and W. J. E. Hekmeyer, under the style or Moens, van der Sleen and Hekmeyer.—*Chemist & Druggist.*

QUININE MANUFACTURE.—An advertisement from from Madras in our columns today ought to have a special interest to gentlemen meditating experiments in the local manufacture of quinine. If the owners of cinchona clearings were able to form a Syndicate for the purpose of establishing such a manufactory or even one to secure the less refined alkaloids, they would probably do more to increase the value of their bark than by any other meeans.

TEA IN DARJEELING.—I hardly think I can remember so many changes in the management of gardens as have taken place this year. The season has been simply disastrous for many estates especially in the Terai, and Messrs. Lloyd and Co.'s failure will, of course, not mend matters for the concerns which were being financed by them. Some gardens have done well, but I think if an average could be struck it would be found that the season just passed was the worst on record for many years. Most hill gardens have done very fairly well owing to being able to maintain the "hill flavour." Given a bad season, and the universal remedy—change of management—is adopted. Foolishly I think in most instances, because a man who knows all the ins and outs of a garden as well as all the coolies, so long as he has a fairly good head on his shoulders and does his work will arrive at much better results than a stranger. The gardens which do best in this district are those which have been under the same management year after year. Local expenditure is being heavily cut down, another mistake I think. It is in Calcutta that the pruning knife should be applied, and that not by any means sparingly. But there is little chance of that step being taken as the "ring" always takes very good care to command the majority of votes at every shareholders' meeting. The "practical gardener," with a Bible in one hand and a spade in the other, seems to be the coming man. He can live and grow fat on a salary that a gentleman would starve on, and will put up with "midshipman's allowance"—more kicks than half-pence. Pruning is well in hand on nearly all the gardens now. By the way, talking of pruning a friend of mine, who is an old and very successful manager, told me that he was going to try what to me is a new departure on a small scale. It is to prune early, and, as he hopes, to get a small flush a week or two after. This of course meant pruning before the sap had ceased to circulate. It will be interesting to hear what results he has obtained.—*Indian Planters' Gazette*, Dec 7th.

COCA LEAF AND SIR R. CHRISTISON.—This well-known Professor of Materia Medica in his 78th year in one of his many mountain climbs experimented in the way of chewing the Peruvian cuca or coca leaves. He took long walks, and finally ascended Ben Voirlich, where he experimented with the leaves. In his journal, he writes thus of what took place on Ben Voirlich :—

"I reached the top very tired. Determination alone carried me the last six hundred feet. As soon as I arrived, I began to chew cuca leaves, and consumed ninety grains during the half-hour spent on the summit and the first half-hour of the descent When I started for the descent, the sense of fatigue was entirely gone. I went strait down without a stop in one hour and a quarter to the road, not much tired—able to walk comfortably a mile and a half to meet the carriage. Although my limbs felt rather heavy to move, I seemed not to care for this." In a more formal report on the subject, he says :—

"The chewing of cuca removes extreme fatigue and prevents it. Hunger and thirst are suspended; but eventually appetite and digestion are unaffected..... ..... It has no effect upon the mental faculties, so far as my own trials and other observations go, except liberating them from the dulness and drowsiness which follow great bodily fatigue."

Surely--says the London *Spectator*—this Peruvian leaf ought to be better known than it is. What is doing with it in Ceylon by planters? At Peradeniya Gardens the other day, Mr. Ferdinandus gave us leaves to try "in the heat of the day," the chewing of which was not unpleasant, though the taste somewhat resembled that of grass. The Garden authorities ought to experiment with their collectors, getting them to use the coca leaves on their long jungle journeys, and to report the results.

TEA WEIGHTS.—A trial of some interest to the tea trade has recently been decided in the Court of Queen's Bench in favor of the plaintiff, who sued the defendants, their Calcutta Agents, for the value of difference in weight of 96 chests Indian tea bought by them for the order of the said plaintiff. The difference was 587 lb on an invoice of 9,225 lb. being the garden weight, and which their agents had accepted as correct and paid for as such. The cases were in good order and the difference could not have been stolen, lost or caused by driage. The defendants pleaded the custom of paying for the garden weights and not actual weight, and some evidence was called on this point, which was, however, not very conclusive. The Judge, in summing up, concurred in thinking that the action was one of some importance, because on the one hand there was a sort of imputation that fraudulent conduct had been pursued somewhere, and on the other hand a custom had been set up which, if it existed, was a somewhat dangerous one—that where principals ordered an agent to send them a certain quantity of tea, he should have the power by custom to send them a much smaller quantity, charging at the same time for the larger quantity—a custom which required a great deal of watching, inasmuch as customs often arose in a trade which were very much to the detriment of the public and the customer. In this case there were two issues—one being for the plaintiffs to establish, and the other for the defendants. It was for the jury to say, first, whether it had been made out to their satisfaction that the plaintiffs had given instructions to the defendants to buy so many chests of tea for them, that they paid for the chests on the basis that the chests would contain a certain weight of tea, and that when the chests came home they were found to be so much short of the invoice weight. The defendants suggested that the short weight might have been caused by pilfering, but the jury would not presume frauds and rascalities unless there was strong ground for supposing that such malpractices were the true explanation of the deficiency of weight.' The jury had been made aware by pleadings of the nature of the custom which the defendants had set up as an answer to the claim. Such a custom must be certain —so certain that if nothing was said, the custom would be assumed to be imported with the contract. It was entirely for the jury to say whether there was so universal a custom that, if an agent sent home chests of tea which were materially and substantially short in weight the principal was not entitled to receive in respect of the deficiency. Could they say that a custom was implied into the bargain, that garden weights should be accepted? If that was not made out to their satisfaction the defence of the custom failed; and then the only remaining question would be whether the plaintiffs had made out, in the absence of specific evidence as to the breaking of the chest in transit, that the invoice weight was in excess of the actual weight, and that they had paid for the excess.—London *Cor.* Local "Times."

ON THE IMPORTANCE OF LIMING.

The value of lime for agricultural purposes has been known from a very remote period. According to Pliny, the Gauls applied lime with great success to their corn lands, while the Romans found an occasional dressing very beneficial to vines and olives. In our own country the practice of liming—that is to say, the use of kiln-burned limestone—is confined to certain localities. Thus, in Scotland, in the northern and western counties of England and in South Wales, it is much esteemed by practical farmers; while in the southern and eastern counties, where the soil is naturally more calcareous and associated with the upper and lower chalk formations, and where the climate is drier and the rainfall less, it is not customary to apply caustic lime, though great benefit results from the use of chalk marl once in nineteen or twenty years. It is to be feared that, with the disappearance of the summer fallow, the practice of liming has been neglected, and too much reliance has been placed upon artificial fertilisers. This, if true, is greatly to be regretted, inasmuch as, in order to get the full benefit from any manure, it is absolutely necessary that the land should contain a sufficient supply of available lime. We should remember that not only is lime a necessary constituent of the mineral portion of all plants and crops, but it promotes the more rapid decomposition of those organic matters which are present in the soil, or which may be added as manure—converting them, in fact, into nitrates and carbonates. Further, lime exercises an important solvent action on the insoluble silicates which are dormant in the soil, but which may be decomposed by caustic lime, and made to liberate their potash and soda. Again, lime neutralises, all vegetable acids, and is therefore especially necessary in the reclamation of peaty land; while on stiff clays it improves the physical character as well as the chemical composition, and thus promotes a more healthy and vigorous growth in the future crops. Lastly, its judicious use is considered a specific on those soils which produce turnips affected by the disease known as "fingers-and-toes;" and where acid manures have been used year by year, a good dressing of lime cannot fail to be specially useful, and to insure the complete utilisation of the soluble phosphate contained in superphosphates and dissolved bones.

It is, therefore, evident that lime is a most important element in all fertile soils, and has been truly likened to a key with which the stores of plant food may be unlocked and made available. Indeed, excessive liming is most exhausting, and has given rise to the old saying that lime is good for the father, but not for the son. Liming should be followed, however, by manuring, and then the full benefit will be obtained.

In the analyses of drainage waters from the Rothamsted experimental plots, made some years ago by the late Dr. Voelcker, it was clearly shown that practically the whole of the nitrogen compounds which were lost in the drainage water passed off in the form of nitrates in combination with lime. Thus, from the unmanured plot there were 6·87 grains of lime and 1·05 grains of nitric acid per gallon; while from the plot manured with farmyard dung the drainage water contained 10·32 grains of lime and 4·34 grains of nitric acid per gallon. From the plot where 600 lb. of sulphate of ammonia was applied per acre, the water contained as much as 13·81 grains of lime and 4·55 grains of nitric acid. Lime, therefore, furnishes the most effective carrier or fixer of the nitric acid as fast as it is formed in the soil; and we have every reason to believe that the composition of drainage water presents us with the best idea how and in what form plants take up their nourishment—at least, so far as their food is in a soluble form. It also appears from these interesting analyses that sulphate of ammonia becomes decomposed during its passage through the soil, sulphuric acid uniting with lime and passing off in the drainage, while the ammonia is retained in the soil, a portion only being lost in the form of nitrate of lime.

Having said so much respecting the value of lime, let us briefly consider the chief characteristics of the best qualities. Usually the most suitable limestone for agricultural purposes is that which yields, after burning, the purest and finest powder on slaking, also the whitest and lightest lime; for the less weight per bushel, the better the quality.

It is important that lime should slake readily and break up into a fine powder, which can be easily and uniformly scattered on the surface of the land, which, if arable, should be subsequently harrowed. Lime should never be ploughed in, for it has a natural tendency, as it becomes dissolved, to work downwards, and beyond the reach of ordinary farm crops. Mountain limestone yields excellent lime; as a rule, 1 ton should give on careful burning in the kiln, about 11 cwt of caustic or quick lime. Great care has to be taken not to overheat the kiln, for when highly burned the lime will not slake readily. The goodness or richness of different qualities of lime may be noted by observing the quantity of water which each sample will take up or absorb during the process of slaking—the more the better, as the superior kinds swell out and increase in bulk from three to four times their original size.

Quick lime is soluble in 770 parts of water, and has a hot alkaline taste, as opposed to the mild taste of powdered chalk, which is only soluble to the extent of about two grains per gallon, or 1 part in 3,500 parts of water.

It frequently happens that limestones from the same district vary considerably, both in their physical properties and chemical composition, so that sometimes the less pure stone yields the better lime, as it slakes quicker and without water being specially added; moreover, it contains appreciable quantities of phosphate of lime. In such cases, where any doubt exists in the farmer's mind, it is desirable to have the aid of chemical analysis before making a selection, especially where carting some distance has to be considered.

In addition to the mountain or carbouiferous limestone, which occurs so extensively in South Wales, Somersetshire, Devonshire, and other counties, there are very fair lias limestones—as, for instance, that found at Aberthaw in Glamorganshire, which has a great local reputation, chiefly, however, for building purposes, as it sets and does not swell much on slaking, so that it is better adapted for cement-making than for agricultural purposes.

In Pembrokeshire we find the Sulirian limestone, also the Caradoc, which, although containing 80 per cent of carbonate of lime, is regarded by geologists as a sandstone, on account of its gritty formation. Lastly, the oolitic limestones of Gloucestershire, and the chalks of Kent and Sussex, form another class which yields a great variety of caustic lime; but we have only space to observe that in most cases, the softer the original rock, the poorer and weaker is the lime.

Now a few words regarding the kind of soils that are improved by liming. It may be truly said that there are few soils which are not benefited by the occasional application of lime in some of its numerous forms.

On peaty land and heavy clays there can be no doubt that slaked lime, applied at the rate of 4 or 5 tons per acre, will prove an economical dressing every seven or eight years.

On light sandy or gravel soils, as well as those formed from the decomposition of granitic rock, which are naturally poor in humus and organic remains, much smaller applications are advisable; thus not more than one ton, or about fifty bushels per acre, are perhaps quite sufficient. Indeed, on such soils it is generally safer to apply lime in the form of ground chalk, chalk marl, shell sand, or in some cheap form of phosphate and carbonate combined, such as the recently introduced basic slag, which in certain localities can be obtained in a finely ground state on moderate terms. Those who are familiar with Cornwall are aware that immense quantities of shell sand are sent inland annually, for application to the arable land. This sea sand varies in its richness in carbonate of lime, according to the amount

of finely ground shells present; thus at Padstow it contains as much as 80 per cent, while further up the Channel, at Bude, the proportion of carbonate becomes reduced to 50 per cent, and at Hartland Point there is only 30 per cent, the remainder consisting of siliceous sand, associated with some oxide of iron.

Practical experience has taught the native farmers which locality yields the sand richest in carbonate of lime, and therefore the most economical for their land, and it is interesting now to know the reason for such selection. Further, this local practice of dressing light soils with finely-ground shells is a strong argument in favour of the value of insoluble phosphate when applied judiciously, in the form of ground bone ash or Cambridge coprolite, on land naturally deficient in lime and fairly rich in vegetable matter. Of course, these insoluble phosphates take longer to become available than is the case with soluble phosphate, which becomes at once precipiated when mixed with the soil, and consequently is in a much finer condition than any ground raw phosphate. Hence, for turnips superphosphate or dissolved bones will be preferred, because they afford an immediate supply of that food which the young plant requires in the period of growth, so as to get quickly beyond the reach of the ravages of the fly. On land poor in lime we should either use a mixture of soluble and insoluble phosphates, or we should apply a dressing of chalk, say 4 or 5 tons per acre, and see that it is well spread over the surface before marking out the turnip ridges and applying superphospoate, as, for instance, was done in one of the experiments with swedes in Warren Field at Woburn, where the application of 5 tons of chalk alone per acre caused an increase of 2 tons of swedes over that obtained on the unmanured plot.

On pasture, lime is best applied in the form of composts made from ditch cleanings, heaped together for some months and put on during frosty weather; also road scrapings, if derived from limestone, make an excellent dressing for grass land, for some of the best and sweetest herbage is grown on old pasture which has been well chalked or is naturally already rich in carbonate of lime. Lime destroys the coarser grasses, and favours the growth of the finer-flavoured and more nutritious herbage.

In addition to turnips and swedes, the following are crops specially requiring a liberal supply of lime:—Clover, peas, beans, vetches, and sainfoin. On land that has been properly limed, clover sickness is said to be less known than where this old practice has been neglected.

During the last twenty years the writer has had numerous instances brought to his notice where judicious liming has been attended with the most satisfactory results, both on arable and pasture land. But lime should be applied with caution and in moderate doses, and, moreover, be followed with manure of some kind, for crops require other constituents besides lime. In these times of depression in agriculture it is well to recall the attention of farmers to some of the old practices of their predecessors, and to remember that such were introduced into the category of local customs as the result of many years' practical experience.

There is, of course, judicious liming and injudicious liming, and there are certain districts where the practice is carried to excess, while in other it seems to be almost entirely neglected.

Further, it has been pointed out in this paper, there are a great number of light sandy and gravelly soils which will not stand the application of lime in its fresh caustic state, but which would be greatly benefited by a dressing in its original form of carbonate of lime, such as we find in chalk, shell sand, or ground coral.

In conclusion, there is one form in which lime can always be applied with safety and without any fear that the results will be unsatisfactory, namely, as a compost with vegetable refuse and soil. If the ditches along many of our country roads were more frequently cleaned out and used in this form, a most valuable dressing would be afforded for the neighbouring fields, be they in pasture, corn, or roots, while the roads would be drier, and less liable to get flooded during wet weather. JOHN HUGHES, F.C.S.,

Consulting Chemist to the Ceylon Planters' Association, 79, Mark-lane, London E.C.—*Field.*

THE QUEENSLAND SUGAR INDUSTRY.

Brisbane, October 24th.

The sugar-cane growers and sugar manufacturers of Queensland seem destined to meet with unexpected troubles. Only a few years back they were nearly swamped by reason of the "rust" disease; then after a brief period of prosperity a series of dry years obtained, and the crops were very short, so much so that it got to be commonly asserted that the lands were exhausted; on the top of this came the scarcity of labour and political harassings, accompanied by a fall of 100 per cent in the price of sugar. Last year was a glorious season, and far more sugar was manufactured than ever before, the total quantity being 66,000 tons, but this year there comes the singular trouble that a still more glorious season than was that of 1885 has prevailed, and so there is far more sugar in the fields than can ever be gathered. Usually the tropical growth of vegetation in Queensland commences in December (about Christmas), and ceases in May, and the rest of the year the characteristics of the climate are decidedly nontropical, for the winter, spring, and early summer are almost rainless, and dessicating westerly winds prevail. This is the time the sugar manufacturer chooses for his operations, for then the cane ceases in a great measure to grow, the juice attains a high density, and carting to the mill of the thousands of tons of cane is easily accomplished through the ground being hard. Now, this past winter and spring have been abnormally wet and mild. Rain every week, and heavy continuous rain every fortnight, would about characterise the weather report. The temperature has been mild, too, the drying winds having been absent. Consequently the cane has never ceased growing, and there is the grandest crop ever known on the fields, even on the old cultivated lands, until lately supposed to have been worked out. The planters have made several starts at crushing, and as often have had to discontinue through the lowering of the density of the juices, the difficulties of keeping the mill supplied, and getting the megass (crushed cane) dry enough to use for fuel. The manufacturing season is now well advanced, and the probability is that the weather will continue showery, for the thunderstorm season has set in; that it will close early is also likely, for the summer rains will begin about Christmas. It is thus absolutely impossible that these fine crops can be gathered this year. This is more or less the state of things at all the centres of the industry, from the extreme north to south of Brisbane, for even on these southern rivers the winter passed without the slighest touch of frost; the cane kept green and growing, so that crops of the south are almost as luxuriant as are those in the north. From Mackay northwards, the rains have been excessive. At Cairns and the Johnstone about 140 inches have fallen since Christmas last. At Mackay they had 8 inches during September, which is usually the best crushing month of the year. It is now night and day, continuous work, at all the principal mills. Nevetheless, it is certain that the gross returns will be considerally less from that district than were those of last season. The selectors who grow cane for sale to the mills of course will feel this absence of returns severely, for the mills will take but a limited quantity of outside cane so long as their own is left uncut. The quality of the sugar produced is quite equal to that of last year, and which obtain such general praise in all markets.

There is one district which this singularly wet season has suited exactly, and that is the Burdekin delta lands. This locality has the least rainfall of any of the sugar centres, and although an immense expenditure of capital was incurred in establishing

the industry, the returns so far have been disappointing, solely in consequence of the non-growth of the cane through want of moisture. Consequently the large Airdmillan mill (which, by-the-by, I believe mainly represented Victorian capital), after an expenditure of over £100,000, was closed, and arrangements made for the cane to be crushed at an adjoining estate. The result of the frequent rains is that the cane crop on Airdmillan is splendid, and it is doubtful if the two large mills, Seaforth and Pioneer, will be able to take it off. Cane which had been left to run out has astonished every one by its growth, and second ratoons have yielded 30 cwt. sugar per acre, thus proving the suitability of the delta soil if only it can be watered. The droughts of preceding years led to extensive irrigation works being adopted, and at the two plantations above-named they have pumps which throw 300,000 gal. an hour, there being an inexhaustible supply of good water at a depth of seldom more than 12ft. Irrigated land has been found to yield four tons of sugar per acre.

The reports from the Wide Bay and Burnett districts are exceedingly favourable, and the return this season promises to be what the local paper terms "phenomenal." The output from millaquin, on the Burnett, is calculated by Messrs. Cran and Company to reach 10,000 tons, and the same firm consider that their manufartory at Yengarie, on the Mary River, will turn out 5 000 tons.

bane and Southern districts. Here there have always

The only places in which there will be a notable decrease of yield through the closure of mills and the relinquishment of cane culture will be the Brisbeena number of small mills, and every year makes it more apparent that such cannot compete with the larger establishments and there more perfect machinery and organisation.

Of late there has been no difficulty about the labour question. The supply of Kanakas has been ample, and a great part of those now on the plantations and that arrive from time to time are those who have previously served a term of years, and who elect to reengage for plantation life in preference to ramaining on their own island.

Mackay, Oct. 25th.

The first half of the crushing season 1886 has been a continuous trial to the patience of sugar growers in tropical Queensland. The spring months, the driest of the twelve, according to records extending over 20 years, have this year been the most rainy, the fall during September having exceeded that of any month of the wet season. As a consequence, instead of half the crops being in at this stage, barely, one-third are yet milled, and in place of the rich juice usually supplied by canes cut in October a density of 9 deg. Beaume only has ruled until within the last fortnight The quality of the liquor manipulated, accordingly, involves an abnormal consumption of fuel, and as such is gall and bitterness to the careful-minded proprietor; the quantity, however, measured per ton of cane is above average, and, in this respect, has seldom been excelled. If the curious reversal of seasons continues, and the late spring is followed by an equally late summer, with January dry, the harvesting will probably be completed, and the total estimated output of 20,000 tons successfully attained. Under less favourable cicumstances many estates will be compelled to leave fields to stand over until 1887. In order to avoid this undesirable result the most strenous efforts are being made to recover lost ground, and labour of all kinds is in brisk demand. Brisbane has been opportunely relieved of some of its unemployed by the maligned planter, who, no doubt, rejoices in this heaping political coals of fire on the heads of the Queen-street Government. It is a case of the north to the rescue, and seldom has better labour been offered mill owners than the young fellows who have lately been landed here at Government expense under agreements for three months at a wage of 10s. to 12s. per week with rations.

The Javanese, on the other hand, introduced as a substitute for the failing Kanaka supply, are constantly in the Police Court on various charges, and have disappointed expectations. In physical activity they are deficient as compared with the cheery Polynesian, but they endeavour in mental quickness to atone for this shortcoming, being prolific in every variety of deceit in order to escape work. These remarks are particulary applicable to the town hands from Batavia or Singapore. Those agricultural labourers from the interior of Java, who have recently being indented with their families, are a quieter class, from whom better results are anticipated. The Kanaka, however, remains *facile princeps* in all the essentials of a reliable nature.—*Australasian.*

COFFEE PROSPECTS IN KADUR.—Nov. The Koppa side of the District has begun coffee picking, just the first round of a little ripe here and there. The general picking will most likely begin in about 15 days more. The season is later than last year by nearly a month, in Koppa, and will be almost two months later in the Chickmuglur and Mudgiri Talooks, due wholly to the lateness of the blossom showers which fell at the close of April, instead of the usual middle of March falls. The crops too will turn out a much smaller average. I have not heard yet of any of one estate with a full bearing crop. I have heard, though the boast of two or more estates with a "splendid crop" but the estates belong to persons whose words are always taken with a very liberal pinch of salt. You may rely on this! The crops are not equal to the usual average; some have half, and others three-quarters, and this is as close as it is possible to make to an average.—B.S.—*Madras Weekly Mail.*

COFFEE-DRINKING AND ITS EFFECTS.—New York has a doctor of unusual brightness, who has busied himself lately writing pithy and scholarly monograms on some of the baptised and endorsed evils of society. His latest manifesto is on "How Coffee Affects People;" and the aim of the paper is to show that coffee is one of the most powerful drugs in the list of medicines. The proof of its power as a drug is shown by the fact that it is used to a greater extent than any other as an antidote for poisons, both animal and vegetable. He urges that he does not desire to reach the ear of the public in general, but of those who have pains in the region of the heart, oppressed breathing, and an irregular pulse; those who are exceedingly nervous and unable to sleep at night; those who have a full feeling, dizziness, and pains of a neuralgic character in the head; who have nausea and sourness of the stomach without; having transgressed the laws of life; who have pains in the liver, a yellow skin, with eyes of the same sortd and lastly, who have hemorrhoids. If the doctor supposes he has left out one or two of all creation from this list he may be right, but he certainly is moving a wide swath, and may honestly say he is after the ear of the public. To these he offers one suggestion. Omit coffee for a time, throw physic to the dogs, and find out if the trouble after all is not in the drug used as a beverage. In moderate doses coffee raises the blood pressure and accelerates the heart. Now, says the doctor, heart disease is in the main an easily prevented disease, and it is very frequently due to the excessive use of coffee. He enumerates several instances where he had been called to prescribe and had found his patients given up to die, but there was really nothing the matter but the breakfast drug. He wisely suggests that in this day of sudden deaths we are called upon to review our methods of eating and living in order to get at the cause or causes. "The heart and brain require rest as well as other organs of the the body." If the vessels in the brain are kept distended we have as a warning dizziness and pain, and, if the warnings are unheeded, appoplexy. So with the heart. So short are its intervals of rest when beating at 72 to 84 that we can hardly conceive it. Add to this the stimulus that sends it up to 90 and we must produce disease. He concludes that for our regular meals and at evening parties we should substitute the simpler cocoa or bouillon and escape danger.—*St. Louis Globe-Democrat.*

CINCHONA CULTURE IN JAVA AND SOUTHERN INDIA.

We have received the annual Report in Dutch of M. von Romunde, Director of the Government Cinchona plantations in Java, which we have had specially translated, and also the Report of Mr. Lawson, Director of Government Cinchona Plantaticns, Nilgiris, for 1885-6. We give them in detail in the pages of the *Tropical Agriculturist*, see pages 479 *et seq*. There is very much of interest to the practical cinchona cultivator and especially to the Ceylon cinchona owner at this time when anxiety is felt as to future bark supply and condition of the bark market. In Java there was no special extension of planting operations in 1885, but preparations were being made for a good deal of work in the current year and in 1887. More particularly was attention being given to the planting of a hybrid between Ledgeriana and Succirubra, and to the increase of the grafted Ledgers on Succirubra stems. These latter are said to be flourishing so far, and as grafts are only taken from trees tested up to 10 per cent of quinine, in fact "from the richest known mother trees," it is evident that the Ceylon proprietor has some cause for anxiety in this direction. As regards private enterprise some idea may be formed—though by no means a correct one—from the results of the sales of seed which in that year amounted to 13,471 florins (rupees we may say) and besides, there were sold 2,730 florins' worth of grafts. We are struck by the very careful and improved system of cultivation employed by M. von Romunde, in clean weeding, thorough draining and digging all over his fields. He speaks, too, of thorough digging before replanting a field with ledgers on which coppicing and uprooting had taken place. Close planting is very strongly recommended. *Helopeltis* continued to give annoyance occasionally. Shaving old officinalis trees had been very successfully practised; but in other cases the process of shaving only half the circumference at a time had done harm and a series of experiments in shaving now going on are described. Close planted Ledgeriana trees are said not to stand shaving at all. The total Government harvest of bark in 1885 was about 500,000 lb. As regards the extension of cinchona planting by private owners, the Director says there has been a decided check, but he affords no estimate of the total area planted. There is much more and detailed information, especially as to analyses, and official experiments made at the instance of private planters, anxious to save freight &c. by sending alkaloid extracts in the rough to Europe; but the report on this *quinium* experiment from Holland is not given. It would appear as if 22 lb. of bark (10 kilogrammes) were reduced to 2 1-5th lb. (1 kilo.) the latter (quinium) having 60 per cent alkaloid against 6 per cent in the bark. It seems a pity that M. von Romunde's Report was not available sooner, for it contains a great deal of valuable information. The common idea in Ceylon is that shaving causes the bark to increase in thickness, and that the renewed bark is much richer in alkaloids than the original bark. This, among other things, is apparently proved not to be the case in Java.

Turning now to the Nilgiris Report, we need only notice here that in connection with coppicing, Mr. Lawson considers after careful experiment, it to be quite immaterial at what time of year cinchona trees are cut down. Mr. Lawson gives most encouraging information as regards the great need for an extension of consumption, showing on Dr. Bidie's figures, that Government will not do its duty until 2 million lb. of bark averaging 6½ per cent of total alkaloids are provided for the people in the Madras Presidency alone! At this rate all the present season's crops in Ceylon and India should be kept for the use of the people in these countries. Mr. Hooper (the quinologist) gives valuable information as to shaving and manuring of cinchona trees, the extraction and preparation of cheap alkaloids, &c. Of Mr. Hooper's further good work we have a specimen in a separate Report which has reached us from Madras giving the result of his investigations into the inorganic constituents of cinchona bark. We give this (see page 476) as well as all that is of practical use in the Botanical Director's Report in our pages.

THE CLOUD LIFTED FROM QUININE.

The better feeling in the quinine market, which has been noted in our regular reports for the past few weeks, is not based on any speculative ideas, but seems to be the result of natural circumstances, with a solid foundation to work upon. The violent fluctuations and remarkably low prices which have marked the course of this alkaloid for a long period rather discouraged investors and consumers, and it became recognized as a dangerous speculative article. There were many persons who considered quinine cheap at half a dollar per ounce, but when it touched that figure they were not so ready to invest; consequently there is less stock in the hands of manufacturers and speculators than at any previous period, as less bark was worked into quinine.

The large shipments of Ceylon bark, from 1883 to 1886, rather mystified operators in quinine, and they lost confidence in the market because of the impression that increased area was under cultivation, and that this bearish element would continue to influence values. The Reporter has previously pointed out the fact that root bark had made its appearance in the London market which was evidence of the destruction of cinchona plantations, the trees being uprooted instead of stripping the bark, owing to the industry proving unprofitable. This has undoubtedly accounted for the large receipts, as whole roots came to the market instead of strips as heretofore. It is stated that the acreage under cultivation in Ceylon is two-thirds less than during 1883, which is a strong argument alone in favour of a reaction.

But what of the Java and South American fields. The latest information from Java was published in these columns last week, and showed a decline in the industry, according to a British consul, but previous reports gave more encouraging prospects; still, that country is not yet recognized as an important factor in the situation. South American barks received a back set from previous experience which it will be difficult to recover from, but in the event of a scarcity of Ceylon barks, followed by extreme prices, South American barks will have to be drawn upon, but the comparatively low percentage of quinine they contain prevents them from being an equal substitute. Manufacturers are speaking more hopefully of the future, and are firmly inclined to the belief that the extreme low prices will never be reached again. The rumor of a combination among foreign manufacturers has no foundation in fact; such a thing is among the improbabilities, as their experience with the syndicate disgusted some of them, and brought about a determination to oppose all pools.—*American Oil, Paint and Drug Reporter.*

JARRAH AND WHITE ANTS; TANNIN IN PINE; STARCH IN PLANTS. NOTES ON POPULAR SCIENCE.

By DR. J E. TAYLOR, F.L.S., F.G.S., EDITOR OF "SCIENCE GOSSIP," &c.

I understand that Mr. Bosisto, with characteristic energy and scientific acumen, has been engaged in investigating the reasons why the Jarrah wood (Eucalyptus marginata of Western Australia) is enabled to defy both the attacks of white ants on the land and those of ship-worms, &c., in the sea; and, further, that he has discovered the chemical principle, and is able to extract it. This is a most valuable discovery, inasmuch as it will now doubtless be possible to make a solution of the substance and impregnate other woods with it, after the manner of creosoting timber. Here is another new industry for Australia. By and by, in a century or so, your descendants will perhaps be sorry you have been in such a hurry to ring-bark and destroy your characteristic gum-tree forests. How hopeless we are to withstand the attacks of white ants is well indicated by the reply of Professor Riley, the well-known American entomologist, who when asked for a remedy against these insects, could only advise his querist to "burn all the wood work above and underground" in his green-house.

A discovery has just been made which may indirectly affect you in Australia, where the wattle is grown for the sake of the usefulness of its bark in tanning. For some time past attempts have been made in Sweden to extract tannin from a native species of pine. This species is nearly related to the American hemlock (Pinus canadensis). Hitherto these attempts have all turned out failures. During the present year a Swedish chemist (Dr. Laudin) visited America for the purpose of experimenting on the hemlock, and he appears to have succeeded, for, on his return to Sweden, he obtained tannin from the Swedish pines by a chemical process. The tannin is said to be equal to the American, but the leather produced by it is yellower in colour. The Swedes are in hopes that this new discovery will have the effect of causing a great tanning industry to spring up in their country. The character of tannin in plants is now better understood than formerly. It is no longer regarded as a purely waste or excrementitious material, but under some circumstances may be converted into good material.

It has been discovered that the leaves of plants are able to form and store up starch, not only from glucose and cane-sugar, but also from mannite, and even glycerine. Potato-shoots growing in dark rooms are also able to form starch out of glycerine, as well as out of glucose and saccharose.— *Australasian.*

GAMPOLA-KADUGANNAWA, 20th Dec.—A good deal of rain fell yesterday and last night. This morning showery, and it looks as if it was going to continue, so I have put a few coolies to supply my tea field with others following them with fern and other shade to place over the young plants. What destructive little creatures rats are, they have been amusing themselves running over my clearing, and nipping the small tea plants in half. If it was not for the dense lantana, what a glorious district this would be for pig-hunting.

THE CULTIVATION OF TEA IN ALBANY, S. AFRICA.—Lower Albany, which may be said to be a suburb of Grahamstown, is anxious to make the most of its resources, and has taken to the cultivation of tea. This is an industry sure to pay, because it gives little trouble, and tea is in constant demand in the Colony, at good rates. Moreover, the tea plant is well adapted to the climate, and is nothing dismayed at a stretch of drought, or an occasional frost. As Mr. Cannell, of Port Alfred, has seedling plants for sale, at a small cost, it may be expected that many people will take up this industry.— *The Colonies and India.*

TEA PACKING.—A buyer writes (sending us a newspaper extract):—"You would be doing the trade a service if you drew planters' attention to the enclosed hints on the packing of tea. It would be very desirable if standard weights were adopted for each description of package, 40 and 45 lb. half-chests are the most expensive weights to work in the London warehouse, besides the heavy percentage of loss in weights by draft and trade customs in mode of weighing the gross and tare." The extract is as follows:—

Packing.—It would seem from the various net weights of Ceylon packages received on this market that the reduction of freight and warehouse charges and loss in weight to the lowest possible point *per lb.* is not sufficiently studied. I find on going closely into the subject that the most economical weight for *leaf* tea to pack in a half-chest is 55 lb. of Broken tea and Dust 60 lb. might I think be packed—care being taken that the tare of the latter does not exceed 19 lb.

For chests, of a handy size, 95 lb. net or even 100 lb. in Japan would is the most economical weight. Chests, when practicable, should always be used when a sampling break can be made up so packed, as besides effecting a saving of about 20 per cent. on the item of Warehouse charges alone, freight and loss in weight are both less. Boxes should not be used except for very choicest teas as besides Warehouse charges and freight per lb. being about double that of chests, the loss in weight is invariably very excessive 7 per cent not being at all uncommon. Boxes, unless those imported from Japan, should neve contain more than 15 lb. of tea, care being taken to ser that the Gross is not over 28 lb. As the market for tease in boxes is somewhat of a fancy nature it is very doubtful if the extra price generally paid is equilized by the extra working expenses and loss in weight incurred. Care should be taken to get the tares of all packages slightly *under* the lb. with Gross weight a good ½ of a lb. *over* the pound, so as to guard against Colombo sampling reducing the gross weights to under the lb. entailing a loss frequently of a lb. on every package, not difficult of attainment if a full ½ of of a lb. extra tea is given in with each package. In hooping packages on the estate for local sale the lid should be left *un*hooped to admit of ready sampling without breaking or cutting the hooping.

OODEYPORE.—Mr. T. H. Storey, the Superintendent of the Gardens of the Maharana of Oodeypore, forwards us a copy of his annual report. Oodeypore is the only station in Rajpootana, and one of the very few places in the native states where the garden establishment is directed by a professional gardener. Mr. Storey, we believe, was trained in the Edinburgh Botanic Garden. The following extract will suffice to show the different conditions under which gardeners in India have to work from what obtain here:—

"FLYING FOXES.—There has been a colony of flying foxes, which had taken up their quarters here for the past fifty years, and were quite a nuisance. They seemed to keep up all day a horrible screaming noise. They were hanging on to large Ficus, Mango, and other trees. There were also many swarms of bees, and the foxes had a very poor time of it. The bees appeared to hate them, and used to chase them all round the place. The trees were quite leafless, and to all appearance half dead. On His Highness coming one morning this way, I took the opportunity of speaking to him about them. He told me, if possible, to have them hunted away, an undertaking which, I am happy to say, was successful. I collected all my men and boys, gave them old tin pots, tom-toms, &c., and made them get up on the trees to the very top. When they began beating their tins, the whole of the foxes got on the wing, and kept them for a few hours, when a few of them took the lead, and the whole flock went off three or four miles away. I expected them back in the morning, and I was not much disappointed, for they were returning to their old place from their night's feed; they must have been disgusted at seeing the men still perched in their quarters. The men went up the trees at 3 o'clock in the morning, and did not allow them to alight so off they went, and have not returned. The trees they were on are now covered with leaves and looking well."—*Gardeners Chronicle.*

Correspondence.

To the Editor of the "Ceylon Observer."

THE VALUE OF LIME TO PLANTERS.

Analytical Laboratory, London E. C. Nov. 19th 1886.

DEAR SIR,—I believe you see the *Field* every mail and if so, you will notice an article on Lime, on Nov. 13th. which may be of interest to the readers of the *T. A.* You remember I recommended the more extended use of lime, while in Ceylon and have frequently referred to the subject in letters from here. I have had so many practical proofs of the great benefit from the judicious use of lime in some of its numerous forms, that I find the testing of soils as to the *presence* or *absence* of a fair supply of lime one of the most important points to be ascertained before considering the kind of manure likely to be most suitable for such soil.—Yours in haste, JOHN HUGHES.

[The paper in question by Mr. Hughes in the *Field*, will be found on page 470.—ED.]

COIR FIBRE REFUSE.

10th Dec. 1886.

DEAR SIR,—The manurial value of fibre refuse is, I see, again being discussed in your columns. With all due deference to the veteran "C. S." and his greater "inventive genius and mania for experimenting" than Mr. David Wilson's, I submit that Mr. Wilson's allowing heaps or mounds of this valuable refuse to accumulate on Horrekelle, is not "a good excuse for his successors not doing more than experiment with it." Mr. Wilson cannot be allowed to have been anything more than an amateur engineer. He was by no means an agriculturist. Very many people imagine that because they own properties and take an intelligent interest in their cultivation, they are, therefore, competent practical agriculturists. To say that because "such a man came to the conclusion that "Horrekelle fibre dust could not be beneficially used," therefore, his conclusions are to be accepted as final, is absurd in the extreme. If fibre dust is of no manurial value, which I by no means admit, yet it possesses a high agricultural value owing to its absorbing properties and owing to its being so retentive of moisture. As a "vehicle" for all artificial manures these properties ought to make it invaluable. It is wellknown that roots *absorb* manure, and to do this moisture must be present, or the manure will remain inert, therefore, a substance that can absorb "12·5 its weight of water" and in which "evaporation proceeds much more slowly" than in open vessels, must be of immense value for application with manure, especially in a dry climate and in a sandy soil through which moisture passes as through a sieve. If a cattle establishment, a *sine qua non* on a properly cultivated coconut estate exists on Horrekelle, what better bedding can be found to absorb all the liquid deposits of cattle?

No one suggested as "C. S." imagines, fibre dust to be used as a top-dressing by itself for coconut plantations. Mixed with artificial manure it can with advantage be deeply ploughed into the "Horrekelle sand." It will, in decomposing, improve the texture of the soil and prevent its too rapid drying. I must join issue with "C. S." when he says that put into holes the benefit is remote and is reaped only when it becomes humus. I maintain that if put round trees after the sand has been scooped out, the benefit is immediate. Coconut trees revel in moisture which when absent cause the leaves to turn yellow and droop. The benefit which so much moisture, as say 15 baskets full of fibre dust represent is not to be despised, especially in a period of drought. With a Decauville Portable Railway the "vast mounds" of valuable substance could in a short space of time be placed in the right place.

If "C. S." has ever seen a heap of coconut husks burnt, he will have observed that in the resulting ashes there are cakes of potash salts. By asserting that fibre dust is of "no value as a fertilizer," does he assert that potash is present only in the fibre and not in the dust? The purity and strength of these salts is so great, that in the villages the husk-ash takes the place of soap with the Dhoby. —Truly yours, A. W. B.

P.S.—"C. S." not growing brinjals successfully in fibre dust proves nothing.

A NEW PLANTING COMPANY.—The Mammoth and Alpha Skull Estate Syndicate, Limited, was registered on the 3rd inst., with a capital of £20,000, in £1 shares, to take over lands, estates and properties in India, and in particular the Mammoth and Alpha Skull Estate, situate in the South-East Wynaad in the Nilgiri District of the Madras Presidency,—*Planters' Gazette.*

"GALLELLA TEA ESTATES COMPANY LIMITED. —Is the latest addition to local planting Companies and we are glad to find that under the auspices of Mr. C. H. Wilkinson,—a well-known planter with about a dozen years' experience—this Company brings in entirely fresh capital into the Colony. The Gallella property of well-nigh 500 acres with 200 acres in tea from 4 years old downwards, about 100 acres good coffee and some cinchona, has been purchased from Messrs. Cross and Ballardie for a cash sum in sterling on behalf of a few capitalists, who are associated with Mr. Wilkinson, belonging to the English Midland counties. Gallella teas have already made their mark in Mincing Lane, averaging up to 1s 5½d. Mr. Wilkinson settles down as local manager, and the directors of the Company hope to find a direct market for their teas in the country commanded by Leicester, Derby and Nottingham. We wish the Gallella Estates Company all success.

NATIVE AGRICULTURE AND PLOUGHS IN INDIA.— —Says the *Pioneer*:—

"The writer whom the *Times*, has employed to describe the Indo-Colonial Exhibition tells us that all attempts to introduce improved agricultural implements in India have failed; that as the hard soil below three inches is completely sterile, deep ploughing would prove a dead loss to the farmer for probably five years; and that the experiment farms and agricultural institutions of India have had no effect on Indian agriculture. These statements are altogether too sweeping. If the writer had taken the trouble to look at the list of implements and machines "used with marked success in India during the years 1882-83 to 1885-86" he would have found 16 different ploughs of an improved make in use, one American, several European, and some merely improvements on the old country ploughs. Still less accurate is to say that experimental farms have been a failure. To take only one of many examples, the Cawnpore Experimental Farm manufactures and sells two sorts of improved ploughs, and imports another for distribution among the cultivators. During the years 1883-84 and 1884-85 some 400 of these ploughs were sold. It is no doubt true that very much yet remains to be done to meet the wants and overcome the prejudices of the native agriculturist but a good start has been made by these experimental farms. Without professing a knowledge of agricultural chemistry, we must beg leave to doubt the five years' loss entailed by deep ploughing. Taking the average of all the experiments at the Cawnpore Farm in 1884-85, deep ploughing gave an increase over the ordinary shallow country ploughing of 53·5 per cent. when the land was ploughed 9 inches deep, and 43·5 per cent. when ploughed 5 inches deep, although the shallow ploughings were twice as frequent as the deep,'

INORGANIC CONSTITUENTS OF CINCHONA BARK.

Dr. Hooper, the Madras Government Quinologist, has reported as follows:—I have recently been engaged in examining the inorganic constituents of cinchona bark, and, considering the results would be of use to all engaged in cultivating cinchona, I forward you the results of my analyses. The dried bark always contains from 2 to 4 per cent of ash, the young bark yielding more than old and renewed specimens. I have analysed samples of bark from *Cinchona officinalis* growing in the Dodabetta plantation, and also from *Cinchona succirubra* growing at the lower elevation at Naduvatam; and it will be seen that there is a great similarity in the composition of the ash derived from both these species:—

	C. officinalis.	C. succirubra.
Silica	5·75	5·60
Soluble Silica ...	1·42	4·40
Alumina	2·70	4·24
Iron oxide	2·85	3·21
Lime	32·70	32·80
Magnesia	2·07	2·52
Potash	16·35	12·49
Soda	3·40	2·28
Carbonic acid ...	27·22	27·77
Sulphuric acid ...	1·16	1·08
Phosphoric acid ...	3·93	3·19
Chlorine	·45	·42
	100·00	100·00

The chief constituent of the ash is the lime, which forms nearly one-third of the whole. It probably exists in the bark in the form of kinate or oxalate of lime, and when incinerated becomes carbonate of lime. The next element of importance is the potash, which amounts to one-sixth and one-eight part of the whole ash respectively. The examination shows that both lime and potash must be present in soils where cinchona plants are grown.

THE CEYLON TEA PLANTER'S MANUAL.

Mr. T. C. Owen has issued a very useful little hand-book, under the above title, which cannot fail to be of much interest to Ceylon Tea planters. There is a good deal of valuable data regarding Buildings, and cost of working on Ceylon Tea Estates. The author says that as a tea-producing country Ceylon possesses many advantages over others. The hills are eminently suited for Tea, the localities are healthy, and the transport facilities are very great. Labour is abundant, though not very cheap; rainfall is well distributed and amply sufficient, so that the check of growth which causes the Tea to winter in India, does not occur so markedly in the Island. Although the harvesting of ripe seed is found to be very difficult and expensive matter in Ceylon, great progress has been made in this direction, and Ceylon is now by no means so dependent on India as she once was for her seed supply. The seasons differ so widely in Ceylon from ours that, necessarily, the systems of cultivation differ widely from ours, but the Indian planter may nevertheless be interested in comparing the two; and this the Book before us will enable him to do. The figures given as to yield and cost of manufacture are particularly interesting. It is stated that 400 lb. per acre on the hills, and 600 lb. per acre in the lowcountry, are easily obtainable, but these figures have been in several cases considerably exceeded—in one instance enormously so,—the Mariawatte estate having yielded 1,200 lb. per acre.

One great advantage which Ceylon Tea estates enjoy is comparative freedom from blight. The worst enemy in the Island for cocoa is the Mosquito Blight, but it has not yet seriously attacked Tea. It is far otherwise with us, unfortunately. Whether, as Tea cultivation in Ceylon extends, the present comparative immunity from Blight will continue, is a question. Lately, it is said, a *Caddis worm*, or insect closely resembling one, has proved destructive to the bark of the tea-bushes, but this insect can easily be picked off and destroyed. Reference is made to the jungle-tree *Symplocas obtusa*, whose decaying roots kill all the tea-plants within their range, but as its evil effects on Tea are so well known, it is not difficult to avoid it, by extermination. Any who may think of trying their fortunes in Tea, in Ceylon, should obtain the Work under review.—*Indian Tea Gazette.*

CHEMICAL IMPROVEMENT OF TEA SOILS.

We proceed now to consider the *chemical* requirements of what should be a good tea soil, and by what means imperfect soils may be brought near the standard of perfection.

It is well known that the soil is the source from which the plant draws through the medium of the root the mineral or inorganic portion of its plant-food, the organic portion being derived through the leaves from the atmospheric air.

In order to determine now what mineral plant-food, a would-be good tea soil must contain, and in what proportion, we must base our remarks upon the tea plant itself, and upon the inorganic substances we find in it as revealed by an analysis of its ashes.

Mr. Schrottky gives the composition of the ashes of young leaves of the *Assam hybrid* tea plant as follows:—

	In 100 parts.
Chloride of Sodium	2·247
Soda	8·941
Potash	36·514
Magnesia	10·089
Lime	8·517
Oxide of Iron and Manganese ...	3·966
Phosphoric Acid ...	16·214
Sulphric Acid ...	13·017
Silica	0·439
	99·944

And states that old leaves and stems will contain more lime and silica than here represented.

Now a soil, to be a *first class tea soil*, should contain all these constituents in proportions which closely approach the above percentage; that is to say, the rootlets of the tea plant should find distributed in the soil, for every 36 parts of potash 10 parts of magnesia, 8 parts of lime, 16 parts of phosphoric acid, etc., etc. If we find, therefore, that any soil contains these substances approximately in the above proportions, not leaving out of sight that potash can take the place of soda, and lime that of magnesia, then indeed it would be impossible to further improve its *chemical* constitution. But it must be remembered that the mineral plant-food in the soil exists in two different states, which stand in very different relations to the requirements of the plants we refer to,—mineral plant-food in *physical* and in *chemical* combination. In the former state it is immediately available for the purposes of the plant, while in the latter it can only become so after the prolonged action of climate and atmospheric influences upon it. At present we have only to do with the former.

Let us assume now, that we find in a soil all the different constituents of available mineral plant-food to be present in proximate proportions to those required by the plant, with the exception of phosphoric acid, of which, say, only 6 parts are available for every 36 parts of potash, etc.; than every pound of phosphoric acid added would render a correponding quantity of the remainder of mineral plant-food, heretofore useless to the plant, available to it, and consequently stimulate the formation of new tissues; *i.e.*, increase the outturn. We can distribute through the soil 10 parts of phosphoric acid in addition to the 6 parts already present, and we will thus make up the 16 parts necessary to correspond with the remainder of available inorganic plant-food. Every pound of phosphoric acid added in excess of this quantity is perfectly useless, as there is not the corresponding quantity of potash, lime, &c., present

and if we wanted to further increase the capabilities of the soil we would have to add the whole of the mineral plant-food in the proportion indicated in Mr. Schrottky's analysis. What has been said of phosphoric acid holds, of course, good for any of the other substances: they have all certain functions assigned to them; they are all jointly and separately indispensible to the plant; and there is not one more important than any other, as far as the requirements of the plant are concerned. If we should find that there is plenty of available phosphoric acid and lime, &c., but that for every 16 parts of phosphoric acid there are only 15 parts of potash present, we must add 21 parts of it in order to bring the proportion of available plant-food up to the standard required by the plant and *thus enable the soil to produce its maximum* with a minimum outlay

In fact it is that ingredient of available mineral plant-food which, if present in smaller proportion than required by the standard when compared with the rest, regulates the outturn of a tea garden; every additional pound of this substance added will start, so to speak, into life the slumbering power of the soil; every pound added will have a marked effect upon the outturn, until the quantity added shall make up the proportion in which it is wanted by the plant. It is, not always necessary to add the exact mineral wanted, if, for instance, we find a deficiency of available potash and phosphoric acid in a soil in which there is an abundance of these two substances in chemical combination as insoluble. Phosphate of lime and silicate of potash, and addition of common salt and burnt lime, will have the effect as the addition of potash and phosphoric acid. For common salt will dissolve the phosphoric of lime, and enable it to enter into physical combination with the soil, while the caustic lime will decompose the silicate of potash and set the alkali free to enter into such combinations as are available to the plant. It is, therefore, a most important point for the tea planter to ascertain whether the availabe mineral plant-food present in his soil comes up to the standard required by the plant; or if not, what constituent is present in relatively minimum quantities. The determination of this point cannot be over-estimated in its importance: it may save the planter hundreds and thousands of rupees, and it is the only way by which he may know thoroughly the nature of the capital he is working with. The knowledge of what available plant-food there is in the soil, and in what proportion, should be the basis of all agricultural operations: it should decide what manure is to be applied, and in what manner. It falls, of course, within the province of the agricultural chemist to supply the planter with the facts dilated upon, and it is our opinion that any expense thus incurred will be amply repaid by a judicious use of the knowledge acquired. The first use of this knowledge should be to supply to the soil the minimum constituent of available plant-food, or if chemical analysis should reveal that abundance of this minimum exists in chemical combination, to add to the soil such substances as will free it from its locked-up state, and render it available for the purposes of the plant. When the plant-food in the soil has by either of these means been brought up to the standard, all further manuring must have reference to what is withdrawn fom the soil, and we cannot too much recommend the planter to bear in mind the Chinese axiom of agriculture that "*without continuous manuring there can be no continuous harvest.*"—*Indian Tea Gazette.*

THE COLONIAL AND INDIAN EXHIBITION.

West Indies.

Vegetable products, as might be expected, formed the bulk of the exhibits in this attractive Court, which had an air of comfort and finish not excelled in any other part of the building. Entering the Court from the northern end, the first bay on the left hand was devoted to

Trinidad, an island celebrated both for the quantity and quality of the cocoa grown upon it which indeed is the staple article of produce. The value of cocoa exported from Trinidad in 1885 is stated in the official Hand-book to have amounted to 421,974*l.*, and in some "Notes on Trinidad Industries," by Mr. John McCarthy, F.C.S., the Assistant Commissioner for Trinidad, recently published, it is stated that the quantity of cocoa imported into England in 1885 amounted to 10,530 tons, against 10,120 tons in 1884 and 9986 in 1881. Numerous specimens of cocoa seeds are exhibited, as well as prepared cocoa and chocolate. Mr. McCarthy describes the cultivation of the cocoanut (*Cocos nucifera*) as a very profitable industry, though the tree does not bear much before it is eight years old. Experiments, he tells us, "are now being tried in Trinidad to make it act as a shade tree to the cocoa (*Theobroma*)" instead of planting the quick-growing "Bois immortelle." The idea of this planting is to realise from the same land a double crop, namely, that from the *Theobroma* and that from the *Cocos*. It is estimated that seventy trees planted upon an acre of land would, when in full bearing, yield 5000 nuts per annum, which would net, on an average, from 3*l.* to 4*l.* per thousand in Trinidad. The annual import of nuts into London is said to be about 12,000,000, besides which, New York imports enormous quantities, and they are also used to a very large extent for the expression of oil in Trinidad itself. Coffee has also a prominent place in the products of Trinidad, and the plant is stated to thrive well, although it has not yet produced even sufficient coffee for home consumption. More attention has, however, been directed of late to coffee culture in the island, so that it is largely increasing. The cultivation of tobacco is also an industry that promises to become of some importance, and the tobacco is described as being second only to the finest Havana. There is a good exhibit of cigars, which are said to have met with general favour, so that a demand has arisen for them.

Bahamas.—In the Official Hand-book, Sir Augustus Adderley gives a very readable sketch of the history of these islands, and briefly refers to the natural products, foremost amongst which are corals and sponges. He describes the "sponging and wrecking vessels" as fine models and fast sailers, built by the islanders of native hard wood known as "horseflesh," and planked with yellow pine obtained from North Carolina. Conch shells are exported in large quantities to the value of about 1200*l.* per annum, and the pale pink pearls which are found in them to the extent of 3000*l.* per annum. The sponge exports were estimated at 60,000*l.* for 1885. Mention is made of the abundance of plants valued as medicines, many of which might be further developed by systematic trial of their effects in this country. Perhaps the two best known medicinal plants are the Canella Bark (*Canella alba*, Murr.) and the Sweet Bark or Cascarilla (*Croton Eleuteria*, J. J. Benn.). The first has a bitter, acrid, and pungent taste, and a cinnamon-like smell. With us it is used as an aromatic stimulant, and as a condiment in the West Indies. The sweet bark is a bitter aromatic tonic, formerly used as a substitute for Peruvian bark, but now chiefly as an ingredient in pastilles and for mixing with tobacco for the sake of its pleasant musky odour. The cultivation of perfume-yielding plants is recommended as a probable commercial success, demand for perfumes at the present time being so great that it has even been proposed to cultivate in Australia on a large scale such plants as are now grown at Grasse, Nice and Cannes.

Jamaica.—The contents of this Court were both numerous and varied. Rum and sugar were fully illustrated by a large number of samples. Coffee was also well represented; of this article the Official Catalogue states that two distinct classes are produced in the island, the total annual export being about 84,000 cwt. per annum, of which about 10,000 cwt. is Blue Mountain coffee, a fine quality, consigned almost entirely to the Liverpool market. Pimentoe or allspice is a product exculsively of Jamaica, where

it is grown in plantations or gardens known as "pimento walks." The commercial article consists of the dried berries, which were exported from Jamaica to the value of 53,867*l.* in 1885. It is very largely used as a spice as well as in medicine, on account of its aromatic and stimulant properties. The fruits contain a quantity of oil, which is obtained by distillation, and is used in perfumery and for similar purposes to which clove-oil is put. Pimento-sticks are amongst the strongest and best for walking-sticks and umbrella-handles, on account of their strength, rigidity, and non-liability to crack. The pimento-tree is of low growth, and is known to botanists as *Pimenta officinalis*.

In this Court were shown some remarkably fine samples of Annatto seeds (*Bixa Orellana*), noted for their plumpness, as well as for their bright colour, the waxy coating of the seeds being highly valued as a red colouring-matter. A large and interesting collection of fruits preserved in a salt-solution were here shown; amongst others the following will attract attention:—Star-apple (*Chrysophyllum Cainito*), Cocoa-plum (*Chrysobalanus Icaco*), Blimbing (*Averrhoa Bilimbi*), Akee (*Cupania edulis*, better known, perhaps, as *Blighia sapida*). Many of these are the produce of introduced plants, and the fruits are for the most part fine examples. Amongst a number of specimens of essential oils from well-known plants, most of which are apparently of excellent quality, are some that are but very little known, such, for instance, as those from the Bermuda Cedar (*Juniperus bermudiana*), the Mountain Cigar Bush (*Hedyosmum nutans*), Mountain Thyme (*Micromeria obovata*), Cigar Bush (*Critonea dalea*), and the Sand Box-tree (*Hura crepitans*).

Barbados.—The exhibits from this island consisted largely of similar produce to the islands already referred to. As illustrating the extent of land occupied by sugar cultivation, it is stated in the introductory notice of Barbados in the Official Handbook, by the Hon. C. C. Knollys, that "out of a total acreage of 106,470 acres, an area of 100,000 acres is devoted to canes." Tobacco is recommended for extended cultivation, and root-crops such as arrowroot and cassava give heavy returns.

British Honduras.—We take this dependency in this order, as it occupied a position in the Exhibition next that of Barbados. The importance of timber in the produce of British Honduras is seen by a simple glance at the exhibits, and to the future development of these timber resources lies in a very great measure the future prosperity of the colony. In the introductory notes to these exhibits the following paragraph occurs:—"To its timber and dye-woods the colony of British Honduras owes its existence, and whatever measure of progress and advancement it may have attained. To the discovery, first of logwood, and subsequently of mahogany, its original settlement must be ascribed."

Notwithstanding the importance of the forest produce, very few of the timbers are yet known either to commerce or to science, but many of them are of exceptional hardness and beauty. Mahogany is, of course, the most important wood in the colony, and, next to it, the cedar (*Cedrela adorata*), which is not only exported to a very large extent, but is also used in the colony for light indoor work—cigar-boxes, trunks, packing-cases, and for dug-out canoes, several of which were exhibited. Amongst a collection of lianes, or climbing-plants, is a specimen of the chew-stick (*Gouania domingensis*), with the singular information, besides that of its use as a tooth-brush and tooth-powder, that "it is used in place of yeast to start fermentation in making ginger and spruce-beer, &c." Probably the most striking object in this Court is a large and beautifully figured slab of mahogany; the dark wavy cross-markings are extremely beautiful and very remarkable in this wood; the plank is moreover, without a flaw.

Dominica.—The space occupied by this island, as well as by the remaining colonies, was small; the exhibits on the whole, however, were interesting, and some were worth noting, such, for instance, as the husks or shells of the Liberian coffee, which are said to be worth from 1 to 2 cents per pound in the United States, the fruits of *Acacia Farnesiana*, stated to be used in tanning, and bark of Guava, the *Psidium Guayava*, which is rich in tannin, and is used as an astringent. Raw lime-juice is exported from Dominica in increasing quantities, but the greater part of the juice is boiled down until ten or twelve gallons are reduced to one, and is shipped in this concentrated form to England and the United States for the manufacture of citric acid.

Montserrat.—Sugar and lime-juice are the principal staples of this island, and these were the most prominent exhibits.

St. Kitts and the Virgin Islands.—From these islands the exhibits were but small, and without special interest.

Antigua.—The chief product of this colony is sugar, the average crop of which for the last twenty years is stated to have been about 12,000 hogsheads. Yams, potatoes, and Guinea corn are also grown in large quantities for native consumption. The exhibits were for the most part such as were shown in other West Indian Courts.

Grenada.—Cocoa is the most important article grown here, and some very fine fruits of good colour were shown, as well as nutmeg (*Myristica fragrans*) custard apples, or bullock's heart (*Anona reticulata*), papaws (*Carica Papaya*) Kola nuts (*Cola acuminata*). These latter were remarkably fine specimens. A good deal of attention, we are glad to see, has recently been paid to its cultivation. The tree exists in all parts of the island, and was introduced in years past by the African slaves, who used to regard it as a specific against intoxication.

Tobago.—The productive resources of this small island are varied, and were well exemplified in the collection of fruits, seeds, fibres, &c. The collection of preserved native fruits in syrup, and jellies prepared from them, was a special feature in this Court, a sample of preserved or candied papaw (*Carica Papaya*) being especially good.

St. Lucia.—Sugar, rum, and molasses are the chief products; cocoa and log wood are also produced in quantities, though the latter is stated to be at the present time a drug in the market. Tobacco, it is stated, has been tried in one district with most satisfactory results, so that it is purposed to extend its cultivation. Neither the individual exhibits in this Court, nor in the remaining one of St. Vincent, call for any special remark. We cannot conclude our notice of the West Indian exhibits without a reference to the series of over 100 water-colour drawings, by Mrs. Blake, illustrative of the flora of the West Indian Islands.—JOHN R. JACKSON, Museum, Royal Gardens, Kew.—*Nature*.

OPENINGS FOR CAPITAL IN CEYLON: THE O. B. C. ESTATES.—The long advertisement in local papers of estates offered for sale in connection with the O. B. C. liquidation must have attracted general attention. At first sight, we thought the new Estates Company was parting with some portion of the list of properties transferred to them by the Liquidator. But this is not the case. The Oriental Estates Company or whatever the title is to be, bought altogether 20 estates from the Liquidator, comprising about 11,000 acres, and the Directors have no intention of selling any of them. But it appears the Bank Liquidator has still the properties advertised on hand, and it must be acknowledged that some of these are exceptionally desirable with reference to more than one branch of cultivation in Ceylon. We would instance Mahabiriatenne, Attabagie, Mooroottie and Ancoombra. The first-named, we are told, is likely to give a profit this year of R20,000. There is therefore much encouragement for capitalists looking after these properties, carefully availing themselves of the advice of practical men of established local reputation in reference to the values to be placed on them.

CINCHONA IN JAVA:
REPORT ON GOVERNMENT GARDENS FOR 1885.

Translated from the "Medical Times" of Netherlands India, 26th Volume.)

REPORT ON THE GOVERNMENT CINCHONA ENTERPRIZE IN THE PREANGER-REGENCIES FOR THE YEAR 1885, BY R. VAN ROMUNDE, DIRECTOR OF THE GOVERNMENT CINCHONA ENTERPRIZE.

1.—Weather.—The year 1885 was remarkable for the sudden change from a very rainy to an equally dry east monsoon. The rains continued to about the middle of the month of May, when a very severe east monsoon set in, during which hardly any rainy days are recorded and which lasted to the beginning of November. The month of November and the early part of December were very wet, whilst the rain considerably diminished during the second half of December. At Nagrak, in the Tangkoebanprahoe range of mountains, there was a rainfall in the middle of August, which in a few hours amounted to fully 100 milimeters accompanied by a fall of hail which caused some damage to the plantations. Night frosts were recorded during in the months of June, July and September, but they caused little or no injury to the plantations; the flat and hollow parts of the land were most affected, these had suffered during the previous year and are not intended to be replanted.

Storms were felt during the months of March and December, and wrought some mischief to the plantations, especially at the establishment Nagrak.

2. Extension.—The number of plants put out into the open ground amounted at the end of the year to 1,567,000. Though a lower figure has to be given for this year's planting than that for the previous year, yet this is solely to be attributed to a more careful enumeration of the existing plants, and not to a real decrease. The number in the nurseries is estimated at 1,390,000 of which 1,165,000 are Ledgerianas and 225,000 succirubras of which a great part will be planted out in the field during the 1st quarter of 1886. Among the Ledgerianas are comprised + (plusminus) 35,000 grafts, which in the 1st and 4th quarter of 1886 will serve to extend the plantations at Tirtasari which consist exclusively of grafts and suckers. Every export has been made to extend the cultivation of Ledgeriana and Succirubra seedlings. The long continued drought was, however, unfavorable to the development of the germinating beds and nurseries and disappointed our hopes of having an enormous number of seedlings ready for supplying and planting out during the last quarter of 1885. It will only be in the first quarter of 1886 that the whole of the ground, which has been dug over will be again planted with Ledgerianas and Succirubra. The comparatively small number of plants raised from seed, which have been transferred to the open ground is to be accounted for by the fact, that only the very strongest and best developed plants were used for that purpose. In large and hardy plants it is easy to recognize the best sorts, so that all undesirable hybrids can be rejected, the upkeep of young plantations which have been formed of hardy plants requires careful and attentive supervision and much less supplying is necessary. But the great advantage of the use of well-developed plants for putting out, lies in the shortening of the period, during which the young plants require very careful upkeep, by which an important reduction of cost is obtained.

For the replanting of certain gardens where the ground has been dug over across between C. succirubra and plants raised from hybrids derived from Ledgeriana seed has been exclusively used. Especially in the establishment at Tjibitoeng the plantation of these hybrids was very considerably extended and from this a very important harvest may shortly be expected. The cultivation of the grafts of Ledgeriana or Succirubra has been during the past year pursued with greater vigour than ever. At Tjinjiraean two germinating houses have been prepared, which are completely successful, whilst about ten small buildings of light materials have been constructed for the grafts which have already taken root. Besides the 35.000 grafts which will be ready to put out in the open ground by the end of 1885, the nurseries contain about an equal number of growing graft plants which will be ready for planting out in the latter part of 1886. The graft nurseries are formed exclusively of the richest known mother trees, of which mention is made in the report for last year. Nos. 25, 34, 38, 75, 94 and 120, the bark of which contains more than 10 per cent of quinine. The plantations of grafts from these trees, was not however extended beyond what was neccessary for the due completion of the gardens. The grafting of the sorts richest in quinine obtained from the mother trees Nos. 23 and 38, the bark of which yielded at least 11 per cent at the age of 6 to 7 years was pushed forward with greater force. From these grafts already planted and still to be planted great hopes are entertained as regards the seed harvest. The cultivation of the Ledgeriana seed plants is now coming more to the front, since some analyses of grafts from known mother trees appear to shew the (beneficial) effects which the succrubra stem exercises on the constitution of the bark of the Ledgeriana grafts.

The extension of the cultivation of the hybrids of C. Ledgeriana and C. Succirubra spoken of in the report for last year, for want of the necessary graft nurseries, has not been so great as was hoped for and expected and the plantations thereof have only been slightly increased. The original Ledgerianas produced in the course of 1885 not only abundance of seed for the Government enterprize, but sufficient for important public sales of succirubra and Ledgeriana seed at stated times. There has always been a great demand for seed produced by the graft and sucker plantations at Tirtasari, which command good prices.

Consequent on the large quantity of seed from original trees, which from time to time was exposed for sale, the demand for the typical Ledgeriana descendants became so small that the collection and sale of the seed was discontinued.

In the month of December 1,000 grafts were sold by public auction.

The proceeds of the sale of seed during 1885 amounted to	*f*	131,471	25
That of grafts	„	2,730	00
Total guilders		16,201	25

On the sale of each lot of seed a portion of it was set to germinate on the government's establishment, for the purpose of having the means of forming a judgment in respect to any subsequent complaint that might be made, as to the germinating power of the seed sold.

All these trials gave favorable results, and no well-founded complaints regarding the seed thus sold were heard of. The demand for succirubra seed made by Foresters was fully met, but the culture of cinchona as a means of forming forests does not seem to answer to former expectations. The demand for Ledgeriana and succirubra seed by botanists or by the representatives of scientific institutions under foreign governments has been insignificant during the past year. At the end of December 1885 the two and three year old grafts in the plantations Tirtasari began to blossom freely, this is especially the case with the grafts from the mother tree No. 25 of which a great portion of the Tirtasari plantation consists.

These trees so rich in quinine promise to yield a large quantity of valuable seed in 1886, but the abundant blossoming and seeding must undoubtedly have an unfavourable influence on the development of the plants.

On a great many of the grafts the blossom is so thick that the fear of their being killed the effects of of it is by no means groundless. Therefore every effort is being made by manuring and by plentiful turning up of the soil, to force the trees to form leaves and to bring about a hardy growth. The evil of overblossoming would certainly have been much greater, had not the ground been well worked during

the long dry monsoon, so as to maintain the uninterrupted growth of the plants as far as possible. With the exception of the graft plantations of No 23 which is naturally prone to excessive blossoming, the blossom thrown out by the typical Ledgerianas even by the mother trees is considerably less than might have been expected after such an unusually dry monsoon, which fact must indisputably be attributed to the repeated and deep upturning of the ground.

The harvest of Ledgeriana and Succirubra seed in 1886 will not only be amply sufficient for the requirements of the government establishments, but also for holding numerous large public sales.

3.—Opening and upkeep.—The opening of new ground has been limited to a few ba-oes of forest land at Tirtasari, intended for the putting out of graft plants.

On the old establishments both the plantations which have already been dug over and those about to be prepared offer most satisfactory opportunities for replantiag the ground with C. Ledgeriana and C. Succirubra to which sorts the government cinchona enterprize is to be limited for the future with the exception of a few experimental gardens of other kinds of cinchona. On the upkeep of the plantations, still greater care is now bestowed than used to be exercised in former years. The young fields are kept constantly clear of weeds, whilst besides this they are forced into strong growth by a deep overturning of the whole surface. All over the old fields the system of deep drains is applied, which has also produced the most favorable results, and has exercised a good effect on the already gathered harvest, which will be more perceptible in the next harvest. In spite of the severe and long continued east monsoon the plantations all over continued to develope well—whilst soon after the setting in of the November rains, a most remarkably strong growth was to be observed both in the old and young fields. By careful upkeep of the recently planted fields the side branches of the young plants were able at once to develop their strength with disturbance and by close planting 4×4 Rhineland feet, the surface of the ground soon becomes shaded and the growth of weeds is checked. Close planting is adhered to as much as possible not only for furthering the rapid formation of humus out of the fallen leaves and thereby improving the soil chemically as well as physically, but also to attain the maximum produce at the lowest possible upkeep. The beneficial influence of close planting for the developement of cinchona is particularly remarkable in the replanted fields, where at first the growth of the plants was slow, and where their development became rapid as soon as the surface became shaded by the branches and masses of leaves. Combined with close planting, the greatest possible care is taken in these fields with the harvesting, so that by means of lopping and thinning out, everything is done to aid the further developement of the plants. The planting out in the open fields was continued during the prolonged west monsoon which lasted to the middle of May until the rains ceased. Before the planting out in March, April and May, large and deep holes were dug for the plants to provide against the desiccation of the soil during the severe drought of the east monsoon. Not only did this precaution prove justified in every respect, but the execution of the work answered perfectly for the attainment of the object.

The planting out of some fields with graft plants had hardly been two days completed when a drought set in, and notwithstanding its severity the plants grew well and the supplies for these fields were of little or no signification. The measuring of the Ledgerianas planted in 1879 was commenced. The mean height of eight-year old plants at Tjibeureune reaches now 4·53 metres and the circumference of the stem is 0·29 metres. The maximum height is 5·63 and the maximum measurement round the stem is 0·38½ metre. At Tirtasari the measurement of six-year old grafts and suckers gives a mean height respectively of 3·79 metres and 3·03 metres, and the mean circumference round the stem is 0·35½ and 0·28 metre, whilst the maxima of height and circumference of stem are respectively 4·85 and 4 metres and 0·35½ and ·33½. The fact deserves mention that the plantations to be measured, especially the seed plantations at Tjibeureune and the graft plantations at Tirtasari yielded a not unimportant harvest of branch bark. The Helopeltis Antoni continued to shew itself during the year now reported on—throughout all the establishments, except that of Kawa Tjiwidei, but thanks to the strict search after the insect and not less to the lopping and burning of all the attacked portions of the plants, the injury done was of little or no signification. At Nagrak in the commencement some damage was caused to the plantations by caterpillars and locusts against which the catching and destruction of the insects appeared to be the only remedy. At Riveng-goenoeng the Western plantations and specially the nurseries had again to suffer severely from the larva of a certain beetle, known by the name ku-uk (oeret).

The continual attacks to which the nurseries there have been subject from this kind of larva, and which have caused so much disappointment with reference to these plantations have necessitated the removal of the Ledgeriana nurseries to the neighborhood of the establishment at Kawah Tjiwidei. The damage done by blight and the larva of a beetle (uter-oeter) was during the past year of little or no importance. The topping Ledgerianas and officinalis plantations of which mention was made in last year's report has not been continued, since the results of shaving the bark for obtaining a rich produce in the shavings does not appear to have come up to what was expected.

4. *Harvest of Cinchona.*—The harvest of 1885, amounted to 216,359 kilograms of bark, the whole of which is intended for sale in Netherland. No demand for bark has been made by the Military Medical department. The harvest was gathered by digging out the roots of backward and diseased C. Josephiana on about four gardens, by digging out the roots of a plantation of C. Calisaya, by thinning out and lopping thickly planted Ledgeriana and Succirubra plantations and by the removal of hybrids from young Ledger fields, whilst a considerable quantity of produce was obtained from Ledgerianas which in consequence of the extensive scraping practised in 1884, had assumed an unhealthy appearance, and threatened to die out.

The produce consisted of

Sort of Cinchona,	Number of Cases.	Net contents in ½ Kilograms.	Number of bales.	Net contents in ½ Kilograms.
C. Succirubra... ...	170	21,094	325	40,703
„ Calisaya (Schuhkraft)	770	83,118	587	94,394
„ „ (Javanica)	39	4,527	15	2,324
„ „ (Anglica)	29	3,299	44	6,401
„ Ledgeriana ...	—	—	1,009	155,287
„ Officinalis	—	—	44	6,273
„ Lancifolia	—	—	2	298
Total... ...	1,008	117,038	2,026	315,680

The last experiment in the application of he shaving method on old officinalis trees at Kawah-Tjiwidei, but the results of the trial since it was carried out on a large scale in 1884 have appeared so unfavourable, that this system of harvesting has been given up for good.

All the shaved trees retained their fresh and healthy appearance, those trees which had only yeilded a single harvest by the shaving of the bark off one-half of the circumference shewed one year after the operation that the undisturbed portion of the bark was much better developed than that on the shaved portion.

Some careful experiments are still being made to ascertain plainly with the help of figures the difference in the growth of the bark—both when the

shaved portion has been covered, as well as without that precaution.

The bad results, of the use of the shaving method in 1884, by which at the end of a few months only one-half of the circumference of the tree was subjected to the operation at a time, became apparent at the beginning of the 2nd quarter of 1885—when at Tjibitoeng and Rioeng-goenoeng, and in a less degree at Tjibeureum, a very considerable number of trees, first estimated at (plus or minus) 5,000, though later on the number had to be doubled, shewed such signs of decay, that it was thought advisable to root out the injured trees.

The partial shaving of the whole circumference was almost exclusively confined to Ledgerianas of inferior quality, and therefore the damage done by the subsequent untimely harvesting of the trees, was of less importance.

But in the closely planted fields at Rioeng Goenoeng, from which only a single harvest of Ledgeriana shavings were obtained, the shaving system was still more unfavourable in its results. Although no dying trees were met with, yet the trees continued to droop for a long time, and during the long-continued rains the exposed portions of the bark began in some few instances to rot.

Should it appear that the trees in closely planted fields cannot stand the operation without danger, then the great advantage which such close planting affords by yielding the maximum produce, at the minimum cost of upkeep, and by the formation of a large quantity of humus and its accompanying amelioration of the surface soil, will cause the system of shaving to be entirely abandoned. If the application of the MacIvor system by which regular strips of bark was taken from the trees, has not in the long-run answered expectations, the results of shaving off the bark have been so detrimental that its continuance is not to be depended on. So that there is nothing left for us to adopt but a systematic thinning out of the plantations, with a carefully limited lopping of the trees, and finally the complete uprooting of the plant.

The shaving system can only be of service, in case a sudden rise in the Cinchona market, should render it desirable to obtain a large amount of produce, and to preserve the plantations, or when the urgent necessity for funds, forces the owner to sacrifice the future to the present. The produce of the harvest of 1884 was disposed of by two public sales, on the 4th March and 22nd September 1885 held at Amsterdam. The prices at the former sale were very inferior to those realized subsequently in the 22nd September. The gross amount obtained by both sales was *f*372,571·86.

The following prices were obtained for the half kilograms:—

	1st Sale	2nd Sale
C. Succirubra	18 to 123 cts.	25 to 301 cts.
C. Calisaya Javanica ...	22 to 72 „	30 to 196 „
C. do Schuhkraft	13 to 86 „	19 to 257 „
C. do Angilica ...	24 to 50 „	55 to 170 „
C. do Hasskarliana	23 to 31 „	
C. Ledgerina	19 to 172 „	87 to 295 „
C. Officinalis	80 to 129 „	112 to 194 „
C. Lancifolia		42 „
C. Papudiana		27 to 121 „
C. Caloptera		46 to 163 „

The average price obtained at both sales was *f*0·944 per half kilogram.

The existing drying stoves at Nagrak and at Tjinjiroean continued in damp weather to render good service but in prolonged rains they were found insufficient for a large extent of produce.

The necessity for drying arrangements, made itself felt more and more on other establishments.

Before proceeding to construct drying arrangements all over, the Director of the Government Cinchona enterprize has been authorized to inspect some private undertakings in the Preanger Regencies, for the purpose of ascertaining the advantageous system for drying cinchona bark.

His visit to some tea estates in Salkarboeme and Soemedang led him to form the conclusion that Davidson's T Sirocco was in all respects the most deserving of approval.

5. *Establishment—Funds.*—By the Government minute of 30th December 1885, No. 20, the establishment was increased by two pupil-overseers each on a salary of *f*50 a month, and an arborist at *f*150 a month, and a premium of one cent for every graft or sucker of C. Ledgeriana suitable for planting out prepared by him, or under his directions up to a maximum to be fixed by the Director of the Government Cinchona Enterprize.

G. Tockamp Lammers was appointed arborist, he having acted in that capacity for nearly four years.

The acting overseer of the 3rd Class A. Von Estaroff was relieved with honor from his acting duties, and his place was temporarily filled by W. Burck. The fixed native establishments at the end of December consisted of one carpenter, one storekeeper, a messenger, 20 overseers and 235 field laborers. The wives and children of the field laborers earn low wages, and are employed, as far as possible, in the nurseries, the upkeep of the young plantations, the harvest and in the destruction of injurious insects.

During nearly the whole year labor was abundant, so much so, that in consultation with some Managers in the districts of Bandoeng and Tjitjalangka wages were reduced by 20 per cent.

This reduction was only made in the wages of temporary laborers and newly engaged fixed-laborers and did not cause the smallest complaint notwithstanding this reduction of wages, and the numerous demands for labor in the private neighboring estates, employment could not always be given to laborers who tendered their services. For payment of the native establishment, constructing and restoring nursery sheds, purchase and repair of tools and other expenses the estimates of 1885 provided the sum of *f*46,000.

It was at once evident that this amount was inadequate to cover the expenses of an abundant harvest, and the introduction of high cultivation, so that an additional sum *f*34,000 was placed at the disposal of the Director of this cultivation.

The outlay for the service of the enterprize amounted to:—

Salaries of the Director, Assistant Director and other Europeans on the Establishment... ...	*f*29·675
Correspondence...	260
Travelling expenses	3,203·50
Salaries and wages for the native establishment, construction and restoration of nurserysheds, purchase and repair of tools and instruments and other expenses ...	80,173·80
Total...	*f*113,412·39

being *f*35,402·39 more than was contemplated in the estimate for 1885.

According to the report for 1884 the total expenditure including the transport of the produce to Batavia during the year was	*f*107,801·54
The total cost of transport of the produce to Netherland together with that for its sale &c. come to	40,583·55
Total...	*f*148,385·09

The gross proceeds of the sales at Amsterdam in 1885 was *f*372,571·86 so that the harvest of 1884 yielded a net profit of *f*224,187·77, exclusive of a farther sum of *f*17,102, realized by the sale of cinchona grafts and seed.

The whole of the outlay including that of transport to Batavia, brings the cost of the half kilogram of bark to the following sales.

The produce of 1884	*f*0·2693
„ „ „ 1885	*f*0·2621

showing a saving in 1885 of *f*0·0072 per half kilogram of bark—which was effected notwithstanding the increased expenditure connected with the purchase and transport of three times the number of cases than in the previous year.

The transport to Europe, sale &c. of the produce of 1884 come to *f*0·1028 per half kilogram so that

the net profit per half kilogram of bark came to. $f0{\cdot}944 - (f0{\cdot}2693 + f0{\cdot}1028)$ *i.e.* $f0{\cdot}5719$

By Government minute dated 21st October 1885 No. 2, the management of the Government cinchona undertaking was placed under the supervision of the Resident of the Preanger Regencies, whilst the inspection of the cinchona plantations and the nurseries is to be performed by the Head Inspector of the coffee cultivation.

6. *Extension of Cinchona.*—The demand for waste land on lease for the purpose of cinchona cultivation continues to diminish, and little or nothing is heard of new undertakings.*

It is true that on existing estates the cultivation continues to be extended but confidence in cinchona culture has felt such a shock by the steady falling of prices that capital worth naming, is not to be had for new undertakings of the kind.

It remains for the future to decide whether this want of confidence is well grounded or not; the figures given in sections 4 and 5 of this report, it satisfactorily appears, however, that the prices now paid for cinchona bark, afford no ground for the increasing want of confidence in this cultivation.

From these figures it appears at the same time, that no regular correspondence exists as yet between the cost of production and the prices which cinchona bark commands in the European market, and with absolute certainty a steady fall in cinchona prices may before told a circumstance well worthy of consideration with reference to new undertakings.

7. *Knowledge of the kind of Cinchona Cultivation in Java.*—The results obtained from plants raised from seed received from Heer Schuhkraft in 1880, have not come up to what was expected, as was mentioned in last year's report. Now that the plants blossom more generally they display a relationship to very diverging kinds. If some varieties approach the type of C. Josephiana others again come near the C. Ledgeriana.

Among those classed as fine and finest Calisaya raised from Mapivi plants there are with them striking varietics, of which the best seem as if they ought to be classed with C. Ledgeriana, Var. Chinidinifera, and C. Ledgeriana var Cinchonidinefera. The plants raised from seed received in 1883, through the intervention of the Minister of Colonies under the name of C. Verde (C. Calisaya oblongifolia) approach still nearer to the type of C. Ledgeriana. The kind planted at different elevations from 4,000 to 6,000 feet, C. Triande (C. Petoyansis) continues to thrive all over. A single plant has begun to put forth buds.

8. *Chemical Researches.*—As in former years the analyses of the harvest of 1884, were carried out in Europe by Heer Moens. The results obtained appear in appendix B and B. The analyses in the interest of the cultivation continue in the charge of the Assistant Director of the Government cinchona enterprize. Those analyses of which the results are given in appendix C. were made in the first place for the purpose of obtaining rich varieties raised from seed of the richest mother trees, to the end that these might be multiplied artificially for the creation of seed plantations.

It was not alone among the plants derived from the rich mother trees No. 23 and 33 that such plants were sought, but also from a very typical Ledger plantation raised from the seed of the mother tree No. 34 a remarkably fine specimen was obtained for chemical examination. It is remarkable as a phenomenon that the bark of all these varieties, some of which are distinguished for containing a very large proportion of quinine, show in a greater or less degree the presence of cinchonidine, an alkaloid of which traces are found in the bark of the mother tree. Plants thus derived were, therefore, not considered fit for the formation of graft plantations for the production of seed. A very important series of analyses of succirubra-hybrids raised from Ledger seed gave surprizing results, in so far, that hybrids greatly resembling the Ledgeriana in habitus, flowers and form of leaf, were all similarly distinguished by a very large proportion of alkaloids. For the attainment of more certainty respecting the influence of the Succirubra stem on the constitution of the bark of the Ledgeriana graft ingrafted on it, the produce obtained by shaving and by partial peeling of the bark, has been submitted to chemical research. A large percentage of cinchonidine was found both in the shavings as well as in the bark removed in long strips. Whilst two analyses of the bark of the two mother trees gave the following results:—

MOTHER TREE No. 75.

	Quinine.	Chinchonidine.	Chinidine.	Cinchonine.	Amorph Alcaloids.	Total.
	℔ cent	℔ cent	℔ cent	℔ cent	℔ cent	℔ cent
in 1876	10·59	—	—	0·31	0·43	11·33
in 1881	9·79	—	0·05	0·53	0·56	0·951

MOTHER TREE No. 89.

in 1876	10·79	—	—	0·23	0·51	11·53
in 1881	11·20	1·17	—	0·57	0·45	13·39

The analyses of stripe bark taken off 5 years old graft plants of these mother trees show 3·30 per cent and 1·40 per cent of cinchonidine. From these results the influence of the succirubra stem on the bark of the Ledgeriana grafted on it appears incontestable. Moreover the bark of a graft from the known mother tree No. 23 was analysed; it contained 1·11 per cent cinchonidine, whilst the bark from the mother tree by two analyses was shown to yield:—

	Quinine.	Chinchonidine.	Chinidine.	Cinchonine.	Amorph Alcaloids.	Total.
	℔ cent	℔ cent	℔ cent	℔ cent	℔ cent	℔ cent
in 1874	9 97	—	—	traces	1·90	11·87
in 1881	11·01	—	—	0·59	0·13	11·73

Analysis No. 33 deserves particular attention. It shows, that five years after the introduction of the Mac-Ivor-system, and three years after the covering of the barked stem was left off, the bark not only showed no indication of a return to its original constitution as Succirubra bark, but even the quantity of quinine in the renewed bark was effected to a greater extent than is harvested during the limited lifetime of three years.

At the request of private cinchona planters H. E. the Governor-General of Netherlands India has caused experiments to be made in the chemical Laboratory at Bandoeng for obtaining a coarse extract of the cinchona alcaloids solely for the purpose of saving the cost of packing and transporting a useless mass of woody fibre.

For this experiment 10 kilograms of bark was selected containing fully 6 per cent of alkaloids; of this by means of boiling with lime and spirts of wine, *quinium* (a resiuy substance) was produced, which by analysis was found to contain about 60 per cent of alkaloids, whilst the ascertained loss in preparation appeared to be little or nothing.

To answer the question as to whether this *quinium* affords a suitable material for the preparation of quinine and other sulphates, it was requested that it should be sent to Netherland which has accordingly been done.

Bandoeng, 23rd March 1886.

RECAPITULATION.

	Cases.	Bales.	Contents. Kilog.
C. Succirubra	56	138	13,837
„ Calisaya Schuhkraft ...	185	379	39,792
„ „ Javanica ...	10	26	2,525
„ „ Anglica ...	17	47	4,594
„ Ledgeriana	—	499	37,609
„ Officinalis	1	177	13,229
„ Calcptera	11	23	2,228
„ Pahudiana	1	4	386
„ Lancifolia	—	1	71
Total	281	1,294	114,262

The alkaloid is calculated or reckoned on air-dried bark.

* How about Heer Mundt's 175,000 acres?—*Question by translator.*

APPENDIX A.—Report of the Position of the Government Cinchona Plantations in Java for the year 1885.

		Plants in the Nurseries.			Plants in the open ground.					General Total of plants.
	Existing at the end of the year.	Ledgeriana.	Succirubra.	Officinalis.	Ledgeriana.	Calisaya and Hasskarliana.	Succirubra and Calcptera.	Officinalis.	Lanciolia.	
Total of different kinds.	1883	1,059,000	194,300	80,000	735,500	306,000	492,500	416,500	9,000	3,299,500
	1884	1,140,500	353,000	23,000	739,900	225,000	457,000	329,000	9,000	3,270,400
	1885	1,065,000 (a)	325,000	—	736,000(b)	95,000	461,000	276,000	8,000	2,968,000
General total of all kinds.	1883	—	1,333,000		—	—	1,966,500	—	—	
	1884	—	1,516,000		—	—	1,753,900	—	—	
	1885	—	1,390,000		—	—	1,576,000	—	—	

(a) Including 35,000 grafts.
(b) Including 130,000 cuttings and grafts, besides the (plus or minus) 4,300 original Ledgerianas.

APPENDIX C.—Review of the Alkaloid limits of Java Cinchona Bark ascertained during 1885.

Number.	Sorts of Cinchona.	Place of Growth	Quinine.	Cinchonidine.	Chinidine.	Cinchona and Amorph alkaloid	Total.
1	C. I.'geriana	Tjibeureum	3·18	0·17	0·55	4.43	8·33
2	, ,	Rioeng goe-noeng	8·74	—	—	0·47	9·21
3	, ,	,	11·11	—	—	0·49	11·60
4	, ,	,	11·82	—	—	0·84	12·66
5	, ,	,	6·98	2·97	—	1·10	11·05
6	, ,	,	8·08	1·68	—	0·53	10·29
7	, ,	Tjinjiroean	4·61	4·75	—	1·93	11·29
8	, ,	,	6·32	6·83	—	1·02	14·17
9	, ,	,	7·86	5·66	—	1·37	14 89
10	, ,	,	4·77	3·94	—	3·61	12·32
11	, ,	,	6·77	—	1·69	2·75	11·21
12	, ,	,	5·51	4·78	—	1·12	11·41
13	, ,	,	4·21	6·27	—	2·02	12·50
14	, ,	,	6·78	1·01	trace	1·87	9·66
15	, ,	,	6·55	3·51	—	1·15	11·21
16	, ,	,	6·02	4·96	—	1·51	12·49
17	, ,	,	6·97	6·22	—	1·27	14·46
18	, ,	,	5·78	3·75	—	1·30	10·83
19	, ,	,	7·44	1·32	0·33	1·94	11·03
20	, ,	,	5·00	4·21	—	1·90	11·11
21	, ,	,	10·67	0·81	—	0·78	12·26
22	, ,	,	3·42	5·53	—	2·10	11·05
23	, ,	,	5·11	3·69	—	1·80	10·60
24	, ,	Rioeng goe-noeng	11·90	—	—	0·73	12·63
25	, ,	,	11·60	—	—	0·80	12·40
26	, ,	,	11·50	—	—	0·87	12·37
27	, ,	Tjibeureum	12·40	1·14	—	1·11	14·65
28	, ,	,	13·26	0·80	—	0·66	14·72
29	, ,	,	9·20	0 36	—	0 43	9·99
30	, ,	,	8·65	1·22	—	0·74	10·61
31	, ,	,	9·14	0·56	—	0·60	10·36
32	, ,	,	4·09	4·00	trace	1·51	9·60
33	, Succirubra	Lembang	4·36	1·05	0·33	4·18	9·92
34	, Ledgeriana	Rioeng goe-noeng	4·36	trace	—	1·56	5·92
35	, ,	,	6·47	0·46	—	2·30	9·23
36	, ,	,	7·99	1·14	—	1·43	10·56
37	, ,	,	5·62	trace	—	1·05	6·67
38	, ,	,	7·07	0·30	—	1·13	8·50
39	, ,	,	5·04	0·20	—	2·10	7·34
40	, ,	Tirtasari	8·21	1·62	—	0·70	10·53
41	, ,	,	8·15	1·87	—	0·75	10·77
42	, ,	,	7·10	1·40	—	0·64	9·14
43	, ,	,	7·20	3·56	—	0·86	11·62
44	, ,	,	7·50	3·52	—	0·93	11·95
45	, ,	,	5·88	3·30	—	0·51	9·69
46	, ,	Soekawana	8·61	1·11	—	1·17	10 89
47	, ,	Lembang	4·01	2·13	—	1·06	7·20

Remarks.—No. 1, neither tree unknown, a; Nos. 2 to 6, derived from No. 23, v to z; Nos. 7 to 13, derived from Succirubra-hybrid apparently, a to g; Nos. 14 to 23, neither tree unknown, h to r; No. 24, derived from No. 23, d; Nos. 25 and 26, derived from No. 38, b, c, No. 27, Succirubra hybrid apparently, d; Nos. 28 to 32, derived from No. 34, a to e,

A NEW TEA DRIER.—A gentleman with large Assam experience as a practical planter has arrived in Ceylon with a new patent tea drier which he anticipates, will secure the favour of our planters both on account of its good work and economy in price in proportion to efficiency.

EUCALYPTI IN ARRAN.—I have been much interested in the correspondence on the Eucalyptus as grown in the island of Arran. I may state for your information that several plants of the Eucalyptus are growing at Auchmanes, Portincross, West Kilbride, which is thirteen miles east of Lamlash, and ten miles east of Corrie, in Arran. A seedling of 1881 was planted outside in 1883, and is now 22 feet in height. Several seedlings of 1885 were planted outside this summer, and are now 12 feet in height, having grown this season 6 feet 6 inches. The plants are grown on light soil sheltered from east and north-east winds, at about 60 yards above high-water mark.—J. MACLEAN, The Gardens, Auchmanes, near Kilbride.—*Gardeners' Chronicle.*

NEW PRODUCTS IN WEST INDIES.—Considerable interest continues to be taken in the suggestions in respect of new industries contained in a letter sent to the West Indies by Mr. Morris. Certainly, the subjects of which he treats are of such deep importance to the people of those islands that they have only to be mentioned in order to engage their serious attention. One idea mentioned by Mr. Morris is that tea will grow in Trinidad at elevations above cacao, and that this is obviously worthy of careful consideration. The cultivation of the ground nut has much to recommend it, while a great deal might be made out of fibres. The Agricultural Society of Trinidad at the instance of Mr. Lange, has been considering whether China grass can be grown at a profit in that Colony. The decision taken by the society to have pamphlets on "China Grass," translated and printed for general information cannot be too highly praised. It seems, however, that the society has fallen into discredit in the past, since a contemporary ventures to suggest that the vacancy in the presidentship of the society offers an opportunity, which may not again occur soon, to infuse new life into it, by a respectful request to His Excellency the Governor, to be in future not only a tron but its president. No doubt, such a step, successful, would rally round the society, the tive support of the best man in the Colony.—*olonies and India.*

TEA IN CHINA.

I have within the last few days, at a friend's house, come across a curious Chinese book of colored plates illustrative of the growth and manufacture of tea in the Celestial Empire. The book was sent to my friend by a relative in Canton in 1844 and consists of 24 paintings on rice-paper, bound in colored silk, the whole folio volume weighing only some 9 oz. The first plate represents the holing of the ground, and the next the seed being dibbled in; while in the third the young plants are shown above ground and a man is raking the soil between the rows. In the next picture, the plants are somewhat larger and are being watered by a man with a small wooden pail at the end of a bamboo. The next picture represents a woman *sitting on a stool* before three tea bushes, from which she is picking the flush. (I believe this is the universal custom, but what would Ceylon tea-planters think of their coolies indulging in such luxury!) Next we see a lanky cooly taking the green-leaf from a basket, and sifting or winnowing it into two heaps; and in the next picture another man appears to be picking out coarse leaf, &c. The next scene is a strange one: it represents a cooly with a heavy pestle in his hands *pounding* the green leaf in a large stone mortar, preparatory to the rolling by hand in a flat bamboo basket, which is shown on the next page. The man employed in rolling seems to have discovered something in the leaf which ought not to be there, and is holding it near his eyes and gazing at it with an expression of disgust: what the object is, it is impossible to say. In the next picture a woman seated at a table appears to be engaged in picking out stalks, &c., from the rolled tea, and in the following one the tea is shown in the form of round flat cakes on a basket, where they have been left to ferment. On the next page we see the balls broken up and a lad with a bamboo whisk stirring the leaf about and adding some liquid to it from a little tub; and then we see the leaf in baskets, being placed on a bench to ferment for a further period. The next picture is the most remarkable of all, it represents a man with a shaven head and a long robe, the fold of which he is holding out, gazing up at a *monkey* who is seated on the rocks above and is grasping with one hand a tea bush which the man below is requesting him to throw down! Here is a valuable hint for Ceylon tea planters as a settlement of the labor difficulty! In the next picture we are shown a man seated at a block on which he is holding with his left hand a tea branch while with a cleaver in his right he is stripping the leaves off. This is a strange way of gathering leaf certainly. In the next page we see the tea grower sack on back and balances in hand on his way to sell his leaf to the trader. Then we see the green leaf being packed in stone jars covered with bamboo wicker, and so transported by boat to the factory, the operations in which we are now introduced to. The first is the firing in a furnace, and then comes the tasting, the taster being a regular 'masher.' The next picture is not one for a lover of China tea to gaze at; it shows a nearly naked cooly trampling down the made tea into large chests. The next picture shows the chests being filled up by a cooly with a long stick in his hands; and then the boxes, nailed up and papered, are having the familiar hieroglyphics painted on them; the last picture representating a cooly carrying one such box on his shoulder.—D. W. *F. in Observer.*

NEW PRODUCTS IN OLD DISTRICTS.

We were not mistaken in seeing many a chena field and many a big patch, now forlorn and neglected, which we remembered to have seen in full cultivation. But on the other hand we had most cheering and quite wonderful expanses of *the* new product—tea—as green, healthy and vigorous as ever its predecessor looked. To a stranger "without reminiscences" there would be in fact little or no evidence in these Northern districts of the time of depression; for estate after estate has now its tea fields covering areas rapidly approaching to those formerly covered by coffee, and it is difficult to say whether "the new Queen" flourishes better on the old "King's" fields, or on previously unopened land. The young tea clearings on the Hatale property seem as promising as the most critical of old-school Visiting Agents could desire and farther on we had a look at fields planted on patana and chena land from tea seed at stake, than which no growth could be better at two and three years old. In the middle of the Knuckles we came on a new estate, planted with tea, cleared from patana, with a lay of land and a promise in much of the soil which may well justify the proprietors in anticipating a second Mariawatte. But of all the cheering sights we saw, commend us to the picture of old Maousakelle and its two year tea on patana soil. Anything better than this we have nowhere heard of in Ceylon, not even in the best of the chena clearings on the side of old Hantane mountain range where again tea is working a very wonderful change. Indeed green flourishing fields predominate throughout the Hantane, Hewaheta and Nilambe districts as much as in the northern group of Kelebokke, Knuckles and Rangala. We are therefore quite prepared now to welcome the original planters of forty years ago, should any of them, dead to the island for a generation, "revisit the glimpses of the moon," to spy out the nakedness of their old clearings. They would simply return, as we have done, saying the half had not been told them and that unless they had seen for themselves no one could have made them believe that tea could flourish so vigorously, not to say luxuriantly on old coffee, patana, and chena land. "Will it last?" may be the cry; but we have no doubt Ceylon Planters will answer that question after a very practical fashion as time rolls on. Meantime "tea" is not the only "new product" that astonished us during our brief passing visit. But of "cacao" in Panwila and Dumbara, we must have a separate notice.

CEYLON UPCOUNTRY PLANTING REPORT.

COFFEE AND GREEN BUG—WHAT IS PROVIDENCE ABOUT? TEA PROPERTIES AND BUYING AND SELLING—CLEARINGS ALONG THE MATALE LINE.

20th December 1886.

Now that *coffee* is going to be trumps those in these districts who have any of it left regard the presence of the bug—black or green as you may choose to call it—with increasing interest. Unlike leaf disease, which resembles the poor in being always with us: bug comes and goes. A bad attack of the former, nay, even a series of attacks, might be got over, but a thorough inroad of bug is as near to sudden death as anything I know of. A slight attack, described by the innocent as, "here and there in patches, but nothing to speak of you know," is like the shadow of impending doom to those who have

experienced with what virulence it can sweep round an estate, and have seen the wreckage it leaves in its wake. Bug has put the philosophy of many a man to the test, and has formulated questions which were hard to solve. One who was suffering mentally and financially from a bad attack of bug, said in reference to it, and in serious earnest: "I really don't know what Providence can be thinking about?" Poor fellow, he had a hard nut to crack, but his attitude of mind was reverent enough, albeit his form of speech was not devout. The other who saw in leaf-disease Providence as having a controversy with the planters, and who looked upon the invasion of bug as the last act in which those who had survived the first visitation, were to be ruined under the second, *had* made an attempt to answer the query as to what Providence was thinking about. But was it a good shot? I heard the other day of a lecturer in Melbourne impressing on his audience that every insect pest has its use, dwelling especially on the mosquito, the cloth moth, and the garden snail. At the close of the lecture, a gentleman got up and asked for something more definite as to the snail. His garden, and indeed almost all the gardens in Melbourne, were over-run with them; his boys caught hundreds of them every night, and it was with the greatest difficulty young plants could be protected. The lecturer was a little nonplussed, but said the snail was fulfilling the aim of its existence, namely eating! If it had been a planter's estate which was being handed over to the destroyer instead of the garden of an energetic colonist, there would have been some one about "to point a moral" and the snail would never have fulfilled the aim of its existence until it had showed a decided partiality for the belongings of reprobate planters.

But this is a long way from the bug on our coffee. To return to it, it is a pleasure to notice that the pest is dying out, evidently in the same way that it did about the same time last year. The appearance is as if a white fungus were growing on the insect. Will it keep away? Is it worth while in these parts to prune, manure or cultivate, even if coffee is to go very much higher in price? If we only knew what Providence was thinking about, it would not be difficult to make up our minds as to what to do with what remains of our coffee.

At present, I fancy, there are more sellers of tea estates than buyers; but it is a happy token to hear of a tea property near Watagama for which £3,000 was refused. It is not a big place, and only a year-and a-half old.

There is the other side, however, of wanting to sell and not being able, like what occurred the other day, a man in search of an investment, for the offer of the property at a rattling big figure. Sterling money of course, and after reading the unsolicited letter which contained the terms of the proposal he said: "Well, Ceylon is far from being worked out yet, when people can have the cheek to ask such a price. There must be something in tea."

I understand that land suitable for tea lying near the Matale line is being looked after, and that next season should see more clearings there.—PEPPERCORN.

TEA, SUGAR, CINCHONA, AND COOLIES IN NETHERLANDS INDIA.

(Translated for the "Straits Times.")

According to the Samarang *Locomotief*, tea plantations in Java, bid fair, this year, to turn out an enormous yield. On one estate in particular, called Sinagar Chirohama, the tea produced is said to materially excel the British India kind in quality. This heavy outturn is generally ascribed to the dry East monsoon in 1885, followed by a lack of destructive insects. In spite of the promising future in store for this branch of planting enterprise there, capitalists in Java shrink from investment therein. For instance, two tea growing companies started in that island last year, have to work with capital mostly drawn from Britain, so it is said. What with the depression of trade and fall in prices, it is no wonder that they mistrust the paying nature of plantation undertakings under present circumstances. Moreover, it is evident that the enormous increase of the tea yield to be expected within the next few years, might readily result in overproduction within, say, four or five years. Even were years of adversity sure to come, there is every sign of prosperity for tea cultivation in Java, provided growers be not borne down by fiscal burdens sure to ruin them in times of crisis.

Of late, natives have been engaged in great numbers in Java for labour purposes in British North Borneo, Queensland, and German New Guinea. The local authorities before authorising their emigration, had ascertained that these recruits were fully aware of the terms of their engagement, and had agreed to them. The authorities also prevailed upon the companies concerned to give security for returning these labourers free of charge to Java, should they wish to come back at the expiration of their contracts. The Netherlands India Government has not yet decided what other line of action to take with regard to the recruiting of natives for foreign countries, or whether special provision be made to protect more effectively the interests of coolies.

In the opinion of experts there is at present no prospect of any rise in the price of sugar which continues to be low indeed in Java. The only remedy worth a thought is that of striving to make the article pay even at the discouraging quotations ruling, by calling in the aid of science and carrying out improvements wherever feasible to increase the outturn on less expenditure.

Steam ploughs have turned out not to meet requirements in Java. Trials have proved conclusively their unremunerativeness. In supervision alone, each plough costs about 150 guilders. Another drawback is that the plough had no steady work. Sometimes it stood still for months. It seems that among the many steam appliances which have replaced manual labour in agriculture the steam plough is one of those which answers the worst.

Uncertain as are the prospects of Java Cinchona planters from over-production of bark in Ceylon, they hope to make head against competition, by relying on the advantage, Java bark has over the Ceylon kind in containing less cinchonidine. Sometimes Indian and Ceylon barks show even 50 per cent higher percentage of cinchonidine than of quinine. The consequence is that their value has become depreciated. For instance, out of 2,518 bales of Ceylon bark put up for sale by auction at London, on the 28th June last, 1,330 proved unsaleable. The 169 bales of Java offered all found buyers readily. Under these circumstances, it is no wonder that the 21 millions of cinchona trees planted in Ceylon when coffee growing proved unremunerative, are being rooted up to make room for tea.

INDIAN HEMP: "BHANG."

An excellent paper was read by Dr. Watt, the Commissioner of the Indian Economic Court, on Indian Hemp which we take the liberty to reproduce.

"He said that it was a common experience in this country that the extracts obtained from the drug were of different strengths. This was due to the use of different kinds of the drug. The drug which was produced in Eastern Bengal was the best, and there were two kinds of it—the flat and the round ganjah, as stated by Mr. Holmes. These differed considerably in strength; moreover, the round was taxed by the Government a fourth more than the flat. The duty on the round was from 35*l.* to 40*l.* per maund, exclusive of the licence to sell it either by wholesale or retail. In connection with this taxation there was a curious anomaly existing in India to which he wished briefly to refer, viz. that the yearly returns in Bengal showed a consumption amounting to 6,000 maunds with a tax of 20,000*l.*, whereas in Bombay the consumption was

9,000 maunds with a taxation of 10,000*l.* only. The law which imposed the tax was passed about ten years ago, and he was surprised that the difference referred to had been lost sight of. These quantities did not represent the total produce of Indian hemp. Two thousand maunds were yearly exported from Bombay to Liverpool and London, duty free, the result being that it could be bought in London at one-twentieth the price at which it was sold in Bombay. (Laughter.) The wonder was what became of it, and he feared that it was reshipped for consumption in India after escaping the customs. Dr. Watt next gave an interesting account of the cultivation of the drug in India. He said that the wild variety—known as Bhang—differs from the cultivated ganjah. It is much weaker, and is used for the preparation of an intoxicating liquor and sweetmeats. The liquor is called *Hasheesh*, this word being the source of our word assassin, a corruption of the native word "Hasheeshcen" applied to the intoxicated and homicidal persons who drink the liquor. The sweetmeats are made by digesting the bhang in ghee, a kind of butter—the mixture being afterwards made into a suitable mass. Ganjah is entirely smoked, never eaten. The drug, Dr. Watt explained, is placed in a pipe, ignited in a certain way, and two or three whiffs are all that is necessary to make a man delightfully drunk. (Laughter.) Bhang is smoked in a different way. It is placed on a fire in the middle of a room in which a number of persons sit, and as the fumes fill the apartment all in the room get drunk together. (Laughter). After explaining that these details were not taken from personal experience but from observation, Dr. Watt proceeded to describe the collection of *Churras*, the resinous exudation from the stems of the plant. For the purpose a number of men are employed. They are stripped of the little clothing which they wear, their bodies well oiled, and they are made to run through the hemp fields in all directions. As they press their way through the stems, their bodies become covered with the resin. They are then conveyed to head-quarters and scraped. Another substance, termed *Mummia*, is a much more nasty preparation. This is referred to in the last edition of Johnston's 'Chemistry of Common Life.' The preparation is made in Nepaul. A certain plant is administered to miserable wretches, and it produces upon them a loathsome eruption. It is this eruption which is scraped off their bodies and used like ghee along with bhang. Incidentally Dr. Watt, remarked that he did not consider that much was to be learnt by associating with the native doctors. They knew all about the many hundreds of drugs which were in India, and there were not more than 40 or 50 of them of any real use. Moreover, the natives kept the drugs in their shops until they were perfectly rotten and worm-eaten, and as they were dependent upon them for many of them, that fat accounted for numerous specimens in the Indian Court being in a bad condition. Again referring to ganjah, he said that it was essential for its production that the fields of it should be quite free from male flowers otherwise a single male flower present in a field would by fertilisation, convert it into bhang. In cultivated fields of the hemp the male flowers were separated by native doctors, who are most proficient in their work. When the plant consists only of a short stem, 1½ feet high these doctors after striking a bargain, go through the fields, and, singling out every male plant cut it down and leave not a single one standing. Dr. Watt had endeavoured to get at the bottom of this wonderful skill, but even with the help of a microscope he had failed to find any satisfactory point of distinction between the male and female plants at this point of growth. He described how the heads are prepared for market. A hollow space is made in the earth, and the freshly-pulled heads are placed in it; the workpeople then roll it about with a shuffling motion of their bare feet the amount of pressure which the heads are subjected to determining the form of the product and strength."—*Wiiri Express.*

COFFEE ADULTERATION.

Not before it was time, an influential meeting has been held of those interested in the growth of Indian and Colonial Coffees, to concert measures for putting a stop to the prevalent adulteration, which is slowly but surely destroying the Coffee trade of this country. Though people are often unaware of the precise reason, all articles of food and drink are consumed for some useful part that they perform in the human frame. They may be nutritious or stimulative, or they may prevent waste of tissue, and it is for the two latter purposes, so physiologists say, that substances like Tea or Coffee are used. These effects depend upon the alkaloids—Theine in the case of Tea and Caffeine in Coffee—which those drinks contain. But if these essential properties are overwhelmed with a mass of burnt woody fibre, such as Chicory consists of, the object of Coffee-drinking is at an end. Nevertheless, in the case of Coffee, if advertisements on tins and otherwise are to be believed, the very thing that destroys its efficacy, is vaunted to be an improvement. This would matter little if the public were not misled by such statements, as they undoubtedly are. English people, as a rule, through the long course of medicinal Chicory they have undergone, are totally ignorant of what true Coffee is like, and a degraded public taste has been created which actually calls for a certain amount of the bitterness and thickness which Chicory gives to Coffee. But this is no reason for the public being kept in ignorance of the proportion of Chicory they are buying, and the present law, by which a simple declaration of admixture, covers the addition, even of 80 per cent of Chicory, simply leads to the grossest abuse. No substance ought to be sold as Coffee unless it contains at the very least 50 or 60 per cent of the substance by the name of which it is called; and in this, as in all other admixtures, the amount of foreign matters added should be clearly declared to the purchaser by a distinct printed label. The present Government stamp on mixtures of Chicory and Coffee, with other things, simply puts the official seal of approval on what is sometimes a fraud. A number of samples of "Coffee" have recently been analysed in London, and proportions of 60, 70, and in one case 92 per cent of Chicory and the like substances, have been found in them. Certainly no such compounds should be allowed to be sold as Coffee at all. If the word "French" be a recommendation to these mixtures, it would equally recommend the word "Chicory," and the proportion of Coffee could then be declared. There is a sort of precedent for dealing with Coffee in the recent Spirit laws, which do not allow Spirits of less than 25 degrees of alcoholic strength to be sold without a legible declaration on the bottle of the exact amount of added water. But this precedent does not go far enough in the case of Coffee. The addition of water in large quantities is absolutely necessary in the case of pure alcohol, which is simply a poison if undiluted. The addition of Chicory to coffee is in no way essential or desirable, and the purer a Coffee is, the better is its effect upon the human frame. It would seem fair, therefore, to go a step further than with Spirits, and to say that the proportion of *all* Chicory, whether much or little, added to coffee, should be legibly declared. The planters in their proposals as reported in *The Times* of Wednesday last, went further than this, and were inclined to ask that no admixture whatever should be permitted, and that people who want Chicory should be compelled to buy it separately, and mix it themselves. This, however, has been already tried in this country, and has been given up, as it was found to be unworkable. Since the first meeting of the Planters, it is understood that a compromise may be entertained, by which a certain proportion of Chicory should be allowed to be admixed, without declaration. To admit this, however, would be practically to defeat the object of the movement, and if such a weak compromise be accepted, the agitation would be better left alone. Those who like Chicory in their Coffee, and tens of thousands do so, would have no objection, but the contrary, to the declaration of the proportion added, while those who

do not want Chicory, ought not to be supplied with it without their knowledge, and under the protection of the law.

In dealing with this and similar matters, the public press is too apt to put down abuses to the retail Grocers, and with great injustice. In the present case, the excessive admixture with Chicory, which is doing so much harm, is not due to the Grocers at all, but to the packers, who introduced a substance with a taking title at a time when Coffee was very high in price. The Grocers had no knowledge or means of knowing the constituents of the mixture and the demand for it has since been endorsed by a special Government stamp, in cases where constituents besides Coffee and Chicory are used. The further step of obtaining a similar profit from the use of Chicory for themselves, instead of for the packers, is not one to be wondered at, but the Grocers if asked for Coffee free from Chicory will always supply it, whether whole or ground. It is, indeed, quite a mistake to suppose that the retail Grocers, as a body, would object to a stringent law dealing with Coffee adulteration, for they see as plainly as anyone else, that, at the pitch which things have reached, the destruction of the Coffee trade is a question of time.

Nor can those who vaunt the superiority of their compounds to Coffee, as the latter is given us by nature, object to their merits being no longer hidden, under the vague general declaration of of admixture with "improving" ingredients. On the contrary, the philanthropic packers who improve upon nature, should be thankful for any law, which compels them to emerge from their modest reticence, and to say how much per cent the "Coffee" in question is kindly "improved." If, on the other hand, they do object to such added fame, the public might doubt the truth of the alleged improvement, and insist, on its own account, on the proportion of admixture being declared. So far as the true home Coffee trade are concerned, that is, the Importers, Brokers, and wholesale and retail Dealers, who sell Coffee and not Chicory, they have for many years past desired a stringment change in the law, which may, perhaps, be carried now that our Indian and Colonial Planters have taken the matter up, especially as the question has a material bearing on the revenue of the country.—*Produce Markets' Review.*

CEYLON PRODUCE IN 1886.

The different articles exported from Ceylon to the various markets of the world have been fairly remunerative to producers during the past year and we make the following notes regarding the movements of them, and prospects for the coming year.

COFFEE.—The high prices now prevailing in Europe consequent upon the short supply from Brazil have caused a similar advance here and planters who still have coffee left, ought to be congratulated on the prices obtainable. It is not likely that more coffee will be planted but, what there is, is being cultivated with more than ordinary care, and, as the ravages of leaf-disease, grub and bug, are now more modified, a fair average export may be looked for.

TEA cultivation has been rapidly extended during the past year and in 1887 we shall probably see more than double the quantity exported that was produced in 1886. Towards the close of the year quality improved very much, and there was good competition at home for all fine teas possessing point and good liquor. As the China Tea season will not commence till May and as the Indian Export Season is about over, supplies will not be brought into the London market in such volume as they have been for some time. It may therefore be fairly expected that prices for desirable qualities will be maintained during the next few months. A number of Indian Tea Companies' averages have been very low this year, and this must be regarded as a somewhat unfavourable feature for Ceylon Planters, inasmuch as it may result in the collapse of many companies, and the acquirement of their concerns by others at ruinously low prices, and fresh competition.

COCONUT OIL.—The year 1885 having been a comparatively dry one, the yield of coconuts in 1886 has in consequence been limited and the production of copra and oil has been on a moderate scale. In the early part of the year the price in Europe fell to an unprecedentedly low level owing chiefly to larger supplies of tallow, palm oil and palm-nut kernels; it has now however somewhat recovered, although it is still much below the average of former years. There has been a good Indian demand throughout the year for oil and copra, but this has fallen off owing to the larger supplies of copra to Indian ports from Zanzibar and the Straits. The manufacture of white oil is a new departure to be noted. It resembles Cochin oil and fetches about R20 more than ordinary Ceylon. As the rainfall in 1886 has been more abundant than usual, the crops of coconuts in 1887 ought to be good after the hot months of the year have been passed.

CINCHONA.—The large export of last year has weighed heavily on the London market, but during the last few months there has been a distinct curtailment in the quantities sent forward, and if this continues a recovery in the price of bark will be brought about. It is to be feared however that when the price improves shipments will be again rushed home and the improvement will be again lost. The quantity still in the country is large; although not increasing, but in the course of another year a great deal must come out to make room for tea, and after that there will probably be a marked falling-off in the production of cinchona in Ceylon.

CINNAMON.—This article still suffers from overproduction, and there is more in the markets of the world than can be freely disposed of even at the low range of prices now ruling. The reverting to quarterly sales has helped the market in some degree, but what is required is curtailment of export of the low common qualities and chips which drag down the value of good cinnamon. Arbitration as to the quality and allowances have been very frequent latterly in the markets of Europe, indicating a want of sufficient care in the making of cinnamon and the sorting of it.

PLUMBAGO.—The demand for London has fallen off during the past year to a remarkable extent, but this has in some measure been made up by the export to Continental ports. The enquiry for America has been good as there has been a considerable revival in the steel trade there. Prices have been fairly remunerative to native producers, but their endeavours are, as usual, hampered by insufficient means of communication in the absence of roads, which the Government do but little to provide.

COIR YARN.—The home markets are borne down by enormous stocks, and losses in the article have been during the past year tolerably widespread; nothing but the curtailment of production will restore the nominal value. A good trade was done with the Australian ports for a time in coir stuffs, but it was overdone, and latterly seems to have been almost snuffed out.

KAPOK.—In this article for a time there was a good business with Australia, but, whether owing to a substitute having been found or some other cause the trade has fallen away and this branch of native industry has suddenly ceased to yield a profitable return.

HIDES, HORNS, HOOFS, &c.—A more extensive busi-

ness could be done in these if the hides were better cured, and if they were more free from brand marks, and if more care was observed in the keeping of the different descriptions of horns separate, instead of *mixing elk and deer together indiscriminately.*

When we come to review the course of the PLANTING interests, both in the hills and so far as it affects the welfare of Colombo, the retrospect of the past year exhibits a very varied study. The rapid and uninterruptedly steady extension of the enterprise in tea contrasts in a very striking manner with the almost equally steady and rapid decadence in coffee and everything connected with it. It is doubtless true that some—and in perfect good faith we may say many—of the estates in Uva are this year giving handsome returns, aided by the rapid and important rise in value of the produce which has recently been established in the European markets. It is also by no means an unimportant fact that we may still find amongst the sale lists of coffee in London, the names and distinguishing markets of many estates in the other districts which we have been led to suppose had long ago been compelled to abandon the cultivation of the berry altogether. The fact, however, is none the less established that the acreage to be recorded as "under coffee cultivation" has during the past year been very materially reduced—in the majority of cases the bushes have been rooted up and the ground thoroughly cleared—whilst over a very considerable area the tea plants have been planted in the already established fields of coffee. Uva still holds its own as the last stronghold of coffee culture, but it is deplorable to note how even here the devastating attacks of the most recently developed pest have spread with marvellous rapidity during the last twelve months. It had required a period of three years, more or less, for the green bug to work its desolating way all through the northern districts, and from thence southward through Kotmale and Hewaheta, spreading to the newer districts around the Peak and Nuwara Eliya; but it has required but a brief 12-months to make its appearance upon almost every estate in Udapussellawa and the newly-created province of Uva. Unless deterred by some climatic influence which may induce the destruction of the insect itself, or by the existence in the plant itself of some recuperative energy with which we are at present unacquainted, it does not need much foresight to predict the ultimate fate of this the last remaining stronghold of coffee cultivation in the island. It must not be forgotten however that coffee in Uva has withstood to a very great extent the influence of leaf-disease which has proved so fatal to remunerative cultivation in the other portions of the island, and there consequently remains to planters no little hope that after all it may not be compelled to succumb to the attacks of the much dreaded green bug. Tea cultivation, as we have already remarked, has been rapidly extended in every direction, land which has previously been under cultivation as well as newly felled clearings have been planted up, and the produce of earlier extensions has already begun to shew a very marked increase in the figure exports—the figures for 1886 being about 7,800,000 lb. as against 4,374,000 in 1885. The buildings and establishments on old coffee estates are rapidly undergoing reconstruction to suit the new manufacture, and life and activity have once more been restored to many an estate which of late years had gradually fallen into decay and abandonment. Following out the course of investigation and review, we find, to our regret, that the era of revivification—whilst affecting in so marked a degree the planting interests as a whole—does not in too many instances follow the fortunes of the individual. There are unfortunately very many whom the future presents but little more than a continuation of the toil and trouble with which in earlier life—and for a long series of years—they had attained a comfortable position during the more lucrative years of coffee planting. Of the many to whom the fragrant leaf will prove the means of attaining wealth and position, there will be but few who survive to tell the tale of the rise and fall of the once important coffee interest in Ceylon; and fewer still who will be able to attain a fair share of the good things attendant on the more modern product of the day. It would be superfluous for us to dwell at any great length upon the influence which this total revolution in the planting industry of the island exerts upon the mercantile houses of Colombo. The profits previously accruing from the manipulation of the berry on the seaborde were lucrative to a high degree in themselves as well as from many sources attendant upon its shipment. The profits arising from a Tea Agency are comparatively insignificant, and to a great measure arise from the supply of material and machinery, whilst the details require but little less attention and outlay than was the case with the old staple. The consequences of this alteration in the course of business are becoming year by year more evident and the Agency houses in our city would seem to be compelled in time to give way to a very considerable extent to tea brokers and tea buyers. There is no necessity for us to dwell at greater length upon the revolution that is so rapidly being effected in the commerce and cultivation of the island; but we must not omit to note its effect as more especially concerns the native populations more or less dependent upon them. A very large proportion of the villagers in the Kandyan provinces have for many years past been directly interested in the cultivation of the berry—being themselves cultivators and proprietors of the coffee plant; many others were in a variety of ways dependent upon or, at any rate, interested in its cultivation upon the large estates of Europeans. To both these classes of natives, the decadence—we may almost say extinction of the coffee plant—has proved disastrous in the extreme. The facility with which the increased value of their produce had enabled them to hypothecate their crops and to incur a variety of monetary liabilities as a natural consequence, tended to intensify the difficulty of the situation when the produce was no longer forthcoming. Poverty and distress have consequently during the past twelve-months run riot throughout the hill country, aggravated unfortunately by a very extensive failure of the paddy crops, consequent on the ravages of a minute fly, which has devastated the fields over large areas of cultivation in the Central Province, as well as in the low country. At the present moment there is being exhibited the very serious and harrowing spectacle of the original inheritors of the soil being steadily dispossessed of the lands which have been handed down to them from time immemorial, the lands meanwhile falling into the hands of strangers, and the few more wealthy amongst the native proprietors. It is difficult to conceive a more distressing, nay, we may say dangerous position, than that which is being established in the Kandyan Provinces, a whole population of landowners and their families being absolutely and literally dispossessed of their native soil and habitations and forced to seek subsistence as best they may from other sources. Nor are the consequences of the failure of coffee, as regards a very large proportion of the native population in and around Colombo, much less

serious than to those in the hill country. The numerous and extensive stores for the preparation and shipment of coffee in the port of Colombo afforded a means of subsistence to many thousands of women and children who were thereby enabled to earn a very substantial portion of the daily expenditure of their households; indeed in many instances they were entirely dependent upon such earnings. The mills and machinery to a large extent have been stopped altogether, and others afford employment to a but a small proportion of those who in former years had resort to them for work. Few indeed are those who can offer anything like permanent employment, and it is needless for us to point out that no other means of subsistence now exist for thousands of women and children who are consequently a burden rather than otherwise to their households. It needs but little consideration to show how serious a matter this is to the native population of Colombo,—one that affects some 15,000 to 20,000 of its inhabitants, and to these the industry which is being substituted for coffee offers no help whatever now or in the future.

THE KOLA NUT.

Messrs. Christy & Co. now publish an analysis of Kola nut (by the Consulting Aanalyst of the Royal Commissioners for Victoria, Fiji, Mauritius, &c.), the report of which reached them too late to be included in "New Commercial Plant," &c., No. 9.

ANALYSIS OF KOLA NUT.

Sterculia accuminata.

	Per Cent.	
Alkaloids or Crystallizable Principles :—		
Caffeine	2·710	
Theobromine	·084	
Bitter Principle	·018	
Total Alkaloids	——	2·812
Fatty Matters :—		
Saponifiable Fat or Oil	·734	
Essential Oil	·081	
Total Oils	——	·815
Resinoid Matter (*sol. in abs. alcohol*) ...		1·012
Sugar :—		
Glucose (*Reduces Alkaline Cupram-monium*)	3·312	
Sucrose? (*Red. Alk. Cupram. after inversion*)*	·602	
Total Sugar	——	3·914
Starch, Gum, &c. :—		
Gum (*soluble in H O at 90° F.*) ...	4·876	
Starch	28·990	
Amidinous matter (*colouring with Iodine*)	2·130	
Total Gum and Fecula ...	——	35·996
Albuminoid Matters†		8·642
Red and other Colouring Matters‡ ...		3·670
Kolatannic Acid§...		1·204
Mineral Matter :—		
Potassa	1·415	
Chlorine...	·702	
Phosphoric Acid	·371	
Other Salts, &c.	2·330	
Total Ash	——	4·818
Moisture		9·722
Ligneous Matter and loss		27·395
		100·000

—*British and Colonial Druggist.*

* Inverted by boiling with a 2·25 per cent solution of nitric acid for 10 minutes.

† Containing nitrogen = 1·387.

‡ Not definitely separable; chiefly resembling some oxidized resinoid matter, and the red-brown colour very like that of the roasted cacao-bean.

§ Apparently one or more of the numerous modifications of tannic acid common in the vegetable kingdom.

A SUBSTITUTE FOR QUININE.

TO THE EDITOR OF THE "BRITISH AND COLONIAL DRUGGIST."

A VALUABLE DISCOVERY,—SIR,—It may interest some of your readers to know that Professor Fisher, of Munich, has, after a series of experiments, obtained from tar a special "carbure," in the form of a white crystalline powder, possessing all the therapeutic properties of quinine. An application for a patent for this discovery has already been made in Germany. Yours truly, R. M. J. TEIL.—Wolborough, Newton Abbot, November 11th. [There are now of course several artificial bases, *e.g.*—kairine, thalline, antipyrine, antifebrine, &c.,—whose antipyretic properties cause them to be recommended in place of quinine. We do not profess to know precisely what may be intended by "carbure."]

COFFEE AND ITS CURERS.

We are indebted to Mr. H. C. Johnston, of the Ouchterlony Works, Beypore, for the following very interesting letters :—

A great deal of comment, and no little antagonistic feeling, has of late arisen between planters and coast agents on the subject of coffee curing. Doubts have been expressed, and an idea spread abroad that curers do not do justice to their part of the business, and it has been asserted that what little they do, is charged for at extortionate rates. As I have not hitherto cured for the public, I hope what I am about to say on the subject will at least be considered disinterested. The figures may, I think, be relied on. I feel certain that if planters were more acquainted with the details of the coffee trade, their complaints would be less frequent.

One of the chief causes of irritation is the loss in the curer's yard by drying. On this point, as on others, I speak from the results of my own experience. Eighteen bushels per thousand is a fair allowance for dryage over a large quantity; I have known parcels lose sixty, and others that gain in the bushel measurement; small lots of 50 or 100 bushels which do not get the turning over, in gathering and spreading that 2,000 to 2,000 bushels do, almost invariably gain. It seems to have escaped planters that when parchment coffee has, by exposure to a coast sun, arrived at dry point, any further exposure renders the parchment so brittle that it pulverises when raking up, measuring, and bagging. It is absurd to think that the curer, whose work is compressed into a limited space of time, can turn on and off the labour tap at will, any more than can the planter, whose crop comes on with a rush. So a higher percentage of loss by dryage is recorded in the curer's books. A good curer can tell almost to an hour when a particular lot will be dry, but it does not always follow that labour is available at the exact time. In the season of 1884-1885 the estate that gave me the largest percentage of dryage gave the best outturn. In the previous season this estate showed the smallest percentage of dryage. In Ceylon yards there are two degrees of dryness known as "bone" dry and "horn" dry; the latter is when you can indent the bean with your teeth, instead of cracking it like a nut. Coffee will peel in the "horn" dry condition, but no respectable curer would do so, and it is only practised by cheap men. There is a curious fact in drying coffee which does not seem to be generally [illegible] planters. Parchment will lose 2 lb. to 2½ lb. the first day, and 1 to 1½ lb. the second, that is for coffee arriving at 38 to 40lb. per bushel.

Another source of complaint is the difference between the estate measurement and coast measurement. I don't think there is much to growl about. The difference over nearly half a million bushels comes out at ·025, which speaks well for Mysore cartmen. The question of shade drying, and the colour of

coffee, has of late occupied the attention of some planters. Shade drying on the estate is a resurrected fad, that ended in a fiasco years ago. Unfortunately, no advance has been made by recent experiments on the conclusions arrived at sixteen or eighteen years ago by the then generation of Wynaad and Coorg planters. One planter writes me, it takes twenty-five days to dry to 35 lb. per bushel; another that he hopes to get out of it with only £13 per ton loss. One thing is certain that the curers can do no more than fix the colour already in the bean when received into their yards. It stands to reason that if the desired colour does not exist in the berry, no curer can put it there. It is equally certain that the planter can do a great deal to conserve what colour there is in his coffee by careful pulp-house work. But after all, the true solution of the question lies in the two words *high cultivation*. Mocha coffee cannot be said to have any colour at all, yet it fetches high prices. The best colour I ever got, came from a lot received at 47½ to 49½ lb. per bushel. It took six days to dry to 29½lb.: dryage 2·26 per cent, outturn 91·5 bushels per ton. Outturns are discussed by planters with great interest. They are looked upon as a test of the curer's efficiency, or to call a spade a spade, how much is not stolen from his yard! It seems almost unnecessary to attempt any defence. You have a body of men managing large concerns along the coast, controlling large sums of money, some of whom have been planters themselves, accused by implication of not being able to defend property entrusted to their care. Most planters would show fight at such an imputation; still, the idea prevails that regular and systematic robbery is permitted in the curing yards. It is ridiculous on the face of it. The best outturn I ever heard of was 79 odd decimals from Mr. Finlayson's Dunkeld Estate in Coorg. I know of more than one case where 80 bushels to the ton was approached. These are, I think, exceptional. If a planter gets 95 all round without any large percentage of clean, and no undue proportion of dry cherry he will take no harm. As a matter of fact I beat this last season by over 4½ bushels.

It has lately been asked in the Wynaad Planters' Association what curers grant as to the maximum waste of weight allowed on coffee shipped home? Just nothing at all. These are the facts:—

Single bags net weight shipped ...		...	168 lb.
" " of bag ...		...	2½ "
		Gross ...	170½ "
Trade tare on bags ...	3 lb.		
Draft on do. ...	2 "		5 "
			165½ "
Nett loss to Planter ...	...	...	2½ "
		Nett Coffee ...	168 "
Double bags the same; they weigh		...	4½ "
And the London Trade exact ...		...	5 "

Draft the same.

Cases take a 3 lb. draft, and anything over 3 cwt. a 5 lb. draft. Bags of any weight under 112 lb. carry a 1 lb. draft, however small they may be. In addition to the above, 3 lb. extra draft has to be allowed on all bags sea damaged. A Broker writes:—'The question of draft allowed on bags has been frequently raised, but dealers have persistently refused to buy without customary allowances. Some time back bags shipped from Jamaica were made heavier. The trade objected to this, and insisted upon a 3 lb. draft on all bags weighing 1 cwt. 3 qr. and upwards.' So our fellow planters on the other side of the world gained nothing by this move. I have proved that coffee thoroughly dry will take up moisture equal to 50 lb. per ton if exposed. The question of draft is a serious one, and Coast Agents have, from time to time, attempted its reduction. The planter, of course, is at liberty to impose on the London Trade any conditions he thinks proper when selling his crop. I have, however, a slight suspicion that in the long run he will come off second best.

Prices are all governed to some extent by certain trade customs and allowances, with which it is impolitic to attempt to interfere. The Yercaud Planters' Association asked some time ago how it was that while they only netted £50 a ton, coffee was selling retail in London at 1s. a lb. or £112 per ton. The following approximate memo will explain a good deal of it. Out of the balance has to come the London wholesale buyers' profit, often the provincial wholesale dealers' profit, the cost of distribution, including a provision against bad debts; insurance and house-rent; and an old curer reminds me of an ancient custom of the retail trade to make tea and coffee pay for the loss on retailing sugar:—

Value nett per ton to Planter...	£50	0	0	Planter pays.
Draft 14 bags at 2 lb.=28 lb. at £56	0	14	0	
Discount 1 per cent ... p. ton...	0	11	2	
Marine Insurance	1	10	0	
Freight 45s p. ton of 18 cwts. ...	2	10	0	
Dock rates	0	14	10	
Fire Insurance, Interest on freight &c.				
Public sale and petty expenses ...	0	7	6	
Brokerage ½ per cent	0	5	7	
Del Credere Commission	0	5	7	
Merchant's Commission	1	8	1	
Average time of bolding before going into consumption 4 months; interest 4 months at 5 per cent...	£ 0	18	8	Wholesale & retail grocers pay.
Dock rent 17 wks. at 6*d.* per week	0	8	6	
Duty at 1½*d.* p. lb.	14	0	0	
3 mos. credit to grocer at 5 p. cent	0	17	11	
Cartage from dock to roasting estabt. not including cartage to grocer's shop	0	15	0	
Charges for roasting 3*s.* per cwt...	3	0	0	
Loss in weight roasting avge. 18 p. ct.	13	14	2	
	92	1	0	

NOTE.—20 per cent is the actual loss calculated for low class coffee in roasting.

On the subject of curing charges I am somewhat reluctant to speak, lest my motives be misunderstood: I will, however, give the conclusions I have arrived at, and my opinions must be taken for what they are worth. I am fully convinced that no curer can put the proper amount of honest work into the curing, or employ efficient supervision over the various processes for 35*s.* per ton, and leave a fair living margin of profit for himself. In these days of leaf disease the expenses of garbling have been enormously increased. I have not had much experience of Sheveroy Hills coffee, but what I have seen, contained almost everything that a good sample of Parchment coffee should not, and I have heard curers complain dreadfully of its quality. What does the cheap curer's offer amount too, skinned?

Curer loquitur:—"I offer to cure your coffee at a reduced rate thereby effecting for you a visible saving of R10 per ton. It is not my business to tell you that I cannot afford at that rate the necessary labour, or supervision. It is not my business to tell you that the coffee will be left spread out on the barbacues all night, subject to the detrimental dews, which I know fall all over India during December, January and February. It is not my business to tell you that I shall peel in the horn-dry condition, skimp the garbling, and not be particular about measuring the coffee from the barbacues, or weighing it from the peelers; that I shall pack in the cheapest bags I can get, and, if possible stick you in the matter of freight; any more than it is my business to tell you that, while I am morally certain you will lose 2*s.* 6*d.* per cwt. I am of opinion that it is more than probable you will obtain 5*s.* per cwt. less than if your coffee had been properly and honestly cured. This is a point, however, you cannot very well bring home to me. I defy any curer, no matter where he comes from, to present to the London trade in its best condition for sale a foxy mixed crop, with leaf disease written on the face of it, for R35, or even R45, and make a profit."

To quote the words of "Wyvern" on his cook :—"I doubt the policy of quarrelling with your best friend." If a curer of his own free will offer a substantial reduction, planters may depend that the offer means slovenly work, and a loss to themselves by way of prices realised. The recent failure on the Coast proves that coffee curing is not all "beer," although there may be a good deal of "skittles" about it sometimes; and even at R45, coffee-curing does not always pay.

In connection with curing, *freight* is a subject much discussed, and some little misunderstanding appears to prevail. The enterprising agents of the British India Company offer to contract for 35*s.* per ton, against 42*s.* 6*d.* to 45*s.* of the coffee steamers, and some planters cotract to ship apparently oblivious to the fact that the British India rate is for 12 cwt. (Bombay scale) or 52*s.* 6*d.* for 18 cwt. (Coast scale). So the planter pays at least 10*s.* per shipping ton more to the British India Co., than he would do to the coffee steamers. Last season the difference was 12*s.* 6*d.* per ton in favor of the coffee steamer. The shipper by the British India has, besides, the above the benefit of transhipment in Bombay, and sometimes the additional luxury of having his coffee delivered in London in broken-up parcels, the cargo being sent off from Bombay as it suits the P. and O. Company to take it. There is an alternative line of steamers, which is being patronised by most of the large shippers on the coast to whom the tone assumed by the British India for so many years has become monotonous. I can speak to the fact that the Asiatic Company and their agents are most desirous of meeting the wishes of planters, and no effort is spared in protecting shippers' interests. An old custom still survives with a few planters of shipping in cases. I cannot account for the reason of it. There is most certainly no enhanced price realised now-a-days, in comparison with bags. On the contrary, the same coffee shipped in bags will net about 4d. per cwt. more than in cases, and there is besides a saving in freight, and R5 per ton in curing charges. In conclusion, I may state, without the slightest hesitation, that it would pay planters hand over fist to spend more money on the preparation of their coffee on the coast.—*Madras Mail.*

"BELOW THE HORIZON:"

COFFEE AND CACAO 100 YEARS AGO IN THE WEST INDIES.

It is, perhaps, a little late in the day to write about coffee and coffee estimates; but yet there is some interest in it even for many of us who, through force of untoward circumstances, are now out of touch of the fragrant berry. We can all appreciate anyhow the present upward course of the market even if we have but tea to sell; for if coffee is going to be scarce, and in time become a beverage only for the wealthy, then, we will have more consumers for our tea, and thus indirectly benefit it by the enhanced value of coffee.

I have lately been dipping into an old history of the West Indies in two volumes by Bryan Edwards, published in 1794, an elaborate book with maps and plates and bound in a way which tells of honest work; for although now nearly a hundred years since it left the hands of the binder, it seems strong enough still to outlive another century. In the chapter on the products of the islands there are two at least, which are of interest to the *Observer*'s readers:—Coffee and Cacao. Regarding the former the writer gives a very clear and full account of the then style of cultivation and curing with an estimate for opening an estate of 300 acres, worked by slave labour.

There is not much for the coffee planter of today to learn from the old methods and it is more for the curiosity of the thing than for ought else that I seek to bring the system of these old planters under the notice of your constituents. They planted 8 ft. by 8 ft., which few Ceylon places could stand; but wide as this was it was found to be too close at times, and the planter of those days "thought it advisable to cut down every second row, within ten or twelve inches of the ground, and by well moulding (? manuring) the stump they will furnish a succession of hearty, young trees while the rows which are left will bear much better for the room which is given them." The trees were topped at a height of five or six feet, so as to have from thirty-six to forty-two bearing branches. The average crop was about six cwt. an acre, but individual trees had borne at the rate of forty cwt! The coffee was not picked until the berry was "black red," and a negro with a bag hung round his neck, provided with an iron hoop in the mouth to keep it open, could, if he were industrious, bring in three bushels a day.

They had two ways of curing, drying in the cherry, and pulping and then drying. By the former method, if the weather was favourable, coffee could be cured in three weeks, the bean "weighing four per cent heavier than if cured without the pulp."

It was also considered a better quality of bean. As to the pulper in use, it seems to have been a simple crusher:—"The pulping mill consists of a horizontal fluted roller about eighteen inches long and eight inches in diameter. The roller is turned by a crank or handle, and acts against a moveable breast-board, which being fitted close to the grooves of the roller prevents the berries from passing through." There was no means for separating the parchment coffee from the skin, it had to be taken out by wire sieves. A negro could pulp a bushel a minute. The coffee was not fermented, but put out to dry at once.

About the time the book under notice was published, the duty on coffee which had been 1s 6d a pound had been reduced to 6½d, and the efforts of the planters were being put forth to meet the increased demand at home which had arisen in consequence. In the island of St. Domingo, which was a formidable rival to Jamaica, the slaves had rebelled and destroyed over a thousand of the coffee estates: the result was a greatly diminished export and a rise of prices in the European markets from 70s to 90s per cwt. There were, therefore, good times before the Jamaica planters and they saw their way to take advantage of them, provided "labourers shall continue to be procured from Africa at moderate prices." They hoped in time to do away with the necessity of importing slaves, through the natural increase of those already in the island, as they would be much healthier on hill estates than they had been in the low country. By this means they would gradually abolish the slave trade and this "without giving reason of complaint to any body of men." This was the state of things when the following estimate was framed to encourage capital to embark in the culture of coffee:—

"Estimate of the expense and return of a coffee plantation in the mountains of Jamaica, fourteen miles from the sea, calculated in the currency of that island being forty per cent worse than sterling:—

	£
First cost of 300 acres mountain land of which one-half is preserved for provision and pasturage at £3 per acre..	900
Ditto of 100 negroes at £70 per head ..	7,000
,, of 20 mules at £28 ,, ..	560
Buildings, utensils, mills and negro tools..	2,000
Expense of maintaining the negroes the first year before provisions can be raised (exclusive of other annual expenses charged below) £5 each	500
	10,960

Compound interest for three years before any return can be expected at 6 per cent ..		2,093
Annual expenses..		13,053
White overseer and maintenance ..	£200	
One other white servant ..	70	
Medical attendance on the negroes	25	
Negro-supplies, clothing, tools, salt fish, &c.	200	
Colonial taxes ..	100	
	£595	
Three years' expenditure ..	1,785	
Compound interest ...	221	
		2,006
Total expense..		15,059

Returns the fourth year at £4 per cwt, being the average price of coffee for five years previous to 1792:—

From 150 acres of young coffee may be expected the fourth year 45,000 lb..		£1,800
Deduct annual charges for the fourth year ..	£595	
Sacks and saddles ..	40	
	635	
Clear profit (being equal to £7 14s per cent on the capital.)... ...		1,165
Returns the fifth and subsequent years 150 acres yielding 750 lb. per acre, 112,500 lb. at £4		4,500
Deduct annual charges as before ..	£595	
Sacks and saddles ..	80	
Repairs of mills, &c..	100	
		775
Clear profit (being equal to 24 3-5th per cent on capital)		£3,725

PEPPERCORN.

SUGAR appears to be the one absorbing topic throughout the West Indies. As in Jamaica, British Guiana, and Trinidad, so in Barbados, it is discussed and looked at all round, in the hope that something may be done to improve its marketable value. A writer in the *Barbados Herald* thinks the West Indies might help themselves by the abandonment of obsolete modes of manufacture, the erection of modern improved machinery, and their emancipation from many inveterate prejudices which, he alleges, impede, their progress. With the abolition of the bounties, or such readjustment of duties as will enable them to compete on even terms with other manufacturers the principal grievance would be removed, and if then sugar cannot be produced at a profit he suggests that it should be abandoned as a forlorn hope.—*Colonies and India.*

COFFEE: THE LANKA COMPANY AND COFFEE CULTIVATION.—Our London Correspondent was misinformed—though he named some one who ought to know, as his authority—in saying that the Lanka Company were rapidly clearing out all their coffee in order to replace it by tea. Such is by no means the fact. The Company's Manager has, of course, allowed certain fields never very favourable for the old stapie, to be cleared and planted with tea; but the main portion of the Company's coffee in Haputale, Udapussellawa and Dikoya was never more carefully conserved and cultivated than at present and well it may be, seeing that crops of from 4 to 6 cwt. per acre are likely to be gathered over a considerable area. Altogether the Lanka Company is fortunate enough to own from 1,000 to 1,200 acres of good coffee; 1,500 acres of tea chiefly young, but with enough in bearing to give perhaps 50,000 to 70,000 lb. this coming season; besides 400 acres cacao in Mtaale, doing well, and cinchona, cardamoms, &c. The Company has not yet done much for its shareholders in the way of dividends; but certainly it has been making money when the Directors have been enabled to plant so much tea without calling in any additional capital. The dividends, after the tea comes into full bearing, ought to be satisfactory to the shareholders.

CULTIVATION IN MADRAS.—The total area under cultivation in the Madras Presidency during the past official year was 22,900,594 acres. No less than 24 per cent was under paddy, 17 per cent under cholum, ten per cent under cambu, seven per cent under ragi, six per cent under cotton, three per cent under castor oil seeds, 2 per cent under general seeds, and one per cent under indigo. The quantity under sugarcane was only 0·2 of the total area. In nearly all the districts the produce over half the area was either middling or poor, and only eight per cent, of the total area yielded a full crop. It would be interesting to know whether the areas here given are even approximately correct.—*Pioneer.*

MR. ELPHINSTONE ON RUSSIAN TEAS, &c.—Mr. G. H. D. Elphinstone is good enough to write to us with the Report and Valuation on the Tea Samples referred to in his last. He says:—"As promised in my previous letter, I herewith send you copy of the London Report and Valuation on the Russian Tea Samples I brought with me. I have sent Mr. Rutherford the samples, I think you will be satisfied on looking over the comparative values that Russia is undoubtedly next to England the best tea market. I know myself from experience in both the American and Australian markets that neither market was as good as Russia, and I trust by a gradual process we may be able to introduce the Ceylon tea into Russia, and so keep up the price for our teas when the yield of the island has increased so as to exceed the English demand."

LIST OF RUSSIAN TEA SAMPLES: LONDON REPORT AND VALUATION ON SAME.

Petersburg Samples.

No.	Roubles.	s. d.		s.	d.	
1	8	@ 1 11	equal	15	4	Reddish leaf not in London Oolong liquor value 8d.
2	5	,,	do	9	7	Flowery pekoe value 1s, not in London.
3	4	,,	do	7	8	Moning with flowery Tip-leaf, not in London Liquor value 9d.
4	3·04	,,	do	5	9¼	Moning Pekoe Flavor 10½d.
5	2·64	,,	do	5	0¾	Moning, Ninchow value 8½d.
6	2·40	,,	do	4	6	Moning value 7½d.
7	2·24	,,	do	4	3½	,, ,, 7d.
8	2·00	,,	do	3	10	,, ,, 7d.
9	1·84	,,	do	3	6½	,, ,, 7d.
10	1·60	,,	do	3	0¼	,, ,, 6¼d.

11 Brick Tea Roubles 1·20. No value in London.

12 Petersburg spurios Tea worthless, used for mixing and adulteration.

Moscow Samples.

No.	Roubles.		s.	d.	
1	2·68	equal to	5	1½	Ninchow Pekoe, 1s 1d to 1s 2.
2	2·20	do	4	2	Pungent Ninchow Pekoe Flavor 1s 6d.
3	2·00	do	3	10	Ninchow 1s 1d.
4	2·00	do	3	10	do 10½d.
5	1·80	do	3	5¾	do 10d.
6	1·40	do	2	8½	Moning Spantum 6½d

Remarks.—You will note that on the whole Moscow sells a better tea than St. Petersburg.

Duty amounts in English money to 1s 6d per lb.

Freight, landing charges, &c. in English money to St. Petersburg .. .. 3d per lb.

Do do to Moscow .. 4d do

10th Dec. 1886. G. H. D. E

Correspondence.

To the Editor of the "Ceylon Observer."

COCONUTS AND THE COCO-DE-MER.

Mahé, Seychelles, 22nd Nov. 1886.

DEAR SIR,—The letter of your correspondent "Latch" dated 25th August 1886, has come under my notice through the medium of your invaluable work the *Tropical Agriculturist*. *En passant*, I may mention that I hear that periodical highly commended by all to whom I have had an opportunity of introducing it, but more than one has said "it savours rather too much of tea." Knowing Ceylon as I do, and the revolution that has taken place in its principal culture, I am not surprized that much of the space in the *Tropical Agriculturist* is devoted to the Tea industry.*

With regard to the coco-de-mer, I think I may safely say that the Island of Praslin is its home. There are a few isolated specimens on Mahé 20 miles from Praslin but these have been introduced. The celebrated coco-de-mer groves, where the tree flourishes in all its unique grandeur are on the aforementioned island, and it is from these groves that the nuts are sent into the market at Mahé. The average price is about R1 per nut. The majority are purchased for export to Mauritius. The few that circulate in the country are used as measures for shellfish and native vegetables or as "balers" for pirogues (native canoes) and a few are polished and sold to visitors as curios. The inside of the nut is a whitish pulp about the consistency of butter, it is edible though not much appreciated. About three years ago I took a few full nuts to England and although essays have been made to propagate them in some of the principal Botanical Gardens there, I do not think they have been attended with success. Nuts that have commenced to germinate have been forwarded to the Botanical Gardens at Pamplemousses (Mauritius), with these the Director has been successful. I will try and procure some for you and forward them in a wardian. One peculiar feature of the coco-de-mer is, that the plant may appear above ground twenty or thirty feet from where the nut has been sawn. The late General Gordon when here made some very interesting sketches of the habits of the tree, as also did Miss North. Those of the latter are to be seen in that lady's gallery at Kew. I enclose you a photograph showing the coco-de-mer nut and germ. I am sorry, I am not well up in coconut lore, so cannot say if those that grow here are the same kind as in Ceylon. From what I remember, there is a great similarity in both the appearance of nut and tree. There is undoubtedly a small variety here, the most noticeable being "the Nicobar," which is almost a sphere and of a pale red hue. I am not inclined to think that "the larger the nut the greater its value" for I find that many of my smallest nuts yield most oil.

I am not, however, a professed coconut planter. Most properties here represent *multum in parvo*: on the one from which I am writing there are cacao, cloves, nutmegs, pepper, vanilla, pine-apples (about 50,000) sugar cane, manioc, sweet potatoes and tropical fruits in numbers; here and there a tree or plant, a wilderness of disorder and as great a variety of soil as there are forms in a kaleidoscope, but everything grows or would grow if properly cared for. So great is the fertility of the soil and so propitious the climate, that it has been said "you have only to plant your walking stick and it will grow." Vanilla is now all the rage and Seychelles has become the largest vanilla-producing country in the world.

Hitherto but little known, Mahé is about to become a large coaling station; it is to be the *tête-de-ligne* of the Messagaries Maritimes in these waters. The Orient Line contemplate coaling here instead of at Diogo Garcia and in all probability it will shortly be made a Naval station. We are woefully deficient in hotel accommodation —wish you would send us a d'Silva—and there is ar capital opening for an English mercantile house I am glad to read that there appears to be a prosperous future for Ceylon, though many old and valued friends have, since I left, gone to "that bourne" from which no traveller returns. I too have travelled far, seeking "crust or crumb" since dark clouds o'ershadowed the pleasures, and at one time the prosperity of a Ceylon coffee planter's life. Yet there is ever a lingering desire to return to the country where I spent nearly twenty not unhappy years. May they who had the courage to stay be rewarded.—Yours, very faithfully E. H. EDWARDS.

* A reference to the index of any of our *T. A.* volumes will shew that there are very many papers on all tropical products: in fact we omit nothing bearing on tropical industry.—ED.

COCONUT FIBRE REFUSE.

23rd Dec. 1886.

DEAR SIR,—If further proof be wanting for my assertion that fibre refuse possesses an agricultural value even if it does not possess a manurial value to the tree that produces it, I have only to mention the high agricultural value of sand for a certain description of soils. Though sand is composed almost entirely of siliaca, constituent that plays a minor part in the vegetable economy, yet when applied to stiff, heavy clays it increase its porosity and therefore fertility. Because sand is intrinsically valueless, will we be justified in saying that because when analysed it gives very disappointing results, therefore it possesses no value in agriculture? What "C. S." who is but Mr. Symons' champion says, will possess some weight if the soil of Horekelle is a stiff clay very retentive of moisture, though even there decaying vegetable matter mixed with it will increase its porosity; but "C. S." tells us the soil is sandy. The defects of such soils are its "extreme porosity or absence of retentivene," the cure for which is said to be the addition of "clayey composts, or green manuring." Neither of these is practicable, generally, on a propertyof over 1,000 acres, however well they may suit a few acres. But as the "humus compound arising from the decay of vegetable matter affords an absorbent for moisture in the same manner as clay" I most unhesitatingly assert that the Horekelle Company can put their "vast mounds" of fibre refuse, allowed to accumulate from the time of the late David Wilson, to no better use than to be sown broadcast in the estate and well ploughed in. Mr. Symons very (il)liberally offered this valuable refuse to anyone who would cart it away. Why? Because Mr. Wilson subjected it to analytical tests and found it worthless. This may or may not be the case but it only proves how little claim that gentleman had to be reckoned as a competent agriculturist and how pernicious a thing it is for gentlemen with no agricultural training to "direct" the working of a purely Agricultural Company. In attempting to do this they have blindly followed the lead of one who was (agriculturally) blind himself and we know what is the usual consequence of accepting lead of the blind.—Truly yours, the A. W. B.

TEA IN KALUTARA 1885-1886. THE KALUTARA PLANTERS' ASSOCIATION FIRST ANNUAL REPORT.

Your Committee in presenting this its first Annual Report, is happy to record that the past year has been one of progress and good promise for planting interests. Since the day the first lots of forest land were sold in the district, many changes have come about. Liberian coffee, cacao, citronella, rubber and cardamoms have all been extensively planted, but the past year has seen nearly all these products superseded by tea. The year 1886 may be said to commence the history of Kalutara as a tea district, pure and simple, and your Committee is glad to note that results both as to yield and price obtained are very satisfactory. In proof of this, the following figures may be adduced;—Tea on Culloden estate, now seven years old has yielded 740 lb. made tea per acre during the past financial year; while tea of about the same age on Gikiyanakanda (manured with citronella grass refuse, has yielded in the past 2 years 900 and 1,100 lb. per acre. As regards young tea, results are equally satisfactory, yield on Ambatenna estate, from tea 2 years and 3 months old, being for the month of November last, at the rate of 600 lb. made tea per acre for taking these facts with the average prices realized, your Committee congratulate you on the good prospects for the future,

COFFEE CORRUPTION.

Mr. Frederick Clifford's letter to the London *Times* brings into prominence the gross injustice permitted in England in connection with the sale of coffee, an article of produce which, here, and in Ceylon, has had to struggle with numerous and often overwhelming natural difficulties bringing sorrow and ruin on many a hapless Planter who has embarked capital and spent years of hard and laborious toil in its growth. The trials connected with its growth are unfortunately inseparable from the enterprize, and with these he must lay his account; but it is hard, indeed, that the laws of his parent country should be such that the most worthless compound can be passed off for the valuable product upon which he has toiled so hard, thereby baulking him of the full profit and advantage from the same which are his due. It is a mistake to suppose that the principles of free trade justify this sort of thing. It is no part of the free trader's doctrine that the merchant or dealer should be allowed to sell goods of the true nature of which the buyer is virtually ignorant; or that the buyer, while believing he is receiving an article of a certain kind, gets something quite different. Under whatever Act the dealer claims to be justified, it is wrong. The law presumes the buyer to know what he is buying; but as a matter of fact, in the case of coffee, he does not, for are we to believe that the average Englishman is such a fool as to give *one shilling and eight pence* a pound for a thing he could buy in a different form for *one shilling* or less? If so, then we may well concur with Carlyle in his opinion of the British population that there are "thirty millions—mostly fools." It has been proved that many of the samples of the article sold as coffee contained no less than from 40 to 90 per cent. of other ingredients of little comparative value; therefore, notwithstanding the precautions provided by the Act for the prevention of fraud, the fact remains that the public are duped into buying daily such mixtures as these, in the belief that they are getting pure, or all but pure coffee; and what is more, they pay pure coffee prices for them.

In the cases which Mr. Clifford brings to the notice of the public through the columns of the *Times*, that of three grocers brought before the Stratford Magistrates and let off, although the article offered for sale as coffee contained 45 to 65 per cent. of foreign ingredients surely makes the inefficiency of the English law glaringly apparent. Packages may bear the mark showing that the contents are a mixture; but the buyer, if he knows anything of it at all, knows nothing of the extent of the mixture. It is quite obvious he is duped, and so some more effectual means are necessary to check the shameless imposition. It is clear that some alteration in the law must be effected, such as will prevent the general buyer being made the dupe of every town and village grocer in the country, and give those who toil on our plantations a fair chance of earning their full and legitimate share of profit. If there be some who prefer a moderate mixture of chicory with their coffee, either let the chicory be sold separately; or, if a mixture be permitted, let the law take care that means are adopted for making the mixture and the precise proportions known without doubt to the buyer. Every consideration must be given to the multitude of ignorant people there are amongst the lower and uneducated classes in England; and the law should guard with great care against their ignorance being taken advantage of.

The Planters of India have no more than one occasion moved the Home Government to deal with the matter; but with no effect. The Indian Coffee Planters' Committee at the Colonial and Indian Exhibition is a good organization for working up the question, but it would be well if the various Planters' Associations on this side urged the Viceroy and the Indian Government to bring the weight of their influence to bear upon the Home authorities. They should also get the Indian Members of Parliament, of whom there are a good many now in the House, to take up the subject. England is the chief customer for Indian-grown coffees, foreign sorts being mostly used on the Continent; so the question affects our Planters in a special degree. The proposal referred to by Colonel J. A. Campbell, in an interesting paper read at a meeting held under the auspicies of the above Committee, namely that they should start shops for the sale of their own produce, is probably a good one. A Co-operative Society, with branches, would, perhaps, be better. Why should they not also make arrangements with existing Co-operative Societies, such as the Army and the Civil Service, &c., for the sale of their coffee? They could rely on these institutions selling their produce unadulterated. Whatever means are employed either to educate the public to appreciate good coffee, to point out how they are being imposed upon by the ordinary dealer, or to direct Government attention to the inefficiency of the Adulteration Act, the general body of Planters and those interested in the trade should not rest till the present abuses are removed, and till knavery is no longer permitted to interfere with their produce reaching the consumer in a pure and unadulterated state.—*Daily Post.*

COCONUT OIL.

An article so long in the market, so widely known, and so extensively used for scores and even hundreds of years, as Oil can hardly respond to what is known as "pushing" in dealing with new products and new brands. A larger consumption, save with reference to the increase of population, and new uses are hardly to be expected; but there is one point which demands and should have early attention—the price of Ceylon Oil. A smaller supply is generally followed by higher prices; but the causes which have led to the diminished exportation of Coconut Oil forbid the hope of this desirable sequence. It is not, however on the low prices ruling in comparison with former local prices that inquiry is needed—during the Crimean War the price of Ceylon Oil was double the present quotation and the normal price was between £40 and £50—but on the difference in price between Cochin and Ceylon Oils. How is it that almost in this article alone the Island is unable to secure the pre-eminence it has won in almost all its products—Coffee, Tea, Cocoa, Cinnamon, Plumbago, &c.? What is more remarkable is that the difference in prices is growing wider to our disadvantage. Thus, whereas in 1884 and 1885 Cochin Oil realized only £3 per ton more than Ceylon, at the present time the difference is £11 sterling, the prices being £37 10s. and £26 10s. respectively. One of the reasons we have heard named for the higher price paid for Cochin is that it is richer in stearine—that is the fatty or the more solid principle in Oils, which is of special value in the manufacture of candles, soap and lubricants. It would be well to ascertain by analysis that this poverty in stearine is a fact, and then to trace the causes to which it may be due. Two of the most obvious causes would seem to be defects in cultivation and defects in manufacture. If it be the former, the defects may probably be removed by supplying the soil with the constituents in which it may be deficient. If the latter, we rather think it must be due to the quality of the raw material operated on than to defects in the manufacture itself. The machinery in use in the Island is believed to be the most finished and effective that can be devised, and certainly leaves very little oleaginous substance in the poonac residuum; but the Copperah which is crushed is too often smoke-dried, and as often the kernel of immature nuts. The same ignorance and necessity which prompt the villager to pluck unripe fruits and send them to the market—including Areca-nuts, though our paternal Government knows naught of it—induce them to pluck immature nuts and hasten them into the market by exposure to a fire on lathed shelves. The conversion of immature and fresh-plucked nuts into Copperah, and the exposure of the kernel to fire may have more to do with the poverty in stearine of Ceylon Oil than anything else.

What would seem to be needed are analyses of Cochin and Ceylon Oils; and if a material difference is established, it would be well to secure analyses of the Copperah produced in the two countries, and also of the soils in which Coconuts are grown. Are the higher prices paid for Kalpitiya and Marawila Copperah due merely to the stuff being better dried —sun-dried not smoke-dried—or to the nuts being maturer, resulting in a thicker kernel more rich in Oil, or to the soil yielding nuts richer in Oil? A comparative analysis of local soils too would be useful; but a visit to Cochin Mills and plantations by a competent observer would seem to be absolutely necessary. It is worthy of note, as indicating that the difference in price cannot be wholly due to quality, that Ceylon Oil for India fetches higher prices than for London. Can it be that our Oil is used for mixing, or that it finds its way into Cochin packages? The subject is one that should be fully investigated.

A Merchant who may be considered an authority on this subject writes:—"The Ceylon white Oil is a new departure, and not fully introduced yet in Europe, prejudice being against it, as well as the fact that the progress made in manufacture is not sufficient to produce an *even* sample. No doubt, in course of time, experience will teach us to overcome that difficulty, and then our white Oil will have a better chance of approaching Cochin in price. Cochin Oil is mostly used for the manufacture of *white* soap. Our white Oil has still a yellowish tinge, and is therefore not *quite* suitable for white soap; and soap-manufacturers say that if they have to colour the soap, the ordinary Ceylon Oil is quite good enough for the purpose. The difference in price between Ceylon and Cochin Oil is so great (£11) only in London, not on the Continent, and Cochin Oil can be bought cost freight in any Continental market considerably below £37-10. There are additional reasons, quite apart from quality, why Cochin is kept so high in London. I have also reason to believe that, the moist climate of Ceylon affects the chemical composition of Oil, and that white Cochin (not Monsoon-Oil) contains more stearine, than Ceylon." It will be seen from the foregoing, that our information is correct about Cochin Oil, being richer in stearine, but is the cause suggested for Ceylon having less stearine the true and only one? The quality alone too, as surmised by us, does not account for the difference in price. As a matter of fact, Ceylon parcels of good quality have sold beyond the price quoted, while Cochin could always be had under its published price. Is not the difficulty in securing samples of Oil of even whiteness due to Copperah being smoke-dried?—Local "Examiner."

THE WILD DATE IN SOUTHERN INDIA.

Read Letter from J. S. Gamble, Esq., Conservator of Forests, Northern Circle, to the Secretary to the Board of Revenue, dated Madras, 29th September 1886.

In continuation of paragraph 2 of Mr. Peet's letter, dated 16th February 1886, No. 2,156, I have the honor to submit, for the information of the Board of Revenue, the following extracts from the reports received from Collectors in this circle regarding the growth, distribution and habitat of the wild date (*Phœnix sylvestris*) as I find that some interesting information has been collected. The Collector of *Ganjam* reports that the wild date is abundant in Chicacole, less so in Berhampore, and comparatively rare in Goomsur. He says further that it is often found along roadsides, but more frequently along streams where the bed is sandy. It also affects "kunkar" soils. The tree is tapped for toddy and the fruit is eaten and can occasionally be purchased in the bazaar. The Collecter of *Vizagapatam* reports that it is common in the coast taluks of the district, and especially so in Sarvasiddhi. Everywhere it is tapped for toddy, and the fruit is regularly eaten and is taken to the bazaars to exchange for grain. The imformation from *Godavari* is very slight; from *Kistna*, the Collector reports that the tree is found throughout the district and best on sandy soil. He says the fruit is not regularly used, but the poorer people sometimes eat both the fresh, ripe fruits and cooked unripe ones. When used for toddy the pot is coated with chunam inside if sugar is being made, if not it ferments The "cabbage," *i.e.*, the tender young leaves inside the crown of the tree, is sometimes eaten. The Collector of *Nellore* write as follows:—"The date is common all over the Nellore district, growing chiefly on the banks of streams and nalas and in depressions where water stands after heavy rain. The soils which seem to suit it best are sandy loams and sand. It is a common weed in all the mango topes, quite spoiling them for camping purposes. It also comes up under the shade of all other trees, except tamarind, where they grow on fairly good soil. The *fruit* is not used for food, but it is sometimes collected and sold to children for an equal measure of grain. But it is not a regular article of food, being generally allowed to fall unpicked. The tree has no value except for toddy and for the good fibre obtained from its leaf stalks." In the Ceded districts the wild date mostly occurs in swampy places where the soil contains either salt-earth or "kunkar." A characteristic locality may be seen close to the old Guntakal station on the Madras Railway. The Collector of *Cuddapah* reports that it is found in all taulks to some extent usually in groups of 200 to 500 trees. He adds that the yield of toddy is better in damp localities; but that from trees in dry places is more intoxicating. The fruits are eaten and the seed is sometimes chewed like arecanut.

The Collector of *Kurnool* also states that it is found all over the district and especially in Nandikotkur taluk. The Conservator has seen it in abundance in salt-earth swampy places in Ramallakot. The Collector also remarks that it is eaten, but has very little pulp. From *Bellary* the Collector sends some interesting remarks which are reproduced as follows:—He says that there are about 19,000 acres covered with it in the district, but chiefly in Adoni taulk:—

"The plant appears to be distributed throughout the district and is found growing principally in the vicinity of vankas (hill streams) in sandy soil impregnated with salts. The plant also grows on regada (black cotton) soil, but not so well as on the sandy soil called 'mussabu.' The fruit is eaten, but not as a regular article of diet. In the Bellary taulk the plant covers an area of 583 acres and is found growing best near vankas on light sandy soil. In the Alur taluk the extent covered by the plant is 12 acres, a part of which is situated in the limits of the village of Hollalagundi and a part in the village of Nagarur. In this taluk the soil is nearly all regada on which account I suspect the area on which the date is found growing is so small. In the Hospet taluk, in the villages of Chilakanhatti and Antapur, the growth of the plant is pretty thick, elsewhere in the few other villages where it exists it is found scattered. In this taluk also the plant is found growing near venkas in mussabu soil; extent 37½ acres."

"*Rayadrug.*—In this taluk near the villages of Kottapalli and Thalakerra the growth is pretty thick, but elsewhere scattered. The soil is mussabu, and the area over which the plant is found growing is 928 acres. In the Harpanahalli taluk the plant is found growing thickly in Yeddahalli, Tellagi, Ragimosalarada and Adavihalli villages and in a few others scattered. The extent on which the plan is found growing is 100 acres. In the Hadagall taluk the extent over which the plant is found growing is 38 acres. In this taluk also it is found growing best in mussabu soil alongside vankas. In Kudligi the plant covers an area of 1,295 acres and is found growing in sandy saline soil near vankas. In the Adoni taluk the plant appears to have spread a good deal, as the area on which it is found growing is 16,000 acres or five times as much as the total area of the remaining seven taluks. The soil on which it is found growing is a light reddish sand impregnated with salts near vankas. From the foregoing remarks it will be observed that the habitat

of the plant is near vankas where the soil is always humid and that naturally it prefers a light sandy soil impregnated with saline matter. The fruit is not used, because the use of the tree as a producer of toddy is general, and it is valued for this purpose alone. The sites favourable for the growth of the date are indicated all over the country by the mounds where salt modas once were situated. These mounds and the land immediately adjoining them are in almost all cases waste and at Government disposal, for their use for the manufacture of salt or saltpetre has been abandoned; the presence of an old moda site implies existence of salt in the soil and a supply of water handy, and the plantation of these old sites with date would result in a distribution of groves all over the country whose value to Government might be very great as their use under restrictions, if permitted, would greatly increase the value of the toddy farms."

The Collector of *Anantapur* also remarks that it is universally found, especially along streams, in a saline or calcareous soil. In Madakasira it is sometimes met with on black-cotton soil. The seed is regularly neate and is procured by barter for paddy. The tree does not occur in the *Nilgiri* district. The smaller wild dates are found in all districts and of several species. In the forests of the Circars the *Phœnix acaulis* is common and the fruit is also edible and sweet, though it has but very little pulp. On the higher hills, as at Mahendragiri, it 'grows into a small tree 10 to 15 feet high, but this may be the species *Onseleyana*. On the Cuddapah and other hills of the Ceded districts the *Phœnix farinifera* is found of very similar qualities, while the species which covers such large extents of country on the northern slopes of the Nilgiris and affords a pleasant fruit is probably *Phœnix pedunculata*. But all these species are difficult to distinguish and may prove to be mere varieties (as is the Arabian date *Phœnix dactylifera*) of *Phœnix sylvestris*.

TEA BLENDING.

The art of tea blending is one which cannot be too thoroughly or too methodically studied by every tea dealer who wishes to make a position for himself in his trade.

The man who has really mastered it can defy all competition; by careful tasting he can buy as well as the large houses, and by making the characteristics of the water of his locality his special study, he can please his customers far better than any outsider can possibly do, however extensive his operations may be, and at the same time secure a good profit for himself.

The main principles of this art are easily laid down; their practical application must be a matter for the personal consideration of each blender, guided by the peculiar circumstances of each case.

It is of the utmost importance to select teas that will mix well; for instance, to put a fine flavory tea to a coarse rasping tea will deteriorate both, while to add it to a full rich liquoring tea will improve both.

Desirable Indian teas may be used very freely to give strength, point and flavor, but sour or acrid Indians, or low Javas, should never under any circumstances be used.

Avoid unsound teas most rigorously; a tea with the least trace of mustiness or the least mousey flavor will spoil any blend.

Scented teas are often used most unwisely; for ordinary purposes 1 lb. in 12, or even 1 lb. in 16 is quite sufficient to give the blend a distinctive flavor. Fine Oolong or Foo Chow Pekoe are the most desirable kinds.

Of course this applies to ordinary trade; in the Caper districts people will sometimes drink a mixture and one part Caper, one part pungent broken Assam and one part Moning, and appear to like it.

When the mixture is made up, it should be allowed to stand in air-tight canisters at least a week before it is sold; the flavor of the component parts thus assimilates. Remember—if your tea is allowed to stand near any strong smelling articles, it will absorb their flavor; the finest teas are often spoilt by contact with soap, cheese, or other items of a grocer's shop.

We would, in conclusion, repeat—be sure your blends have some distinctive flavor; let them always be the same style and always kept up to a standard quality, so that people will learn to rely on them and come for them again and again; it is thus big businesses are built up.

The following specimen blends are of the simplest possible character, and are merely intended as a basis or guide for those commencing the work of scientific tea blending; as the complexity of the blends increase, the possible variations become so numerous that it is obviously impracticable even to indicate them within reasonable limits, but to a practical man keeping pace with the times," fresh developments and new combinations growing out of these foundations will constantly suggest themselves.

The following is a specimen:

SPECIMEN BLEND NO. 1.

Low-priced broken leaf. Principal ingredients:—
Kaisow siftings.
Assam or Ceylon fannings.

Notes.—Moning siftings are preferable to Kalsows, but are scarcer, and in consequence often cannot be obtained at a low enough figure.

Where dust is not inadmissible an Assam Pekoe dust should be added; it is a marvellous improvement to the liquor.

For flavouring use Scented Orange Pekoe fannings; or, when prices will allow, Namuna broken Pekoe.

A fraction of a penny in buying low broken teas will often make all the difference between a good and a common tea; it is false economy to inflict nasty rubbish on your customers to save a farthing.

SPECIMEN BLEND NO. 2.

Low to medium priced tea. Principal ingredients:
Saryune.
Oonfaa.
Broken Assam.

Notes.—Above will make a strong thick tea, will come out well in all waters; as, even in soft-water districts, buyers of low-priced teas look more for strength than quality.

Scented Capper or scented Orange Pekoe can be used where desired.—*Tea and Tea Blending.*

THE COCOS NUCIFERA OR COCONUT.—By W. Lascelles-Scott, M. S. A. The following from recent analyses of my own, shows the average percentage composition of a Ceylon coconut:—

Exterior fibre (coir)	32·65	per cent.
Shell	17·30	,,
Flesh or edible portion ...	26·40	,,
"Milk"	23·65	,,
	100·00	,,

Of the "flesh," or edible portion of the nut, the constituents are as under:—

Nitrogenous (albuminous) matter	6·48	per cent.
Fatty matter...	67·11	,,
Sugar and gum	5·89	,,
Mineral matter	3·65	,,
Cellulose and colour matter ...	9·76	,,
Water and loss	7·11	,,
	100·00	,,

Lastly, the analysis of the interior fluid or, "milk" gives these results:—

Nitrogenous matter	·712	,,
Gum and trace of fatty matter	·305	,,
Sugar...	4·150	,,
Mineral matter	·261	,,
Water	94·582	,,
	100·000	

British and Colonial Druggist.

COCONUTS IN CEYLON: LOWCOUNTRY PLANTING REPORT.

COCONUTS AND COPRA—"THE VALLEY"—BURNING WEATHER.

HAPITIGAM KORALE, 3rd Jan. 1887.—1886 has been a good year for the staple product of this district; there has been no long droughts—and ample of both rain and sunshine, the two climatic wants of the tree. A numerically average crop has thus been well filled, and has resulted in more than an average weight of copra. Besides improving the quality of the current crop, the fine season has put a crop on for 1887, much above the numerical average. The proprietors have thus secured one good crop, and have a fair expectation of a better coming.

A visitor to the valley has lately informed you that all the estates are in excellent order. It is true that within the past few years there has been progress, but progress is magical in different cases, and all the estates cannot justly be classed as excellent.

A fortnight of burning sun and dry searching wind has had a sad effect on all vegetation; the grass is already withered down to the roots, and garden stuffs are nowhere. Every thing is drooping, brown and yellow leaves are falling in showers, with every gust, as well as immature fruit of kinds; and the last planted coconuts are beginning to die. Fortunately the drought has not yet affected the older trees, but their time is coming if this weather continues much longer.

CEYLON TEAS —"BULKED UNASSORTED.

We are heartily glad to see that our Circular of 21st Oct. has at any rate attracted the attention of Messrs. Wilson & Co., of Colombo, who favour us with some comments upon it. With their permission we may state broadly that though they do not altogether agree with us, they go so far as to admit that Bulking unassorted is in some cases beneficial. We shall show by and bye they do not know when. We must be allowed to remind their readers that we most distinctly guarded against a hasty conclusion being come to that "all planters are advised to forward their Teas unassorted." On the contrary, we stated emphatically, "it would be absurd to lay down any hard and fast rule about it." Our critics overlook this, and rather commit themselves to a rule they immediately proceed to lay down. We think it a little misleading to state that we were "only able to point to one instance out of the hundreds that are sold in London." It is quite true that the particular case quoted by us, was the only instance we were aware of in which the entire produce of an estate had been divided and treated, as to one portion, by subdivision into six breaks, and as to other by Bulking unassorted, and sold side by side the same day; but we have repeatedly referred to the prices obtained for unassorted parcels. We learn from an interesting letter of Mr. Jas. W. Holt, of St. Leys, published in the *Overland Ceylon Observer*, of November 18th, that in his experience the figures were reversed, and the assorted got 1s 5½d, against the unassorted 1s 1d. Mr. Holt, with the best intentions, publishes his letter for our "benefit." We should doubtless profit more by it if he had kindly taken the trouble to state the exact proportions in which fine and common Teas entered into his unassorted division. As it is, though his statement is a fact, it benefits no one; we learn nothing from it; not even from the Editor's foot-note:—"Hear, hear! It is evidently ridiculous to lay down any hard and fast rule." Our own words to a tick. We notice a difference between the quantities when divided in Mr. Holt's invoice. 1,500 lb., he says, were assorted into five grades, and 1,000 lb. were blended. The 1,500 lb. fetched 1s 5½d, and the unassorted 1s 1d. We fear Mr. Holt's experience of blending Teas is of little use to him if he cannot do better than that. If he were to try to write a Doctor's prescription containing six ingredients he might achieve even more startling results not of course so easily expressed in pence. And here, in justice to ourselves, we may repeat what we said at the time we were writing fully on this interesting subject. "Besides we do not advocate treating the entire crop of Ceylon in this way. It is quite open to the expert to decide how much of this Broken Pekoe he will ship as it is, and how much return to the bulk to assist in giving tip and appearance to the remainder of the parcel. *It would be obviously absurd to lay down any hard and fast rule about it.* Experience and judgment must guide the planter, after all said and done, as to how he is to get the best return in money, and we trust we have indicated one direction in which he may look for a reward for thought and skill. There is no reason to be disheartened and discouraged if first efforts do not bring out a much higher result. The secret of the success of blending is that the finer Teas, owing to their greater strength and flavour over-master a much larger quantity of somewhat inferior Teas, and raise the quantity of the bulk, but the exact limits to which to go without making the fine Tea resemble the proverbial needle in a bottle of hay, can only be arrrived at by experiment and practice." The thanks of all his readers are due to the editor of the "Overland Times" of Ceylon for his able and exhaustive leading article on the subject. He at any rate discerns our desire to further the interest of the Ceylon planter. Supposing we were absolutely wrong in our views, is it not much better that the matter should be thoroughly ventilated and all the arguments *pro* and *con* discussed freely so that the best course for all parties may be arrived at? But we are no theorists on the matter of Tea blending. Ours is practical experience extending over many years, and leading us to certain conclusions, but it was a long time before we could dictate a blend of seven or eight Teas, as we do to dealers every day, to get the best result with least money. The "Overland Times" says we appear to hold very strong views on the subject. We do, and we are glad to say we have succeeded in impressing them upon some others. Messrs. Wilson & Co., in theirs of 23rd November, sum up "in short, Gardens producing medium Teas such as Broken Pekoes selling at 1s 1d to 1s 2d per lb. Pekoe Souchong 9½d to 10½d, Broken Tea 8d should bulk unassorted, and Gardens producing fine Teas should not." To what advantage? What is the average of 1s 1d, 1s. 9½d, and 8d? Where does the improvement of the bulk come in? Do Messrs. Wilson & Co., or does any one suppose that by mixing Teas from 8d to 1s 1d, they will get an average of., 1s 2½?—*Rucker & Bencraft*, London, Dec. 17.

THE LANKA PLANTATIONS CO., LIMITED: COFFEE, CACOA, CINCHONA, TEA.

DIRECTORS.—R. P. Harding, Esq., *Chairman*, Geo. Allen, Esq., James Thomas White, Esq., Sir Herbert Bruce Sandford, Horace George Hayes, Esq. Resident-Manager:—Mr. Edward Gonne Harding. Agents in Colombo:—Messrs. J. M. Robertson & Co. Secretary:—Mr. William Bois.

Authorised capital, £200,000 in 15,000 ordinary shares of £10 each and 5,000 reference shares of £10 each.

REPORT

To be presented at the Sixth Ordinary General Meeting of the Lanka Plantations Company, Limited, to be held at the offices of the Company, on the 30th December, 1886, at 12 o'clock at noon.

1. The Directors submit their Report for the twelve months ending 30th June last, together with the Balance Sheet and Accounts of the Company made up to that date

2. The weather has again seriously affected the coffee crop in all parts of Ceylon, the outturn for the year in that Island being about one-fourth of what it was a few years since. The The Company has suffered with the rest. The cause is to be found in deficiency of sun heat, superabundance of rain, leaf disease and new insect pests. Extraordinary climatic effects have occurred in most parts of the world, and until they cease and normal weather returns giving well ripened wood and good ripening seasons, Coffee crops will continue to be short, and although short crops result in better prices, such prices do not compensate for short crops.

3. The quantity of Coffee (estimated at 2,516 cwt. shipped home was 2,416 cwt. against a crop of 5,499 cwt. last year, and the amount realised from Coffee gives a total of £7,762 13s. The price of the Company's Coffee during the past year has been better than in 1884-85, having averaged 66s 8d per cwt. against 60s per cwt. last year.

4. The Cinchona Bark harvested has been about 165,580 lb. (of which 30,402 lb. were sold in Ceylon: the greater part has been realised and the whole is expected to produce £4,922 14s 5d.

5. In consequence of injury to the shade trees and the consequent prevalence of insect pests the Cocoa which was estimated at 500 cwt. has only produced 165 cwt., realising £528 15s 6d, but additional shade trees have been planted and the general appearance of the Cocoa has greatly improved, and there is every prospect of a good crop for the current year.

6. The plantations of Cardamoms have not produced the estimated quantity, only 893 lb. having been received which realised £50 3s. The prospect, however, is more promising for the present year.

7. The first plantings of Tea of Fordyce Estate have fully answered expectations; the estimate for the year was 15,000 lb., but the shipments received amount to 34,519 lb. realising £1,770 5s 6d and showing a net average of 1s 0¼d per lb.

8. The Tea Factory at Gonagalla having been found unequal to the proper manipulation of the largely increased pickings of Tea leaf, a Jackson's Excelsior Tea Roller has been purchased and shipped for Ceylon. This will anable the Manager to prepare and send forward the greatly increased quantity of Tea which the Estates are expected to produce. The estimate for the current year is 120,000 lb. As the Tea trees on the Company's 450 acres of Tea at Fordyce and Gonagalla come into full bearing, they will supply sufficient leaf for the Gonagalla Factory and consequently our Colombo Agents concur with the General Manager in recommending the erection of a Tea Factory at Fruit Hill Estate, which is close to the Railway and conveniently placed for the purchase of leaf in the event of the 237 acres of Tea there, not furnishing enough to keep it fully employed. The estimated cost of this factory is about £1,250 and there is ample water power at Fruit Hill for working the factory.

9. Your Directors have pleasure in stating that of the proposed issue of 2,000 six per cent £10 Preference Shares (part of the authorised Capital of 5,000 Preference Shares) of which 1,100 had been allotted at the date of their last Report 230 shares in addition have been since applied for and allotted, leaving 670 shares still available for applicants.

10. The dividends on the Preference Shares issued prior to the 30th June last, have been duly paid out of the profits shown by the Accounts.

11. No addition has been made to the Company's estates during the year under review, and the present state of cultivation is sufficiently shown in the Tabular Statement contained in paragraph 19 of the Report for the year 1884-5.

12. Your Directors regret very much that they are not in a position to pay any dividend on the Ordinary Shares. Since of the formation the Company its management has been a constant source of anxiety and responsibility, but although the Directors have been well nigh beaten by bad seasons, low prices, leaf disease and other causes over which they have had no control, they still consider that, with better seasons, the Company will before very long be in a better position than it has been for some time past. The Directors have now four products to rely on, coffee, tea, cinchona and cardamoms and they rely on each of them, coffee and tea as their support, Chinchona and Cardamoms as helps. Ceylon Coffee will shortly be if it is not now a luxury, and many parcels have been lately sold at over 100 shillings a cwt., whilst Ceylon Tea is making a most remarkable progress in the estimation of the Tea drinking public. Although costing more, Ceylon Tea goes much further than most other Teas, and in the opinion of these most competent to judge there will always be a maket for it so long as it is carefully prepared. On these points the following Extract from the *Ceylon Observer* of the 9th November last may be interesting:—

"We think our home friends may rest assured that Ceylon can compete with any other country in supplying superior Teas at moderate prices, and as the English taste gets educated to the fine Indian and Ceylon Teas, clearly the bulk of inferior 'China' kinds will not pay to export. A certain proportion of fine China Teas will always find a good market in England, but we certainly expect to see inferior Teas superseded. Ceylon Agents are everywhere pushing our Teas in new markets. As regards planting and crops, the work of supplying and even planting out Tea has been carried on vigorously upcountry. Big crops of Coffee are being gathered in Haputale and some other parts of Uva. There is great activity still about Cinchona bark, but later on a slackening here, simultaneous with a large increase in the export of Tea, is anticipated."

If the cultivation of Cinchona does slacken it will be good for the Company, as great attention is being given by the General Manager to the proper cultivation of this product. The Directors acknowledge with pleasure the zeal of their General Manager and of their Colombo Agents. Mr. Henry Bois, the senior member of their Agents' Firm has lately visited the Company's Estates, and has written a very interesting Repors thereon. The Report was not intended for publication, but as it will put the Shareholders in full possession of our Agents' views, the Directors have determined to publish it as an Appendix to this Report. The Shareholders may rely on the Directors continuing to exercise the utmost care in the management of the property. The very large share they hold in the capital of the Company, to say nothing of that held by their personal friends, is a sufficient guarantee that they will do all they can for its benefit. The two Directors who on this occasion retire are Mr. George Allen and Mr. James Thomas White, and they both being eligible offer themselves for re-election,

Mr. John Smith (a shareholder) the Auditor, also retires and offers himself for re-election

By order, WILLIAM BOIS, Secretary

No. 8, Old Jewry, E.C., 16th Dec. 1886.

APPENDIX.

REPORT ON ESTATES BY MR. HENRY BOIS.

Colombo, Ceylon, 7th Oct. 1886.

The Secretary, Lanka Plantations Company, Limited, London.

Dear Sir,—Between the 7th and 18th ultimo, I visited nearly all the Company's Estates, that is to say, Fruit Hill, Gonagalla group, Rillamalle, Rappahannock, Ampittiakande, Arnhall and Thotugalla. Mr. Harding, who accompanied me, has sent you Reports upon some of the Properties.

Speaking generally I found all the Estates in a good state of cultivation, quite as good as we could expect for the money spent upon them. I doubt if any further material economies can be effected or if any changes could be profitably made anywhere in the superintendence or management of the Properties. The Tea is growing well nearly everywhere and the Coffee did not appear to me to have gone back since my last visit. Gonagalla has a very fair crop upon it and the Autumn crops in Haputale are also fairly good. Spring crops will, however, certainly be short. The season has been most unfavourable, constant rain when sun was wanted. At the date of my visit the weather was fine but rain has since fallen I believe, and in any case it is now too late to expect anything more than very small Spring crops from the Haputale and Uva Properties.

As regards Fruit Hill the tea is growing satisfactorily but not so vigorously as on some places that I have seen. The estate is, however, so conveniently situated that it can be worked cheaply and the leaf can be sold to great advantage, owing to the proximity of the estate to the railway station, should it be found impracticable to manufacture it all at Gonagalla as at present. *I do not think it will be advisable to put up a factory on this property*, at all events not for some time. I see no reason to doubt the estimate of 20,000 lb. of tea and 300 bushels coffee for 1886-7. A few acres of coffee manured with refuse from the bazaars has put on a very large crop. I do not suppose,

however, that this would be repeated a second season or that it can be taken as an indication of what coffee would do if heavily manured.

GONAGALLA (Group)—Owing to constant rain the ground had a soddened appearance and the coffee looked as if it wanted some sunshine. Assuming that the bearing acreage of coffee is correctly estimated I do not think the estimated crop more than is on the trees. *The tea is coming on satisfactorily and further provision will have to be made formanufacture*, the present Rolling Machinery being inadequate. I believe Mr. Harding wrote to you about sending out an Excelsior Roller, Mr. Murray Robertson has just purchased one for us direct from the manufacturers and you will no doubt be able to do the same, thereby saving the extra sums charged by Mr. Jackson's Colombo Agents.

From Gonagalla I proceeded to RILLAMALLE and I wish I could write more favourably than I can of this Property. It is, in my opinion, the most unpromising of the Company's Estates. The Coffee which was so fine when it was young is now yellow and unhealthy, the wood wiry, and the general appearance indicating but little prospect of crop. Mr. Harding and Mr. Owen both insist that this is the result of long continued wet weather and that with normal seasons the trees will recover and crop well. This may be so to some extent but it is also true that leaf disease, green and black bug, and, Mr. Owen says, also grub are at work upon the Coffee, and it is probably the combination of all these adverse circumstances that is answerable for the unsatisfactory appearance of the Property. So far there had been little or no blossom and it is certain that the crop will be very small, how small cannot be determined just at the moment, for Mr. Owen was still hoping that fine weather would force out a blossom. There being sufficient Tea Plants in the nursery for the purpose the 70 acres planted with Tea are to be increased *to 100 this year. I should stop at that for the present* to see how it does. On the neighbouring Estate the Tea planted some years ago shows a very fair growth and Rillamalle will probably do the same. There is, however, *much against Tea cultivation at this spot.* The transport is very difficult, everything having to be carried 10 miles, part of the way over a very rough mountain road to Padiapelella on the high road to Kandy. It (Padiapelella) is possible that something may be done by Government to provide the district with a proper outlet, in which case Tea cultivation will be less handicapped, but there is no immediate prospect of any such work being undertaken.

I should like to see Rillamalle again some months hence—in the meantime I do not see that anything else can be done than what is proposed by Mr. Harding—the trees certainly want pruning. This means expenditure; but the coffee has hardly a chance to do much with a lot of very bad wood upon the trees.

RAPPAHANNOCK is another unsatisfactory property. It has, in common with nearly all Uva estates, missed its blossom for spring, and crop will certainly be very short. There is a large quantity of healthy cinchona on the estate, and a corresponding large harvest of bark can be secured; but unfortunately prices are so low that large shipments of bark do not mean very much money. I think that about 150 acres in the centre of the estate should be kept and cultivated as coffee, manure being applied whenever a set blossom promises a fair crop. All the cinchona should be cut out or uprooted in these fields, for it is a fact beyond all question that *cinchona and coffee will not grow together after the former is some years old.* The coffee almost invariably deteriorates, and ceases to be productive. I agree with Mr. Harding that the 57 acres at the bottom of the estate should be put into tea.

The fine coffee on AMPITTIAKANDE looks, I think, as well as ever it did, and it has the best crop on it that I saw anywhere. The acreage of the fine coffee however, is smaller than it used to be, and there is not sufficient area to admit of the place giving very large crops. I was agreeably surprised to see how well the tea was growing on this estate, and I see no reason why it should not be a success. Transport difficulties are no doubt against it, but they are not really serious as is the case with Rillamalle. I think when tea is manufactured in any quantity the factory for both Ampittiakande and Arnhall should be at the latter place.

ARNHALL has a very fair autumn crop upon it. The coffee did not strike me as having gone back since I last saw it, and there is no doubt the rain has been favourable to these low-lying places. The quality of the coffee should be much better than it is when picked in a dry season.

THOTULAGALLA *is about the finest sheet of coffee in the company's possession*, and with fine weather I believe it would have given a very satisfactory crop this season. 4,000 bus. (parcht) are supposed to be on the trees; how much more will be yielded cannot yet be quite estimated. For the expenditure incurred, I think the condition of this estate creditable to Mr. W. Harding. Pruning is, perhaps a little behindhand but it is not possible to do the work very quickly on such large trees with the limited labour force kept upon the property. Mr. W. Harding's health seems to call for a change to England for a time. I think during his absence the necessary work of the estate might be carried on by Mr. Bouton, he drawing his own pay and half Mr. Harding's. The latter getting leave on half pay.

The *green* bug to which Mr. E. G. Harding refers is, in my opinion, not the old variety of cocus that we have known in former years. Its attacks appear to be of a more persistent character, and there is no doubt that in many instances serious results have followed upon its attacks. I saw it more or less everywhere on my travels, and I am not disposed to minimise its importance. I am in hopes that fine vigorous coffee will not be permanently affected by it, but, on the other hand I am bound to say that I have seen really fine trees almost killed by it. Thatching the trees with Mana grass and applying lime perhaps do a little good, but in olden days we found that there was no real cure for it until nature caused its disappearance.

The railway to Haputale is still an unsettled question. It is hoped that the Governor's strong recommendation of the work will induce the Colonial Office authorities to agree to the commencement of the extension. Personally, I have no faith in a 2-feet gauge line to Uva.—I am, dear sirs, yours faithfully, HENRY BOIS.

LANKA COMPANY, LIMITED.

BALANCE SHEET, 30TH JUNE, 1886.

Dr.

	£	s.	d.	£	s.	d.
To Capital paid up ...				162,000	0	0
15,000 Ordinary Shares of £10 each ...	150,000	0	0			
1,200 Preferance Shares of £10 each ...	12,000	0	0			
To Loan obtained on the payment of the Mortgages on Arnhall & Ampittiakande ...				9,030	0	0
To Sundry Creditors ...				12,311	12	11
Bills Payable ...	7,896	2	10			
Sundries ...	4,415	10	1			
To Balance of Profit and Loss Account... ...				527	9	4
				£183,869	2	3

Cr.

	£	s	d.	£	s.	d.
By Estates				163,721	10	1
Ampittiakande ...	26,225	5	0			
Arnhall ...	18,521	6	9			
Fruit Hill ...	10,232	14	9			
Fordyce and Garbawn	16,149	2	0			
Gonagalla and Paramatta ...	18,185	12	11			
Rappahannock ...	22,846	10	7			
Rillamalle ...	10,333	11	9			
Thotulagalla ...	35,143	13	1			
Yattawatte ...	6,083	13	6			

By Machinery, Tools, &c. ...				729	1 11
By Sundry Debtors ...				157	19 10
By Produce Unsold on 30th June				8,572	11 10
Since Retailed ...	6,697	14	10		
Bark Unsold ...	1,875	0	0		
By Cash				2,305	10 6
At Bankers—Deposit Account ...	1,500	0	0		
At Bankers—Current Account ...	801	0	7		
In Hand ...	1	9	11		
By Suspense Account—Tea Planting, &c. ...				6,313	5 8
Tea Planting, &c., Account, 1884-5 ...	4,541	5	7		
Less—10 per cent carried to Profit and Loss Account ...	454	8	6		
	4,089	17	1		
Tea Planting, also of Cocoa & Cardamoms, &c. Account 1885-6	2,223	8	7		
By Payments on Account of Upkeep for 1886-7 ...				2,068	19 2
				£183,869	2 3

TRADING ACCOUNTS, for the year ending 30th June 1886. To Cost of Cultivation in Ceylon—

Dr.	£	s.	d.
Ampittiakande	1,234	2	9
Arnhall	1,532	1	9
Fordyce and Garbawn	2,228	19	11
Fruit Hill	736	16	6
Gonagalla and Paramatta ..	2,365	1	10
Rappahannock	1,803	8	5
Rillamulle	838	12	3
Thotulagalla	1,699	15	10
Yattawatte	2,115	10	2
General Manager, Sundry Expenses..	829	18	3
	15,384	7	8
Less—Machinery	504	4	5
	14,880	3	3
To Insurance	123	16	11
„ Balance carried down ..	30	11	3
	£15,034	11	5
To London Expenses (less £2 12s 6d Transfer Fees)	1,051	11	0
Directors' Fees, Secretary, Law Costs, Income Tax and General Office Expenses..			
„ Interest on Loans	627	17	0
„ Balance carried to Profit and Loss Account	574	11	10
	£2,253	19	10

Cr.			
By Net Proceeds of Coffee sold in London	7,762	13	0
„ „ Bark „	2,838	8	7
„ „ Cocoa „	528	15	6
„ „ Tea „	1,770	5	6
„ „ Cardamoms „	50	3	0
	12,950	5	7
„ Net Proceeds of Bark sold in Ceylon	209	5	10
	13,159	11	5
„ Estimated value of Bark not yet realised	1,875	0	0
	15,034	11	5
By Balance brought down ..	30	11	3
„ Amount carried to Suspense Account being part special expenditure on Planting Tea, Cocoa, Cardamoms, and on Buildings	2,223	8	7
	£2,253	19	10

PLANTING IN NETHERLANDS INDIA AND JAVA.

(*Translated for the Straits Times.*)

The *Java Bode* asserts that in consequence of the Supreme Government refusing to do anything permanent and thoroughgoing, to relieve the planting interests in Java from the disproportionate burden of taxation weighing it down, the eyes of many enterprising individuals there are directed towards British North Borneo where sounder economic priciples are put in practice. So far as fertility goes, British North Borneo is not one whit superior to many of the latter, such as Celebes and Sumatra, and is in nowise better off as to population, so that only fiscal conditions count in its favour. These differ so widely from those predominant in Netherlands India, as not to admit of comparison. Already a Netherlander, Mr. Geloes d'Elsloo has applied for 30,000 acres of land within the territory of the British North Borneo Company At Batavia a syndicate has been started for the purpose of turning that acreage to account on adequate capital, which was being raised by last advices. No wonder that British North Borneo is coming into favour among the planting community in Java, considering the drift and scope of the Government relief measures for their behoof in these hard times. After beating long about the bush, the Second Chamber of the States General has finally decided to abolish provisionally only the tax on the free cultivation of sugar, and to grant a delay of five years for half payments to the Government by sugar growers working under contract with the latter, and to abolish the export duty for five years. However welcome this instalment of justice has proved to the planters, they regret that the Supreme Government cannot break away from half measures, and make up its mind to do away altogether with a form of taxation quite unsuitable to changed circumstances, and free, once for all, European planting industry there from crippling burdens.

COFFEE REDIVIVUS IN CEYLON.

It is very satisfactory to hear anyone with long planting experience say a good word for the coffee tree on Ceylon plantations nowadays. But we have had such a good word spoken by a gentleman with practical experience in several districts. He instances Koslanda estate, Haputale, run down some two years ago and now very flourishing with a big crop. Although our informant's interest in coffee is now limited, he does not believe that "green bug" cannot be successfully driven away. It has disappeared from several places where once it was bad. Yoxford, Dimbula, is giving 5,000 bushels of crop, and it was thought to be far gone; another mid-Dimbula property, is giving 3,000 bushels; still another 4,000 bushels; and farther west, where a Superintendent was ordered to take out the coffee, and refused "the Colombo orders," because he expected a thousand bushels, he is gathering 1,200;—all found money! One of the best known planters in the country—with Uva, Deltotta and now Dimbula experience—calling on us today, expressed confidence in being able to do something with coffee yet in Ceylon. We suspect all over the country now, that every coffee bush with a green leaf will have the utmost care taken of it, and all manner of help given to the tree in fighting against bug or any other enemy. We trust, therefore, that, where still to the fore, our old friend, coffee,—especially in the Uva and Udapussellawa divisions—may have a long career yet of crop-bearing to the benefit of the planters, the labourers and the Colony at-large.

In this connection we may attract attention to the information on our back page in reference to the Lanka Company's plantations, and we may add that no greater treat met our eyes during a recent visit to some of the north Kandy districts than the sight of some 300 acres of vigorous young (three years old) coffee in blossom on Pallekella, Doombara. Long may it flourish and bear the bean which is likely to become more precious, than ever before in its history for the past forty or fifty years.

CINCHONA IN JAVA AND CEYLON.—We had an interesting visit today from Mr. Dinger of Batavia, the very intelligent proprietor of extensive cultivation in Java and a gentleman thoroughly interested in social and political as well as planting progress. He has presented us with a copy of the pamphlet written by Mr. Mundt ("Ceylon and Java") mainly made up from our "Handbook and Directory" (but without acknowledgment!) in which Ceylon is held up as a model to the Dutch Government in respect of its planting enterprise. Mr. Dinger has one cinchona plantation in East Java of about 350 acres with trees 6 by 6 feet or 2,000 to the acre from 7 years old downwards. He has experimented in harvesting by all plans, shaving, coppicing, uprooting, having no difficulty in getting fresh trees to grow over old ground. Mr. Dinger is evidently of opinion that a large—very large deduction—should be made from Mr. Mundt's calculation as to the area planted with cinchona altogether in Java, although he agrees that the export thence is bound largely to increase. We have told him that present appearances point to Ceylon sending as much bark as last season. Mr. Dinger being interested in laws and legislation, is to send us a complete copy of the Java-Dutch Code, more especially with reference to the admirable Law of Mortgages prevailing in Java. We shall have the same looked into, on receipt.

PETROLEUM AS A FUEL is thus noticed in the Home Letter of the *Indian Engineer*:—The other day, a number of gentlemen visited the works of Messrs. Priestman Brothers, Holderness Foundry, Hull, to attend the trial of a patent engine, the motive power of which is obtained from the use of common petroleum. These engines are made under Messrs. Eteve and Hume's patents, and are extremely simple in their internal arrangements. The petroleum is stored in a small tank containing one to two days' supply, as the case may be. A small pressure of air is put into this tank, and the petroleum is forced out of it into a vessel in a vaporized condition, in which it is then drawn into the cylinder by the outstroke of the piston, and having been compressed on the instroke the charge is ignited by means of a small electric spark. This immediately explodes the contents in the cylinder, and the piston is driven forward. The engine, in which the highly refined petroleum is used, is very similar to that in which the common petroleum is employed, the only difference being that in the latter engine the oil is taken into the cylinder in a heated condition. The cost of the oil is estimated at a half-penny to three farthings per indicated horse power per hour. Four horizontal engines were at work, two with benzoline and two with common petroleum. One of about three and-a-half indicated horse-power, supplied with benzoline, was driving easily four blasts at which chain-makers were at work, besides a a punching and a shearing machine. A vertical engine of about four-horse power was driving a namcar and doing work with ease. The tests were considered most satisfactory.

COCA LEAVES show no improvement whatever. Four bales, mostly sea-damaged, *huanoco* leaves sold at 8d. to 8½d. per lb. From Hamburg the article is reported decidedly firmer, the stock at that port having within the last fornight been diminished by 15,000 kilos. partly for German and partly for American consumption.—*Chemist and Druggist.*

CINCHONA BARK.—A correspondent writes:—Some fifteen years ago experiments were made to grow cinchona at Singapore, but the young plants would not flourish, and the attempt was abandoned. In some of the protected States, for instance Perak, cinchona is grown, but whether it will become a profitable product is doubtful. Some of the planters who have ground from the Sultan of Johore have also planted cinchona. Of these places, Perak, which is a protected State in the Malay Peninsula, is as yet the only one which can have trees fit for barking. The Hon. Sir Hugh Low has done much in promoting cinchona cultivation in Perak.—*Chemist and Druggist.*

BOTANICAL EXPLORATIONS IN COSTA RICA.—The district of Chirigui in Costa Rica, whence the bulk of the so-called Jamaica sarsaparilla comes, was lately explored by an English botanist, who gives an interesting account of his journey in *The Gardeners' Chronicle*. Among other things he mentions finding an anonaceous plant, probably a Hylepia exhaling a perfume very like that of *Cananga odorata* (ylang-ylang), and a tree known as the "samba gum tree," which yields on incision a creamy-looking yellowish sap, which after a time becomes hard and resinous and then resembles the tenacious hog gum of Jamaica, the produce of *Symphonia globulifera*. He also met with a thin-coated coconut one-third larger than the ordinary kind, and which he thinks deserving of cultivation. The natives ornament their cheeks with paint made among other things from an oleoresin resembling elemi, yielded by a tree called "pontapée." This paint is prepared by burning the oleoresin and collecting the lamp-black, a purpose for which it is doubtless well adapted.—*Chemist and Druggist.*

THE LINNEAN SOCIETY, DEC. 2ND.—CEYLON PLANTS.—As a chapter in the history of East Indian botany, Dr. Henry Trimen gave a paper at the Linnean Society meeting, on the above date, "Hermann's Ceylon Herbarium and Linnæus' *Flora Zeylanica*." The collection of dried plants and the drawings of living ones made in Ceylon by Paul Hermann in the later half of the seventeenth century possess a special interest as being the first important instalment of material towards a knowledge of the botany of the East Indies; but Hermann himself, who died in 1695 published very little of this material. Some of his MSS. were subsequently printed by W. Sherard including a catalogue of the herbarium as then existing, under the title of *Museum Zeylanicum* (1717). This herbarium was lost sight of till 1744 when it was recognised by Linnæus in a collection sent to him from Copenhagen. After two years work at it, Linnæus produced in 1747 his *Flora Zeylanica*, in which all the plants that he could determine are arranged under his genera. At that date Linnæus had not initiated his binomial system of nomenclature, but in his subsequent systematic works he quoted the members of the *Flora Zeylanica* and thus Hermann's specimens became the types of a number of Linnæus' species, for the most part additional to those in his own herbarium now in the possession of the Linnean Society. Hermann's herbarium is now in the botanical department of the British Museum, having been purchased by Sir Joseph Banks from Prof. Treschow, of Copenhagen the specimens are in very fine preservation, but some were originally scanty or imperfect. The paper consists of the results of a critical examination of the whole of the collection, and a catalogue is given of all the *Flora Zeylanica* species as named by Linnæus, along with the determinations of Hermann's species of each as now identified. Not a few difficulties, ambiguities, and misapprehensions of Linnæus' species have been thus recovered and cleared up, and the most important of these are discussed in a series of short, critical notes which form the conclusion of the paper.—*Gardeners' Chronicle.*

THEINE AND CAFFEINE NOT IDENTICAL.

Recent experiments by Dr. Thomas J. Mays, *Therapeutic Gazette*, and summarized in the *Druggists Circular*, demonstrated that the theine of tea, and the caffeine of coffee, were not identical, at least, so far as their physiological action is concerned. Discovering that the theine and caffeine of commerce are made " indiscriminately from tea, coffee, kolanut or paraguay tea," he took special pains to secure alkaloids beyond suspicion and from two different makers of high repute. The results of the use on frogs of theine and caffeine from sources indicated by their names are summed up as follows:—They agree in (1) affecting the anterior extremities; (2) in diminishing respiration; (3) in producing hyperæsthesia during the latter stage of the poisoning process. They differ in the following particulars:—(1), Theine principally influences sensation, while caffeine does not; (2), Theine produces spontaneous spasms and convulsions, while caffeine does not; (3), Theine imparts the nasal reflex early in the poisoning process, while caffeine does not, if at all, until the very last stage; (4), The lethal dose of theine is larger than that of caffeine. Enough evidence has now been adduced to show that theine and caffeine, while they have properties in common, also differ so widely in others that their separate manufacture becomes imperative in order that they may be more fully investigated both physiologically and clinically; and it further teaches that a knowledge of the chemical constitution of a substance is a very feeble and misleading guide to its physiological action —*American Grocer*.

COFFEE PREPARATION: DRYING AND CUR IN INDIA AND CEYLON.

(To the Editor of the "*Tropical Agriculturist*.")

MYSORE, Dec. 22nd, 1886.†

DEAR SIR,—Last year there was considerable attention paid by planters to the alleged deterioration of coffee sample. All sorts of theories were promulgated and a good deal of light was shed on the question. My own idea from experience in Ceylon and India is, that if the Ceylon method of rapid drying and despatch were adopted and closer attention paid by the Coast curers, the trouble would cease. Open sheds close to the barbacue, and a liberal supply of coir-matting will asist greatly to improve the sample. From what I have been able to learn, the Indian men dry their coffee very slowly. The coffee is kept in the sun for 10 or 15 days when by spreading more thinly and using coir-matting five days are ample. I have already this season proved this. When I first came here, I was puzzled at the universal system of raised platforms. I was told that you must do so here as coffee would not dry otherwise. I have proved that it dries on coir-mattiug in less than half the time required for the raised platforms. Men also speak of the cold wind interfering with proper fermentation, as an excuse for badly washed coffee. Old planters have told me that it is so cold at night, that the coffee mucilage will not come off in the orthodox time (36 hours). I have proved that that is all fudge. The coffee washes beautifully when the coolies are made to tramp it thoroughly. All sorts of theories are put forward. They say that too ripe coffee makes it foxy; under-ripe coffee makes the colour pale, &c., &c. Evenly picked coffee quickly dried on coir-matting after being well washed and promptly despatched, ought to turn out a good sample if the curers do their duty.

I cannot help thinking that many practices in vogue in Ceylon have been adopted in India without duly considering whether these plans are absolutely necessary under different conditions. My idea is that *pulping*, and *washing* coffee was found useful in rainy weather upcountry in Ceylon because of the absence of sufficient sunshine. In doubtful weather, *parchment* is more easily dealt with than cherry. But in the normal dry season here, why should not planters dry their cherry on coir mats? Then again mills were erected and worked in Colombo because upcountry (1) there was not flat ground available for large barbecues, (2) there was not a sufficiency of cheap labour, (3) there was no certainty of sunny weather,* and (4) Colombo was the seat of estate financial arrangement and control through the agency firms. But here, curing works could surely be worked if they are worked in Bangalore. Planters (especially proprietors) would like to see what is going on at the mills; but on the Coast everything is done in deep mystery. With cloudless weather, flat country and cheap labour, there is no reason why curing works should not be started nearer the planting districts especially, as we expect a railway soon. If we could dry our cherry on mats and send our coffee to the mills near by, to be peeled and despatched, I feel sure much expense would be saved, and curers would not be left in undisturbed quietness and profit-making. The west coast surely is more humid than towards the east. I myself cannot see the gain in sending the coffee so far out of our sight. Were the curing works brought nearer to us, then a local market would arise and brokers would be attracted; and these again would attract capitalists to invest in coffee property. Dried green coffee or strippings are universally *pounded* on the estate as pounding is so cheap. But how injurious is this pounding! A large percentage is broken by this crude and cruel method.

There is an idea here that, if you spread the parchment thinly the parchment cover will break. Fudge again. Surely it is injurious to allow the coffee to blister in the sun in very thick layers, for say, 14 days; whereas by a quicker method you have your heaps sweet and cool (if properly turned and in open ventilated sheds) with only five days' exposure to sun.

Heaping coffee in the sun or in close rooms without windows is very apt to taint the coffee.

If we could be sure that these curers gave their strict attention to the care of the coffee entrusted to their charge (for which they exact heavy costs) then things would be more satisfactory. But how much of this work is left to subordinates? There is no sample sent down by post as in Ceylon; and men use new bags *turned inside out* to keep the bag clean for home despatch and send the coffee off with the *sewing outside*. Then each bag is carefully *sealed!* What is the good of locking the door of a room with the window left open? Surely it would pay to keep a stock of bags for country use, and send the coffee home in bran new bags. Still better would it be if casks (as in Ceylon) charred in the inside were always used.

A Ceylon planter when visiting his neighbour during crop looked at the *sample of parchment* and commented thereon. Here youngsters of a few years' experience discant learnedly on the proper weight to dry down to. They rub up a handful of parchment and examine the colour with a knowing look when really a planter who has proper appliances should not look inside at all, but be satisfied with colour of his parchment. Some day I must visit the curing works at the Coast, and I will send you the result of "a chiel's" notes.

ABERDONENSIS.

THE COFFEE INDUSTRY,

We have all heard the old saying about giving a dog a bad name, and the consequences that would be likely to ensue. The name may be given without any reason, and the application is very general. For instance, several industries in India have had a bad name given to them, and people are told to keep clear of them. The industries may be sound, and such as would pay, and pay well, in any other country; but here we are told they are unprofitable. The fault in most cases lies in the way they are

* The principal reason: drying and packing complete were tried in Dumbara and Hantane, but even there was not considered an economical success.—ED.

taken in hand, and not in the undertakings themselves The latter may be everything that may be desired; the former may be all wrong. We have been told, over and over again, that gold mining in India will not pay; that there is gold, but that the cost of working will more than eat up the money obtained from the sale of the precious metal, and that only millionaires who can afford to lose money should engage in the industry. Those who express this view of the case think only of the reckless manner that companies went to work some years ago. Fine houses were built for the Superintendents, costly machinery was brought out, and everything was conducted on a most extravagant scale. The result might have been seen from the beginning—the ruin of many of the shareholders, and the collapse of the whole undertaking. If gold could be dug up in the same way as potatoes, it might be made to cost more than it could be sold for. But, when economically worked, there is no reason why the gold industry should not pay. The shareholders have learnt a lesson from previous failures, and they are doing now what they ought to have done before—working the mines in a sensible manner. Gold has not yet had a fair trial in this country, and it cannot be declared a failure till it has. In the next place, we have the coffee industry, and we are often told that it has gone to the dogs, wherever the abode of those animals may be. We are, however, of a different opinion, and believe that the industry, if properly taken in hand, will pay and pay well. The price of the berry is going up. and, in a short time, it may touch a hundred rupees. We will not undertake to say that the large fortunes; that were made in former years can be made now but we hold—and with reason—that a fair amount can be obtained from the cultivation of the coffee-plant. If we ask the reason why so many have failed who went into the industry, we shall be told that leaf-disease, the borer, low prices, &c., have been the cause of the mischief, and we are willing to make all allowance for them. But we must not stop here. There are other causes, and we will give them. In the first place, men often engage in the industry who cannot tell a coffee tree from a rose bush, they and their friends are of opinion that no special knowledge is required; that a man has only to take up a piece of land, plant the trees, and enjoy the proceeds of the undertaking. Sir M. E. Grant Duff in his "Review Minute" gives an instance of the way young men "go into" coffee, and we have heard of many cases like it. It is hardly the correct thing to lay the blame on coffee when the fault lies in altogether another direction. Then, again, men commence coffee-planting without capital, or with very little, and the interest on the capital eats up the whole profit. Sooner or latter such men come to grief, and the blame is laid on the industry—very erroneously, it must be said. Capital is required in this industry as well as in others; it is also required that it should be judiciously employed, and if these two necessary conditions are neglected, it is unreasonable to expect that coffee-planting should pay. No other industry would pay under the circumstances, and yet people wonder that planters—or rather so-called planters—fail. But we have not yet come to the end of the list of the evils that are adverse to coffee. Some of the planters are absentees. As soon as they have raised a good crop they take a trip to England, and there spend the money that they ought to have laid out on their estates. They have to leave their estates in the charge of others, and when they return they find them much in the same state as Solomon described the garden of the sluggard—the weeds higher than the trees, and the whole having a most dilapidated, out-at-elbow appearance. It is well known by all engaged in coffee that an estate requires the most attention the year after a good crop has been raised, and the neglect of this has been the ruin of many a planter. Then, again, the owners of estates—or some of them—too often leaves them in charge of overseers, while they enjoy themselves at the nearest large station. We have heard it said that the Ootacamund Club ahs had more to do with getting coffee in the Nilgiris a bad name than the leaf-disease; and though there is exaggeration in this, it is not without truth. The estates are left during the absence of the owners in the charge of those who, too often, neglect them. When the master is away enjoying himself, the servant see, no reason why he should not follow suit, and this he does to the detriment of the property. Till these mistakes have been remedied, it is wrong to talk so much about the failure of coffee. The old planters lived in a very different style from their successors, and they succeeded and did not complain. Their houses were not the palatial edifices that are to be found here, and there in the planting districts, neither did they think it their duty to be always running home. They lived in the plainest style; dressed in the homeliest manner, and the consequence was—they made money. If the planters of the present day were to follow their example their rupees would be more and their complaints less.—*Madras Standard.*

ALOE FIBRE ROPE.—We have been shown a sample of rope made by hand from the fibre of the ordinary aloe. The rope appears to be very strong and close, much more close than rope made from the fibre of the New Zealand flax. If rope of equal quality to that shown us can be turned out in any quantity, there should be another enterprise open to those who wish to see colonial produce utilised.—*Natal Witness.*

RINGING FRUIT TREES.—The effect of ringing fruit trees is a question of the flow and return of the sap. If the branch is ringed below the fruit spur, the result will be that the fruit will attain extraordinary size, and that the ripening will be accelerated. Some of the peach growers at Montreuil, near Paris, have practised ringing for some years; but they do not publish their secrets.—T. FRANCIS RIVERS (Sawbridgworth).—*Field.*

COCONUT OIL.—Veyangoda, 7th January, 1887.—My idea always was that the chief cause of the disparity in price between Ceylon and Cochin Oil was in the colour. I remember reading years ago in the pages of the *Observer*, that some one interested in Oil did enquire personally as to the low price his Oil fetched, and was told that it was owing to its colour. All that could be done in the Colombo Mills with the wretchedly discoloured Copperah they press, is to clarify it. The colour of the Oil they cannot change. The remedy is in the hands of the Mill-owners. If they make a stand against purchasing discoloured Copperah, or pay, as a discouragement to careless manufacture, low prices for it, it will be to the interest of the Natives to bestow more care in drying their Coconuts. The Mill-owners might also press clean and dirty Copperah separately and classify their oil. If better prices were obtainable for clear Copperah, Estate proprietors and lessees of large Estates will devise means to dry their Coconuts, even in wet weather, without contact with fire and smoke. As it is, they sell their crops to regular dealers, who, even in the best weather, resort to fires under lathed platforms to dry the nuts, owing to a belief they have that smoke and fire-dried Copperah is heavier than that dried in the sun, and because the more tardy and expensive process of sun-drying does not give them appreciably better prices. If such a delicate article as Tea is dried by heated air from a furnace, it will not require much inventive skill in Coconut planters, to devise a sheet iron room with a furnace underneath to dry their nuts; but, as I said before, there is no inducement for it. It pays better to sell our nuts on the spot. There is a great deal in your surmise that the Oil from immature nuts may account for paucity of stearine. It is notorious that small landholders do not wait till their nuts are mature to pick them. One reason is that if they do, thieves will be before them. I wonder whether, if Sir Arthur Gordon receives as many petitions from owners of Coconut land as he said he received from owners of Arecanut plantations, to protect their produce, he will next year insert Coconuts amongst the other products, in the clause, to possess which is an offence!—Local "Examiner."

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, December 16th, 1886.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 a £7 5s
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	3d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s 1d
per lb. and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 4d
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	7½d a 1s 8d
2nds	,, ,, ,, ,,	7d a 1s 5d
3rds	,, ,, ,, ,,	6½d a 1s 1d
4ths	Woody and hard	5½d a 11d
Chips	Fair to fine plant	2½d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	75s 6d a 82s
	Medium	70s a 74s
	Triage to ordinary	50s a 65s
COFFEE Ceylon Plantation	Bold to fine bold colory	88s a 100s
per cwt.	Middling to fine mid.	78s a 86s
	Low mid. and Low grown	75s a 78s
	Smalls	66s a 75s
,, Native	Good ordinary	95s a 72s
Liberian	Small to bold	55s a 62s 6d
East Indian	Bold to fine bold	90s a 110s
	Medium to fine	73s a 88s
	Small	68s a 70s
Native [per ton	Good to fine ordinary	65s a 72s
COIRROPE, Ceylon & Cochin	Mid. coarse to finest raight	£5 a £17
FIBRE, Brush, per ton	Ord. to fine long straight	£10 a £35
Stuffing	Coarse to fine	£8 a £17
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £32
Do [cwt	Roping fair to good	£13 a £15
COLOMBO ROOT, sifted ℔	Middling wormy to fine	10s a 28s
CROTON SEEDS, sifted	Fair to fine fresh	23s a 35s
GINGER, Cochin, Cut	Good to fine bold	80s a 90s
per cwt. ,,	Small and medium	38s a 60s
Rough	Fair to good bold	30s a 55s
,,	Small	22s 6d a 29s 6d
GUM ARABIC, Madras	Dark to good pale	20s a 70s
NUX VOMICA, per cwt.	Fair to fine bold fresh	7s a 11s
	Small ordinary and fair	3s a 6s
MYRABOLANES, pale, per cwt.	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	5s 9d a 6s 3d
Pickings	Burnt and defective	3s 3d a 4s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	1d a 1d
LEMON GRASS ,,	,, ,, ,,	1½d a 1¾d
ORCHELLA WEED [℔ lb	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk, sifted	Fair to bold heavy	8¼d a 8¾d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	9s a 14s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	6s a 11s
Dust	Ordinary to fine bright	8s a 10s
RED WOOD, per ton.	Fair and fine bold	£5
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £44
Do. chips	Inferior to fine	£5 10s a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	8d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2½d a 4½d
TURMERIC, Madras, ℔ cwt	Finger fair to fine bold	11s a 12s
Do.	Mixed middling [bright	10s a 10s 6d
Do.	Bulbs whole	8s a 9s 6d
Cochin	Do split	6s 3d a 7s 3d
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 28s
2nds	Foxy & reddish 5 a 8 ,,	10s a 16s
3rds	Lean & dry to middling under 6 inches	7s a 12s
4th	Low, foxy, inferior and [pickings	1s a 8

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTTIAONS.
ALOES, Socotrine and per cwt. Hepatic	Good and fine dry	£8 10s a £8 s10
	Common and good	£4 a £7 10s
HILLIES, Zanzibar per cwt.	Good to fine bright	30s a 31s
	Ordinary and middling	25s a 29s
LLOYES, Zanzibar and Penang, per lb.	Good and fine bright	11½d a 12½d
	Common dull to p air	1[illegible] a 11½d
,, Stems	,, fresh	2½d a 3d
COCULI'S INDICUS	Fair	12s 6d
GALLS, Bussorah & Turkey ℔ cwt.	Fair to fine dark blue	59s a 65s
	Good white and green	48s a 51s 6d
GUM AMMONIACUM per cwt.	Blocky to fine clean	15s a 34s
AMMI, washed, ℔ cwt.	Picked fine pale in sorts,	£13 10 a £14 10
	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£ 7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden per cwt.	Sorts	65s a £5 12s 6d
Ghatti	Fair to fine pale	38s a 85s
Amrad cha	Good and fine pale	80s a £6
	Reddish clean	31s a 68s
ASSAFŒTIDA, per cwt.	Clean fair to fine	35s a 40s
	Slightly stony and foul	25s a 30s
KINO, per cwt.	Fair to fine bright	35s a 40s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 97s 6d
OLIBANUM, drop per cwt. ,,	Fair to fine white	45s a 55s
pickings	Middling to middling	32s a 44s
siftings	Middling to good pale	38 6d a 11s
INDIARUBBER Mozambique, Ball & sausage	red hard	11s a 13s 6d
	white softish	2s 2d a 2s 4d
	Ball & sausage	1s 9d a 2s
	unripe root	10d a 1s 1d
	liver	1s 8½d a 2s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz.	Nearly water white	3¾ a 4¼d
2nds ,,	Fair and good pale	2¾d a 3d
3rds ,,	Brown and brownish	2¾d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 3d a 2s 6¾d
	Fair to good black	1s 8d a 2s 1d
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	23s a 29s
,, Natal	Common & middling soft	8s a 22s
	Fair to fine	25s a30s
ARROWROOT Natal per lb	Middling to fine	3½ a 4¼d

FROM [illegible] JAPAN & THE [illegible] ISLANDS.		
CAMPHO[illegible] ℔ cwt.	Good, pure, & dry white	63s a 65s 6d
[illegible] ,, ,, pink		
GAMBIER, Cubes, cwt.	Ordinary to fine free	32s a 33s
	Pressed	29s a 30s
Block per lb.	Good	20s a 20s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a3s 3d
Sumatra	Barky to fair	[sar 6d a 2s3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 5d
NUTMEGS, large, per lb	61's a 80's, garbled	2s 5d a 3s 6d
Medium	85's a 95's	2s 1d a 2s 4d
Small	100's a 160's	1s 4d a 2s
MACE, per lb.	Pale reddish to pale	1s 9d a 2s 10d
	Ordinary to red	1s 4d a 1s 6d
	Chips	1s 2d a 1s 3d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 1d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	12s 6d a 14s 6d
medium	,, ,, ,,	11s 6d a 12s 6d
small	,, ,, ,,	10s a 12
Flour per lb.	Good pinky to white	8s a 9s
TAPIOCA, Penang Flake	Fair to fine	1¾d a 2¼d
Singapore	,, ,,	1¾d a 2¼d
Flour	,, ,,	1¼a 1½d
Pearl	Bullets, per cwt.	20s a 21s
	Medium ,,	18s 19s
	Seed ,,	18s 6d a 19s 6d

NEW PRODUCTS IN OLD CEYLON DISTRICTS:

Cacao—Coffee—Croton-Oil—Tobacco.

"Better late than never," and now that the accumulation of arrears created by holiday-making in a busy office is in a fair way to be cleared off, we may give the continuation of our story of a very brief visit to some of the old Kandy districts and what we saw of new products. The Pangwella or Watagama district is a comparatively modern planting division, the nucleus of cultivation being in olden days part of the Hunasgiriya district. Mr. Holloway may fairly claim credit as the pioneer of a group of new plantations and of new products in this direction, and, though like all other experiments here and in other parts of the country, there have been ups and downs, still enough remains with a substantial show of prosperity, to warrant a good degree of pioneering pride. We have but a look at some of the plantations in passing, seeing a little more however of "Maria," and there the appearance and the crop on the cacao fields amply justify congratulations to Mr. Rowland Boustead. Cacao everywhere in the district is doing well this season, and we are sanguine that proprietors of "cacao walks" or gardens in sheltered situations and on good average soil, and where the trees are from seven years old and upwards, have now got over their difficulties and may henceforth feel that they have plantation property as free from risk almost as coconuts. In Dutch Guiana an old cacao planter has written that no cultivation has been more troublesome, variable or uncertain than cacao up to the tenth year; but, after that, there need be nothing to do but to gather the crops, and provide such cultivation as can be afforded, for a hundred years! Lucky proprietors of cacao walks in Guiana, and, we believe we may add, in "Ceylon."

But before leaving Pangwella district, we may refer to one or two other articles of experimental cultivation, such as rubber, with which much has not yet been done; and the croton-oil seed plant regarding which there was the extraordinary development of caterpillars by millions some months ago—these leaving every tree leafless. This enemy has now again completely disappeared and the trees are green and flourishing as ever; but in answer to our enquiry as to information respecting the cultivation of the shrub, a Haputale planter who, we imagine, was the first to give this "new product" a start, writes discouragingly as follows:—

In reply to yours *re* croton-oil-seed, what good can it possibly do my trying to give instructions in the cultivation of a product already almost overdone? The market is already showing signs of being overstocked and unless other uses are found for the oil, the sooner we begin to root out our croton trees the better. What do you think of this for a fall in price of the product? In October 1884 9 cwt. sold for 82s per cwt. in London. In October last 21 cwt. 2 lb. sold at 33s per cwt., and if you deduct say 23 per cent for discount and charges Colombo to London, say 25s 2d per cwt. nett. Ceylon has evidently quite enough acreage under crotons. In September 1883 my first despatch was:—

	lb.		cwt.	qr.	lb.
	601	equal to	5	1	13
During 1884 despatched	1,971	,,	17	2	11
,, 1885 ,,	10,616	,,	94	3	4
,, 1886 to date	15,630	,,	139	2	6

Pangwella planters will not, therefore, make their fortunes from croton-oil seed trees; but with limited cultivation there may be times still when a crop of seed will find a very remunerative market.

But this is a small matter by the way, compared with the Cacao industry. It was in the Dumbara Valley and on the farfamed, extensive Pallekelle plantation that we had the opportunity of leisurely inspecting a large area under cacao. The Dumbara Valley with its rich soil and easy lay of land was naturally one of the first scenes of European planting in Ceylon. Indeed, long before the British annexed Kandyan territory, Dumbara was celebrated for its royal domains and gardens surrounding royal palaces. The lowest point of the Valley is 1,200 feet above sea-level, and cultivation runs up to 2,000 feet. The soil, alluvial mould largely impregnated with lime has always been regarded as amongst the richest in Ceylon and but for prolonged droughts would be among the most productive. This was, and is, true of coffee cultivation; but fortunately cacao, with its deep feeding roots and more robust habits (at least after attaining full growth) is much better fitted to stand drought than coffee; and there can be little doubt that Dumbara has now found the plantation product best suited to its climate, soil, lay of land and general conditions. Very curious have been the different experiences of shade and no-shade cultivation in Dumbara. At first all the coffee was planted under shade, or rather large trees such as "kekuna" and "jak" were cultivated to afford shade; but at the instance of the then youthful Mr. R. B. Tytler, fresh from the West Indies, at the beginning of the "Forties" all the big trees were rung and taken down and the west Indian system of open clearings was universally adopted. In the case of Cacao, the West Indian system is that of shade, not so much for protection from the sun as from wind and Mr. Tytler rightly began after the example he had seen in Trinidad; but after a time several Dumbara and other planters thought they would do better without shade in the case of cacao as in that of coffee. They very soon found their mistake, not only through the effects of exposure to wind, but through continuous attacks of *Helopeltis*. Very marked has been the change since the renewal and growth of shade trees in removing the bad effects of such enemies; and now Dumbara presents a scene of thoroughly healthy vigorous cultivation. Mr. Vollar has a good deal of coffee still intermixed with his cacao on Pallakelly, and it is found that in such fields the cacao prospers more than under the shade of large trees. But there are all varieties of cultivation, as well as many experiments in preparation, still being tried in Dumbara, where barbacue and store room are not only in full request for large crops of the dark red or brown pods, but also for thousands of bushels of our old staple coffee. For, Mr. Vollar has extensive clearings of young coffee (and cacao) of the most refreshingly vigorous appearance. Planted from Nakanaad (Mysore) seed—said to be fungus proof, although that was not the experience in some others of our districts—in Dumbara so far, there has been no trouble with enemies whether fungus or bug-insect, and the season having been an exceptionally favourable one for blossoms and fruiting, a handsome coffee crop was expected to be gathered—the fields in blossom being "a cure for sore eyes." Of cacao too the gathering was expected to equal 6 cwt. per acre over a large area. Cultivation is still kept up on a handsome scale on Pallekelly and well it may in view of the crops now being harvested. Stall-fed cattle for manure are kept in large numbers, and what with the work of providing a supply of water from a large artificial tank and a host of minor aqueducts, of supplying fuel in

another direction for a steam engine, of cultivation, crop gathering and preparing, this fine old Dumbara plantation we were glad to find, affords profitable employment to a far larger number of hands—both Tamils and Sinhalese—than we had at all anticipated. Blackman's Air Propeller—an American fruit evaporating machine—Mr. Vollar has found very useful in drying his cocoa. Squirrels at one time so damaging to cacao pods in Dumbara have now nearly disappeared. Rats do a little injury and wild pigs occasionally are troublesome; but on the whole with the absence of the dread *helopeltis*, the cacao planter has no enemy worth mentioning.

Nothing can be more pleasant and refreshing than an early morning walk, ride or drive on a Dumbara plantation. Pallakelly is so well roaded and has such variety of cultivation that a new and delightful sense of the reality of a good basis for planting prosperity in modern Ceylon, is speedily borne in upon the interested inspector. Pallekelly ought to be called the "Philadelphia" of Ceylon; for, the plan which William Penn adopted in laying out his Quaker City across the Atlantic of giving the names of trees to his streets—pine, maple, elm, spruce and so on—has been adopted with cheering effect on modern Pallekelly. In this way, we have the Satinwood avenue, this estate road being bordered with a row of flourishing satinwood trees; we have the Sapuwood tree avenue; and the Halmillille, Grevillea and Inga Saman avenues or roads, and no better distinguishing, interesting and let us trust profitable feature could be desired.

Of minor, but still very interesting cultivation, we have on Pallekelly, the most careful piece of Vanilla training we have yet seen in Ceylon and the crops of pods averaging £100 a year in value ought to be remunerative for what is really a bit of Garden culture. With Rubber not much has yet been done, but the wonderful growth of the Ceara trees (apart from their usefulness for shade)—some of them a few years old being 30 feet high, 4½ in circumference—with ready gatherings of more than ½ lb. of rubber per tree experimented on, afford encouragement to look for profit when systematic tapping can be effected. In a slack year with cocoa and coffee crops, attention could well be given to tapping the rubber with surplus labour. Again, 50 acres of comparatively waste ground put under Sapan ought, some years hence, in their supply of dyewood, to go far to make up for short crops when such may be experienced.

More interesting was it to learn of a systematic experiment in the culture of tobacco in the neighbourhood of Pallekelle. Dumbara has long been famous for its tobacco; but hitherto the culture of the plant has, we believe, been confined to natives. In this case, a piece of virgin forest land, 50 acres in extent, was cleared, prepared and planted with the greatest care, and the result in a crop of 20 tons of very fine silky leaf, valued at 2s 3d per lb. is regarded as very satisfactory—the more so as it is felt that the proper time to plant was not chosen. But tobacco is too exhausting a crop to be profitably cultivated continuously, even in Dumbara.

In conclusion we can only mention in one word the charming and almost unequalled mountain, woodland and river scenery enjoyed by the visitor to Dumbara. From an elevation of 1,600 feet (about the level of Kandy) at the Pallekelly bungalow—the same but much improved on good old "R. B. T.'s" almost historical residence—one of the finest panoramic views in Ceylon is obtainable, extending from Yakdessagala above Kurunegala, past the bold Ettapolla and Asgeriya summits, with Hunasgiriyakande and the Knuckles round by Rangalla and the Medamahanuwara Gap to the far south-east of Madulsima, if not of Badulla's Namunukulakanda itself. How the panorama is filled in with hill, dale, river, glistening paddy-field and wide-extending jungle, or shade-covered plantations, with all the wonderful effects of light and shade visible in an upland tropical valley, no words of ours could do justice in describing; and our object in this imperfect notice of a brief visit has not been to write about the scenery, but rather to show how New Products in Old Districts are laying a new and substantial foundation for an approaching and, let us trust, comparatively permanent era of Planting Prosperity in Ceylon.

NOTES FROM UVA:—COFFEE PLANTING.

Haputale, 5th January 1887.—After wishing yourselves and the "Old Rag" long life and prosperity, with the New Year and many happy returns of the season, I must apologise for my long silence and explain that I was engaged on a small job of planting a clearing *with coffee* near a village in the centre of the plains of Uva midway between this and Wilson's Bungalow, and not as from my having lost the nib of my pen, as a friend surmised, or because you sat upon me for my report of the Gamarala's murdering his wife in June last, which case I shall allude to further on under the head of crime in Uva and British justice as administered in our petty Courts by sucking Magistrates. You will see by the above that there are still believers in the old product "King coffee," and while some are planting tea and cinchona, as well as coffee, there are not a few of us who believe in the revival of the coffee enterprise in Uva, and some are turning their attention to a better system of cultivation, of doing more justice to the coffee shrub by pruning, handling and manuring, which necessary works for some years back have been much neglected, owing to the sad visitation of leaf-disease, financial difficulties, grub, bug and other pests, such as Medical Inspector's Registers, &c., but now with better prices for the fragrant bean ruling in the markets of the world, suddenly, believers in the permanence and paying returns of coffee cultivation, especially in Uva, are turning up, while others are deploring that they dug up and destroyed good young coffee fields to make room for tea, cinchona, &c. Others are actually opening their eyes to see that leaf-disease is not nearly so bad as it used to be, and that it does less harm to coffee in Uva year by year; in fact that leaf-disease is wearing itself out, and "a consummation devoutly to be wished;" it will soon be a thing of the past, and perhaps leave us for ever; or like the potato-disease and phyloxera on vines, rust on wheat, we will get so accustomed to it, and as "familiarity breeds contempt" we will take little or no notice of leaf-disease in the future and go on cultivating coffee "with a heart for any fate still achieving, still pursuing, learn to labour and to wait," not at the same time putting all our trust in the one product or like eggs in a basket making a head-long rush at T or D—T as some wag wrote that some planters were afflicted with. Green bug is another thing some young men of my acquaintance have got on the brain, and fancy it flying about with wings all over the estate up their nostrils in their hair and in their boots! I pity these young men, but they will get cured of this mania when they get older and are as familiar as I am with bugs of all kinds, village bugs, black bug, white bug, green bug, feted bug and jiggers of every variety. Green bug is the new mania and "cholera morbus;" that is to snuff out all the remaining coffee bushes in the Island according to some wiseacres, while few persons take any measures to rid the coffee of this pest: they simply close their eyes and wait for the inevitable death and extinction of the coffee tree; these gents however don't sell an old stager like

myself so familiar with black bug in the "Forties and Fifties," for like Paddy I meet them with the query, "Do you see any green in my eye?"

INDIAN TEA COMPANIES AND THEIR DIVIDENDS.

It is seldom that the financial papers have anything to say about tea and tea companies, we, therefore, quote the following from the *Financial News* on the subject:—"This has been an eventful year in the Indian tea trade: it has witnessed the lowest prices ever recorded in Mincing Lane, and has also known some of the very highest. While some favoured companies may retain and even improve on their average returns, the generality will fall behind. These different results are due to the extremely variable qualities of the teas offered. Specimens have been shown which were rarely equalled, but the bulk of the lots were thin and poor. The coming dividends of the Indian Tea Company will reflect the fluctuations which have taken place in Mincing Lane. Some of them will be unexpectedly good, while others are bound to be disappointing. Shareholders will await with anxiety the announcements which now begin to fall due and which will go on for five or six months to come. Several interim declarations have already been made. The Assam Company, which is understood to have been very fortunate with its sales, announced the other day a dividend of £1 per share, or at the rate of ten per cent for the half-year. Interim reports have also been issued to the shareholders of the Jokai, the Panitola and the Jhanzie companies, conveying the pleasant news that their usual ten per cent is to be maintained.

"These reports, in explaining the results of the year so far as known, show that the loss in price has been largely compensated by advantages in other directions. The Jokai crop has turned out 696,000 lb., an excess of 16,000 lb. over the manager's estimate. About one-half has already been sold at an average price of rather more than 12½d per lb. The gain from the increase of quantity is consequently over £800, and through the fall in exchange, a considerable saving will have been made in cost of production. It is a question if the whole of the loss in price will not be recouped from this source. In the Jokai and other well-managed gardens tea has been grown this season at a very much lower cost than would have been thought possible a few years ago. Not long since a shilling per lb. was considered the standard cost of tea delivered on board steamer at Calcutta. The pioneer planters would have been horrified at the thought of having to pay their way no less, but this year a good many of them will have run their gardens on not much over sixpence per lb. Well for them that they have been able to do so, for great quantities of Indian tea have been literally given away in Mincing Lane at 7d or 8d per lb.

"It is to be hoped that such another season will not be seen again for a long while. In fact, it would be difficult to conceive of such a convergence of adverse circumstances happening again. The teas came in very early, and in great quantities. They were thrown precipitately on a dull and weak market. In the first part of the season sales followed each other so rapidly that brokers had hardly time to taste half of the samples submitted to them. Many lots went through a merely nominal show of bidding, and the price received for them was no criterion whatever of their value. Within the past week or two the situation has in these respects greatly improved. The supply of tea has been more moderate, and the sales better regulated. At the same time low prices have had their natural effect on consumption. Last month the deliveries of Indian tea for the first time in the history of the trade exceeded those of China, and they are still going on in greatly increased volume.

"China tea, which has always been inferior to Indian in quality, had up to this year a great advantage over it in its lower price. It was always taken for granted in Mincing Lane, that China tea could be sold at 2d or 3d per lb. under Indian. Hence it was the standard article for the cheap grocers, who were able to put enormous quantities of it into consumption. But this season the relation of the two teas has been entirely reversed, India having been actually sold below China prices. Two very important effects may be expected from such a change. The importation of China tea will probably suffer a check, while the use of Indian tea in this country and in Europe generally will be extended. Low prices are therefore not without a redeeming feature; they have done, and are still doing, much to expand the market for Indian teas; they have reduced competition with China to a level where even Chinese cuteness cannot go much lower. Altogether 1886 will be a memorable year in the history of the tea trade. It ought to make a turning point in a long downhill course, and the next year should see the tea market tending in a different direction."

JOKAI (ASSAM) TEA COMPANY, LIMITED.

The following interim report of the directors, for season, 1886, has been issued:—Telegraphic advices received, report that the season had closed with a total crop of 696,000 lb. of tea, against the manager's estimate of 680,000 lb. costing within the estimated Indian expenditure of R244,000, as given in detail in the last annual report. The above information is subject to adjustment, eleven months being actuals and one month, December, being estimated. Of the season's crop, just over 300,000 lb. have been sold in Mincing Lane, averaging 1s 0·60d per lb. gross. The market for Indian teas has, during the greater portion of the year, been depressed for all except the finest grades, and the medium and common sorts are now selling at much lower rates than have ever before been known. These very low prices will, beyond doubt, lead to far greater consumption, and it is hoped consequent recovery of values within a reasonable time. The ascertained results of the season being so far satisfactory, the Board has resolved to pay the usual interim dividend of 5 per cent on the paid up capital of the Company, payable on the 20th inst.—*Home and Colonial Mail.*

THE PRODUCTION OF THE "SENEGAL" GUM ARABIC.—The "Senegal" gum of commerce is found in the territory of the tribes inhabiting several cases between the Senegal and the Atlantic Ocean; the largest forest gum trees are those of Sabel-el-Tatack and El-Hiebar; the former produce the white gum, which is most valued; the other the grey and red varieties. The acacia trees which grow in the desert are inferior to and have a more crooked appearance than those growing near the river, where the soil is more favourable for vegetation. The acacia of the desert rarely attains a height of more than 30 feet, and it has the shrivelled appearance which is peculiar to vegetation in these regions, which are exposed to strong winds. In Western Africa there are only two seasons, the rainy and the dry one. The nearer to the equator, the longer the duration of the rainy season. In Senegambia it lasts two months and is preceded and followed by a month of tempest. In November the bark of the gum trees cracks in numerous places and the gum exudes. About this time the hot winds begin to blow and the burnt trees lose their leaves, assuming the appearance they have with us during the winter. The gum dries quickly, outwardly it looks dull, but on breaking it is brilliant and shiny; it becomes very transparent if put into the mouth for an instant. About a month is required to make the tree produce its full crop. The natives then prepare for the gathering in, and the whole tribe, men, women, and children, some on foot, others on horseback, proceed to the forests. A camp is established for the duration of the crop, and all set to work. The gum collected is placed in sacks of tanned bullock hide, which are fastened by twos to the backs of camels and bullocks. The work is done slowly, there being no fear of rain; when finished, the whole tribe return, and proceed towards the banks of the Senegal, which are at a great distance from Fort Louis. The merchants come to Golam, a small

station situate about 1,000 kilometres from St. Louis on the Senegal, and there wait for the tribes and their crop of gum, which is generally paid for in printed calico, which the collectors resell in the interior.—*Chemist and Druggist.*

Mariawatte Tea Garden gave over the 1000 acres, 1,059 lb per acre from Jan. to Dec. 1886, we learn from Mr. Rutherford. This ought to re-assure sceptics in India about Ceylon tea continuing to yield heavy returns.

"An Inexhaustible Mine of Wealth."—Such is the term which has oftentimes been applied to the Pitch Lake of Trinidad; and although in the past the Government have made very little out of this natural product, it may be hoped in the future, now that the "ring" has been broken, that a very considerable revenue will be derived by the issue of licences "to dig." We learn from Trinidad that the royalty has been fixed at 2s 6d per ton, which is the sum named all through the legal proceedings. This figure ought to prove remunerative to all concerned. For the last four years the crude asphalte has been valued at 1*l* per ton, and the boiled (*epuree*) at exactly double, and it is curious to note that while the exports of the latter during the last three years have slightly increased, the figures being 4,863½, 6,562, and 6,371 tons respectively for the years 1883-84-85, the exports of the former have slightly decreased, being 34,277 tons for 1883, 33,383 tons for 1884, and 28,505 tons for 1885. Under the new regulations, however, there is every reason to anticipate that a very much larger trade will be done both in raw asphalte, *epuree*. West Indian Colonists have cause to be grateful for small mercies nowadays, and the opening up of the Trinidad Pitch Lake, which has hitherto only been looked upon simply as the island's chief natural curiosity is certainly a matter for general congratulation.—*Colonies and India.*

Coconuts.—Maha Oya Valley.—After seven months visited I this district and could see signs of improvement in almost every estate that I have known and visited for the last twenty years. I found the principal road from Negombo to Giriulla bridge at the latter end almost choked up with lantana growing on both sides, covering up the side drains and actually overtopping the fences of the estates bordering the road. I was surprized to learn that for the first time this year a gang of coolies have been busy clearing this road in this district; they are now busy about the 20th mile-post. Robbery and pillage seem to be making rapid advancement, a large brass bell and other valuables belonging to a Roman Catholic church having all been removed. Cattle stealing not so rife, but illicit sale of arrack and coconut stealing steadily progressing. What has astonished me most is to have witnessed the manner in which estates belonging to native proprietors are now kept, as compared with what was the practice say five years back. Without exception the estates are all in splendid order and the valley is well worth a visit from those who care to see coconut planting well done. I send you herewith the rainfall registered in one of the "crack" Maha Oya Valley coconut estates, belonging to a wealthy native gentleman. You can make any use of same. If necessary, I could most likely procure the registered quantity for last year as well. [Would certainly be interesting.—Ed.]

Registered rainfall in Mahaoya Valley for 1886 ending 10th December:—

January	...	3·41
February	...	2·53
March	...	1·26
April	...	8·95
May	...	10·78
June	...	15·15
July	...	4·54
August	...	2·86
September	...	3 55
October	...	12·53
November	...	10·90
December (1—10)	...	·71
Total	...	77·17

Andrew's Patent Metal Tea Chests.—The first break packed in these chests is now being despatched from Mariawatte estate. Tea planters will watch with interest the report from London brokers on these packages. We understand there are two kinds being sent: the full sized chests, of steel sheets lined with paper inside to prevent rust coming in contact with the tea; the half-chests are lead-coated steel sheets and require no inner lining. Taking into consideration that wooden boxes require lead linings, hoop iron, solder, and nails, and that there is a saving in freight of 15 per cent in favor of the steel boxes, we are not surprized to learn that the total cost of the steel sheet is slightly under the wooden package. Should they be approved by the trade and be preferred to the wooden leaden package, the patentee will have a "good thing" on his hands. He had the pleasure of seeing the packages being put together at Mariawatte, and although the men were quite new to the work, they were already fixing them up in an expert manner under contract at 12 cents per chest. The packages all tare exactly alike, and if they had no other advantage but this, it would alone make them more suitable than the present package.—Local "Times."

Cutting Rose Flowers.—Exhibitors of roses who cut daily are said to have the most continuous display of blooms on their plants. This should be good news for the inexperienced grower; there are many who are afraid of weakening their plants by cutting the flowers, but in practice this does not happen if the blooms are taken singly. If with the first flower that is cut several buds are also removed, the flowering season will be short. My own experience is that the more roses are cut, the better for those are left, and this applies to all classes of roses, whether grown under glass or in the open. I think cut roses for room decoration never look better than when displayed in the Munsted glasses, or glasses of a similar pattern. I like to have the glasses half filled with water, and then a layer of green moss as a bed for the flowers which, with sufficient leaves, is capable of making a very tasteful arrangement; but in whatever way the flowers are arranged, there should be a plentiful supply of their own foliage. Roses without leaves never look well, however much taste may be displayed in arranging them. Cheshunt Hybrid is deficient in richness of colour, but its delightful fragrance more than makes up for its lack of brightness. Under glass, we have it here every year in the middle of April very beautiful.—Taunton.—*Field.*

Testing Seeds.—When you want new seed Peas put one from the stock into your mouth and bite it. If it is very hard it is more than one year old. If the teeth enter it with moderate ease it is new seed. New Carrot seed always has a green shade on it. Old seed loses this, and is of a dead pale brown, and less fragrant. New Parsnip seed has a shade of green, which it loses if more than one year old. Onion seed is more difficult to prove than most other seeds, but if you take a single seed at a time and carefully bite it you will find that old seed has a tough dry skin, with a very white and harsh kernel, while new seed has a more tender, moist skin, and the kernel possesses a greater degree of moisture, and is somewhat oily. The seed may be cut with a penknife instead of bitten. Onion seed that has no vitality at all has no kernel, or one perfectly dry. Test this by pressing the seed on a piece of white writing-paper. If it leaves no moisture on the paper it is of no use, and has been tampered with, or has lost its vitality by age. New cabbage and Broccoli seed possesses a pale green shade in the kernel when pressed out or cut, and a tinge of green in the brown skin also. But old seed loses this in proportion to its age, becoming of a dull, dark brown. Cabbage, Broccoli, Kales, &c., will retain their vitality longer than any other seeds, and will grow well when three years old, or even six years, if well kept. Beet seed has a faint tinge of pale green if new, but is a dull brown if old, and its vitality is very doubtful if old. New Celery seed has a faint tinge of green, and is very aromatic, but it loses the green and becomes less fragrant if more than a year old, and is doubtful.—*American Horticulturist.*

SOME OF THE DRUG EXHIBITS AT THE COLONIAL AND INDIAN EXHIBITION.*

BY E. M. HOLMES, F. L. S.,

Curator of the Museum of the Pharmaceutical Society.

In the first place the quality of the products exhibited indicated that the requirements of the London drug market are not well understood in the colonies. I say advisedly the London drug market, because it is generally acknowledged that London is the principal market for drugs in the world. In the majority of cases drugs had been evidently collected with the least possible trouble and apparently in ignorance of the fact that the price realised will depend in great measure on the care bestowed in preparation for the market. Thus the bitter orange peel exhibited in the West Indian Court possessed neither the form nor colour required in the drug trade. Cinnamon was also shown from several colonies, which would not compare in flavour or appearance with that from Ceylon, with which it must compete if it is grown for the drug or spice market. Beeswax affords another instance in point. Although it is easily clarified there was hardly a clean specimen of good colour to be seen in the Exhibition.

In the second place, it was noticeable that the best and most important of the drugs exhibited were those prepared either by colonists who combined pharmaceutical and chemical knowledge with operative skill, or by analytical chemists in the employ of the Colonial Governments. I may instance the excellent samples of essential oils and various pharmaceutical products manufactured by Mr. Bosisto, of Victoria, and Mr. Sharp, of the Seychelles, both of whom are members of this Society; the very interesting preparations sent by Dr. Bancroft, of Queensland; and the fine series of pharmaceutical products of essential oils from Mr. Staiger, of the same colony, from Mr. McCarthy, of Trinidad, Mr. J. J. Bowrey, of Jamaica, and Mr. F. Bert, of Barbadoes, all of whom are analytical chemists.

In the third place, an ignorance of the physical appearance by which drugs are distinguished was evident from the fact that several drugs were exhibited under erroneous names. Thus the ipecacuanha shown in the West Indian Court was not the true drug, but that of *Asclepias curassavica*, which is locally used under that name. The sarsaparilla exhibited in several of the West Indian Courts was the root of *Bromelia Karatas*, although the true drug was shown in the Honduras and Barbadoes Court. This want of accurate knowledge in the colonists has probably often to be deplored by the drug merchants and brokers in this country, to whom such drugs are consigned for sale.

In the fourth place it seems remarkable that a large number of colonial products which could be obtained in almost unlimited quantity, are practically unknown in commerce in this country. Thus the oil of the purging nut, and even the seed itself, does not appear to be known here, although about 300,000 bushels of the seed are annually sent from the Cape de Verde Islands to Portugal for the expression of the oil. Crab-nut oil, which thirty-five years ago was awarded a prize medal at the International Exhibition, and which could be procured in almost unlimited quantity from both British Guiana and West Africa, is not yet an imported article of trade in this country, and many other instances could be adduced. These facts suggest the importance to the colonies of employing thoroughly competent chemists, possessing not merely a knowledge of applied chemistry, but a familiarity with the appearance and character of ordinary commercial products, whose business it should be to investigate and report on the native productions in such papers or publications as come under the cognizance of commercial men.

The lack of knowledge in the colonies of the requirements of the home markets and the absence of information in this country concerning valuable colonial products indicate the necessity for a central building in London and other large commercial towns where samples of colonial products sufficiently large for examination and experiment could be obtained, together with all published information concerning them. Such an institution, containing series of samples from different colonies, would prove doubly instructive: in the first place by showing whence the finest qualities of any product could be most easily and cheaply obtained; and, secondly, as an educational department in commercial knowledge for intending emigrants to the colonies.

I will now pass on to notice some of the drugs exhibited at the Colonial and Indian Exhibition. For our present purpose these may be grouped under the following heads:—Medicinial drugs, medicinal species, essential oils and camphor, fixed oils and fats, gums, resins, and saccharine substances.

Of the official medicinal drugs, *i.e.*, those recognized in the British Pharmacopœia, the following possessed of tonic or febrifuge properties were shown, viz, cinchona, nux vomica, quassia, hops, bitter orange peel, chirata, cascarilla, and bebeeru.

The most important exhibits of cinchona bark occurred in the India, Ceylon, and Jamica Courts; the principal barks shown being those of *C. Ledgeriana*, *C. robusta*, *C. officinalis*, *C. Calisaya*, and *C. succirubra*. The last-named was also exhibited from the Mauritus, Perak and Fiji.

By far the larger proportion of cinchona bark is purchased for the manufacture of quinine, and as each bale is usually analysed before being sold the appearance of the bark is to the quinine manufacturer but of little consequence. To the pharamacist, however, it is of importance to be able to distinguish between the different varieties by their physical appearance, since one variety of bark is sometimes prescribed in preference to another. Lately a great quantity of cinchona bark in the form of shavings has been sent to this country, which it would be almost impossible to refer to any particular species. Fine bold quills for druggists' purposes often fetch a higher price in the market than they are intrinsically worth, *i. e.*, judged by the percentage of crystalline sulphate of quinine they afford. In view of this fact, and of the low price at present paid for cinchona bark, a careful selection of well-marked varieties might prove as advantageous to the planter as it would be welcome to the pharmacist. The barks most suitable for this purpose are the Calisaya bark from Madras, which presents the same characteristic appearance as the cultivated Bolivian bark, viz, a predominance of longitudinal fissures, with comparatively few nearly circular transverse cracks; the variety of *C. officinalis*, known as *C. crispa*, which yields a peculiarly corky bark of good quality, and which is thus easily recognized from other varieties; and the red bark of India and Ceylon, having a peculiar warty appearance. But on the other hand the hybrids between *C. officinalis* and *C. succirubra* cultivated in Ceylon and elsewhere, and the variety of red bark chiefly grown in Jamaica, are by no means easily recognized. Renewed bark and shavings are still more difficult to assign to their respective species. These are therefore less suitable for the use of the pharmacist.

Nux vomica seeds were shown from Trinidad and Ceylon. It may be interesting to exporters of these seeds to direct attention to the fact lately demonstrated by Messrs. Dunstan and Short (*Pharm. Journ.*, [3], xv., p. 6), that the seeds grown in Ceylon are much richer in strychnine than those either of Bombay, Madras or Cochin China, and that as the principal use of these seeds is for the preparation of strychnine the Ceylon variety would best repay cultivation.

The specimens of quassia exhibited in the Tobago and British Guiana Courts were derived from *Quassia amara*, and not from the official tree, *Picræna excelsa*.

The hops exhibited in the Canadian Court were of very good colour and aroma, and the specimen in the New Zealand Court was of fairly good quality. Bitter orange peel, which was exhibited by several colonies, was badly dried, and consisted of quarter sections, instead of carefully dried strips of good

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, November, 17th, 1886.

colour as sold in this country. Chirata, bebeeru and cascarilla did not present any feature worthy of special notice, except that the latter was shown in very slender quills, as if derived from the twigs or small branches only.

Of sedative or anodyne medicinal drugs the following were exhibited:—Opium and poppyheads, coca leaves, Indian hemp and aconite. With these Calabar beans may be classed for the sake of convenience. Opium was, of course, well represented in the Indian Court, but elsewhere was observed only in the Victoria Court, where excellent specimens were exhibited by Mr. Bosisto. These have been shown by analysis to yield 10 per cent of morphine in the crude state, and 11½ per cent when dried. The Victorian-grown opium is protected by a duty of 20s. per pound on imported opium, but the quantity produced in the colony is not at present sufficient to meet the local demand for it. Indeed it appears doubtful, owing to the high price of labour in the colony, whether it could be produced at a sufficiently low price to compete with Turkish opium. It is a suggestive fact that the great bulk of the official or medicinal opium used in the world is supplied by Turkey, although there can be little doubt that opium of quite as good quality could be prepared in India. As at present made in the latter country opium usually contains more narcotine and morphine than Turkish opium. This may be due to the tedious process of preparation of the drug for the Chinese market, or to the particular variety of poppy employed (var. γ *album*) which differs from that used in Turkey (β *glabrum*). In view of the immense increase of opium production in China during the last few years, and the probable growth of a taste for the home-made article in that country, the suggestion naturally occurs, whether the preparation of medicinal opium in India might not yield an important addition to the revenue of that country, and at the same time, render this country independent of the Turkish product.

The poppy heads exhibited in the Victoria Court were born on stems more than six feet in height, which shows the luxuriance with which the plant grows in that colony.

Coca leaves were exhibited from Jamaica and Dominica, but as yet are probably grown there only as an experiment. The alkaloid contained in the leaves so readily undergoes decomposition that the greatest care will be necessary in drying and preserving the leaves, if they are intended to compete with the South American drug as recently imported.

Aconite root and *Cannabis indica* were exhibited only from India. Concerning the latter it is important to note that the strength of the drug appears to vary greatly, according to the district in which it grows. According to Dr. Watt, the flowering tops which are more or less cylindrical are possessed of much greater medicinal activity, and fetch a considerably higher price in India, than those which are simply compressed. The tincture made from the former is likely to produce alarming symptoms if given in the same dose as that prepared from the latter. This difference does not appear to be recognized in the British Pharmacopœia.

The aconite root did not appear to be sufficiently uniform in character for use in medicine in this country, although some good specimens from Nepal, collected by Dr. Grimblett, were exhibited.

Fine specimens of Calabar bean were shown in the Ceylon Court and also from Lagos and Gambia. It may be here pointed out that a variety of this bean which contained more alkaloid than the ordinary kind was imported into England a few years ago. It was more oblong in shape and had a longer hilum or scar. In the case of many drugs, and especially poisonous drugs of which a limited quantity is used, the market is often spoiled, so far as the interests of the colonies are concerned, by an over supply being sent at one time, so that the prices realized hardly pay for collection, or may even entail a loss.

Of purgative drugs, aloes, jalap, *Cassia Fistula* and senna were exhibited. Aloes was very poorly represented, a solitary gourd of Barbadoes aloes, apparently of inferior quality, being shown in that Court, while in those of Natal and the Cape of Good Hope no specimens were noticeable. It may be here mentioned that the botanical source of the opaque aloes known in commerce as "Natal" or "Hepatic Cape" has not been accurately determined and that the cause of its opacity is also unknown. Barbadoes or Curaçoa aloes is sometimes translucent at first and becomes opaque on keeping, but there is no evidence that this is the case with Natal aloes. Fine pods of the *Cassia Fistula* were shown in the St. Lucia Court. Senna leaves were shown in the India Court and in that of the Cape of Good Hope. That from the Cape had been collected in the Hopetown district, where the plant is exceedingly abundant. The leaves appeared to be those of *Cassia obovata*, a species the leaves of which were formerly mixed with those of *C. acutifolia* in Alexandrian senna, but are now rarely found in it. This kind of senna is stated to be less active than the leaflets of *C. acutifolia* and *C. angustifolia*. Some very large leaflets from plants cultivated at Barcelona were offered in the London market a year or two since and some has this year been sent from Tinnevelly, but neither, I believe, were purchased; nevertheless, comparative experiments concerning the relative strength of these species might be useful to confirm or otherwise previous statements; in any case it might serve as a substitute for senna at the Cape. Indian bael is intermediate in character between the purgatives and astringents and may be mentioned here as occurring in the Indian Court. The fresh fruit has so delicate and pleasant a flavour that a conserve or syrup of the fruit might possibly meet with acceptance as a laxative in this country.

Of astringent official drugs there were exhibited catechu, kino, logwood, galls, and arecanuts.

Pale catechu was shown in the Straits Settlements Court in two or three forms, viz., in large and small cubical pieces and in the form of flattened discs; the latter were of a pale colour and intended for chewing with betel nut. In this connection it may be useful to recall the fact noticed by Dr. Haygarth Addison that pale catechu produces a tonic effect on the nervous system entirely apart from its astringent action (*Pharm. Journ.*, [3,] xvi., p. 720.) It has not yet been determined whether this action is due to quercetin or to catechin, or to some other constituent of the drug. Kino was represented by several different preparations. The official drug was exhibited only in the Indian Court. From the Seychelles an elegant product obtained from *Pterocarpus indicus* was shown by Dr. Brooks, and in the Victoria Court Mr. Bosisto exhibited an Australian kino, entirely and readily soluble in cold water, side by side with the crude insoluble product obtained from the red gum tree, *E. rostrata*. In the Queensland Court several products of the kino class obtained from various species of eucalyptus were shown by Dr. Bancroft; of these I have been unable to obtain specimens from the Executive Commissioner.

It is remarkable that the original kino, which is a product of gambier and which affords a satisfactory tincture, is not represented in the West African Court, although the tree that yields it (*Pterocarpus erinaceus*, Poir.) is a native of West Africa, from Senegambia to Angola. A product intermediate in character between kino and catechu was shown by Mr. Bosisto in the Victoria Court. It resembled kino in appearance, but was styled Australian catechu. It was an extract made from the waste chips of wattle bark, and could doubtless be made on a scale sufficiently large for tanning purposes if required.

Logwood may be noticed under the head of astringents, being used in medicine for that purpose. It is of interest also on account of its use for staining microscopical preparations. It does not appear to be generally known that microscopists distinguish different varieties of logwood, one of which gives a bluish and another a purplish-red stain; whether thisdue is

to inherent differences in the wood or to more or less exposure to light and air is not clear. It appears, however, from the Official Catalogue of British Honduras that there are two varieties of the tree, of which the broad-leaved one is considered the most valuable, on account of the solidity of the timber and of its yielding a larger quantity of the dye, whilst the smaller-leaved tree is said to yield the better quality. Specimens from Jamaica, British Honduras, Dominica and Tobago are shown in the Exhibition. The varieties recognized in the London market are, I believe, the following, which are here placed according to their relative values:—Campeachy, Honduras, St. Domingo and Jamaica.

Galls and arecanuts were shown in variety in the Indian Court. Of the former I may observe in passing, that the galls of the *Tamarix articulata* and of *Terminalia Chebula* appear likely to prove of considerable value for tanning purposes, on account of the richness in tannic acid and the pale colour of their extract. Pomegranate bark was shown in the Jamaica Court, of a quality much superior to that ordinarily met with in commerce.

Of demulcent medicinal drugs, linseed is the most important, and was shown in great variety in the Indian Court. It is worthy of note that the cultivation has commenced in Canada, and that samples were exhibited in the Court of that colony. Hitherto nearly the whole, if not all the linseed used for flax growing has been derived from Russian-ports, the product of a cold climate being apparently more suitable for growing purposes. It may be hoped that Canadian linseed, or that from the northern parts of India, will in future years replace that of Russia for this purpose. Indian linseed frequently contains numerous seeds of cruciferous weeds, particulary of species of *Brassica*, which by reason of their containing a sweet or non-drying oil render the linseed oil obtained by pressure of a less drying character, and therefore of less value commercially. The only other official drug conveniently referable to this class, worthy of notice, is buchu, concerning which it may be observed that certain varieties of these leaves, which are more highly esteemed to the Cape of Good Hope than those official in the British Pharmacopœia are frequently sent to this country to the loss both of the shipper and of the consignee. Such varieties are always rejected by English druggists.

Of alternative drugs sarsaparilla was exhibited from British Honduras and Jamaica. The latter, however, was not the article known in commerce as Jamaica sarsaparilla (which really comes from Panama,) but resembled the Honduras sort in having a thick and mealy bark, while it differed from it in the orange-red colour of the bark. The Panama drug, which fetches the highest price in the market, and is the most esteemed, has a thin wrinkled brownish bark.

The sarsaparilla exhibited by the other West Indian colonies was the root of *Bromelia Karatas*, and would not be recognized in this country as sarsaparilla.

Several colonial remedies that have recently been introduced into Europe and America were shown in various Courts. The pretty scarlet and black seeds of *Abrus precatorius* formed a conspicuous object in several of the West Indian Courts and also in that of British Guiana. *Alstonia constricta* bark, *Duboisia* and *Euphorbia pilulifera* were shown in the Queensland Court, *Piscidia erythrina* in the Jamaica, and papaine in the Seychelles and Dominica exhibits.

With respect to the non-official medicinal products of the Exhibition it is possible to regard them from two points of view: the one being that of Colonial Governments, which are naturally anxious to obtain indigenous substitutes of equal value for expensive drugs imported from the mother country; the other is that of the pharmacists of Europe and America who may be desirous of ascertaining if any of the colonial drugs possess medicinal properties which are worthy of careful investigation or are superior in quality or value to others at present in use. The latter point of view is the only one which falls within my province to-night, the former may safely be left to the medical profession in the colonies.

The following list includes the colonial drugs which were accompanied by statements indicating that they possess medicinal properties worthy of closer investigation both by the chemist and the medical profession.

As an alterative *Siegesbeckia orientalis* is highly recommended by Dr. Daruty, of Mauritius, in infantile cachexia and as an application to gangrenous wounds. The active principle, darutyne, was shown in the Mauritius Court. The root of *Arctopus echinatus* has long been used at the Cape of Good Hope for cutaneous eruptions; *Rourea fulgens* is used for leprosy in the Straits Settlements, and lukrubau seeds at Hong Kong. For skin diseases, henna leaves are employed in the Straits Settlements and henna seeds in Gambia, and the bark of *Acacia falcata* in New South Wales, and *Melianthus major* at the Cape. For ringworm the yellow juice of *Haronga madagascariensis* is employed in the Mauritius, and that of *Bocconia frutescens* in Jamaica, and the sap of *Laplacea Hæmatoxylon* in St. Vincent; also the leaves of *Cassia alata* in India, and the seeds of *Vatairea guianensis* in British Guiana.

For asthma *Gymphocarpus fruticosus* and *Gleichenia dichotoma* are used in the Mauritius, and *Euphorbia maculata* in St. Vincent. *Atherosperma moschatum* is highly spoken of by Mr. Bosisto as giving relief in asthma and bronchitis and *Phytolacca stricta* is used at the Cape for pulmonary diseases.

As antiperiodics the bark of *Michelia Champaca* is used in Mauritius, *Thevetia Neriifolia* in the Straits Settlements, and proteacin, prepared from a species of *Leucadendron*, at the Cape, the latter drug being recommended by Dr. J. H. Meiring Beck. As a tonic in flatulent indigestion boiari root seems to find general acceptance in British Guiana.

As anthelmintics, *Quisqualis indica* is used in Mauritius, and *Leucas linifolia*, in the Straits Settlements.

As resolvents, *Coleus atropurpureus* and *Plumbago rosea* are employed in the Straits Settlements.

As nervine tonics, *Eryngium fœtidum* is considered useful in Jamaica, and keng root in Gambia.

Emmenagogue properties are attributed to *Poinciana pulcherrima* in Mauritius. *Cissus capensis* and *Sansoviera thyrsiflora* are stated in the Cape of Good Hope Catalogue to give relief in hæmorrhoidal complaints.

Antiseptic properties appear to be present in *Cyperus articulatus*, used in Jamaica to stop vomiting: in *Lichtensteinia interrupta*, *Teucrium africanum* and *Cluytia hirsuta*, used at the Cape of Good Hope, the two former being employed in splenic fever. The following, from their poisonous properties, also seem worthy of chemical investigation: aromata, coroo-coroo and moraballi bark, dividora root, haiari root (*Lonchocarpus densiflorus*) and the seeds of *Cacoucia coccinea*, from British Guiana: tuba root (*Derris elliptica*) from the Straits Settlements; *Toxicophlœa Phunbergii* and *Hyœnanche globosa* from the Cape of Good Hope; poison-wood from British Honduras, and *Elœodendron orientale* from the Mauritius.

Medicinal Spices.

The best exhibit of cinnamon was that of Ceylon, the specimens from Jamaica, Barbadoes, Fiji and Sierra Leone being all inferior in aroma as well as in appearance; that from St. Lucia was by no means deficient in aroma, but consisted of thick bark, and would only be marketable for making the powdered drug or for distillation of the essential oil.

The cardamoms from Ceylon were the finest in the Exhibition, but official cardamoms were also shown from Jamaica and Grenada, and round cardamoms from the Straits Settlements. The seeds of the latter are hardly distinguishable by taste from the official kind. The long grey cardamoms, known in commerce as Ceylon cardamoms, were also shown. These are said to be obtained always from wild plants by the natives. The seeds possess less aroma than the official kind and are of a slightly different character,

nevertheless they appear frequently in the London drug market.

Nutmegs were shown in the Ceylon Court and also in those of Jamaica, Grenada, St. Vincent, St. Lucia and Dominica, the Grenada specimens preserved in brine being particularly fine. The nutmegs and mace in the Fiji Court were valueless as spice, being entirely deficient in aroma,

Cloves were exhibited from the Seychelles, Ceylon, St. Lucia and Dominica, the two first-named being the finest.

Ginger was shown by Jamaica, Barbadoes, St. Lucia Dominica, Montserrat, British Honduras, the Gold Coast, and Sierra Leone. None of the exhibits presented a very good appearance, and some being in the growing state it was difficult to pronounce any opinion upon them.

Pepper was shown by Ceylon, North Borneo, and the Straits Settlements, but none of the specimens appeared to be particularly fine.

Allspice was shown by Jamaica and Ceylon, and the berries of the nearly-allied *Pimenta acris* in the St. Lucia Court.

Dill and fennel fruits were observed in the West Indian Court, and coriander fruit in that of Natal.

Mustard was exhibited in variety from India and sparingly from Natal and the West Indies.

Excellent specimens of chillies were exhibited from Natal, and both chillies and capsicum in great variety in nearly all the West Indian Courts and in British Guiana.

Canella bark was shown from Jamaica, Trinidad and the Bahamas, but none of the specimens were equal to those frequently obtainable in the London market.

Of non-official spices, vanilla was well represented in the Exhibition; the finest specimens were those from the Seychelles and Mauritius. Tonka beans, as fine as those of Para, were shown in the British Guiana Court.

Essential Oils.

Comparatively few of the essential oils used in medicine were shown, but there were many others that should possess considerable value in perfumery.

Oil of cloves was represented by some excellent specimens in the Seychelles Court. These had been prepared respectively from green cloves, dried cloves and clove stalks.

The oils of cinnamon bark and leaf were shown both from Ceylon and from Seychelles. The oil from the leaf possesses an odour different from that of the bark, resembling a mixture of cloves and cinnamon, and is, I believe, chiefly used for scenting soaps. Oil of cassia distilled from the leaves and twigs was shown in the Hong Kong Court, and oil of cajuput only from the Straits Settlements. An oil prepared from the fresh leaves of *Melaleuca Leucadendron*, var. *Lancifolia*, Bail., exhibited in the Queensland Court, and supposed to be "similar, if not identical with cajuput," differs in having a much more disagreeable odour; that of *Eucalyptus populifolia* does, however, closely resemble cajuput in odour.

Oil of lavender was shown only by Mr. Bosisto, as a product of Victoria. Although not equal to Mitcham oil, there is little doubt that this able and energetic pharmacist will succeed ultimately in having an excellent article prepared from Victorian flowers.

Oil of peppermint of excellent quality, prepared from plants grown in Victoria, was also exhibited by Mr. Boisto. Some years ago it was offered in this country, but the price obtained (25*s.* per lb.) was not sufficiently remunerative to lead to a repetition of the experiment. Peppermint oil and menthol were also exhibited in the Hong Kong Court by Messrs. A. S. Watson and Co. According to information furnished by these gentlemen the oil is distilled from several kinds of mint, and is used in neuralgia and indigestion.

Oil of sandal-wood was exhibited in the India Court and also in that of Victoria (*see Pharm. Journ.*, [3], xvi., p. 820). The oil imported from India is generally so adulterated with fixed oil, and is so opaque, that English dealers prefer to distil the oil from the imported wood. There can be no reason, however, why the pure oil should not be imported direct for medicinal use, if carefully prepared in Mysore under the superintendence of a qualified chemist. Some fine logs of sandal-wood (*Santalum Yasi*) were shown in the Fiji Court, but no sample of the oil. A specimen prepared from Australian sandal-wood was shown by Mr. Bosisto. Besides the above official oils there were a large number of others deserving of notice, as capable of being used as flavoring agents, or in perfumery. Oils prepared from the rind of the lemon, lime, orange, shaddock and citron formed prominent features in several of the West India Courts. A sample of oil of limes in the Trinidad Court, prepared from what seems to be a hybrid between a lemon and a lime, was shown, together with the fruit from which it was obtained; it resembles a very fine specimen of essence of lemon in flavour and odour, but gives chemical reactions like oil of limes. The ecuelled oils both of limes and lemons were far superior in point of odour to those prepared by distillation. The ecuelled oil of lemons from the West Indies might well compete in the European market with much that is now derived from Sicily. Other essential oils that might be employed as flavouring agents are the oil of sweet basil, exhibited by the Montserrat Company and by Dr. Hollings in the Montserrat Court, the oils of pepper and mace from the Straits Settlements, and the oil of pimento from Jamaica and St. Lucia.

Some of the oils which might be made available in perfumery are the following. In the Indian Court, oil of *Pandanus odoratissimus*, having an ordour like honey; oil of henna flowers, resembling in odour a tea rose; and the aromatic oil of champaca flowers. In the Straits Settlements Court, oil of balsam of Peru pods, resembling the perfume of bean flowers in odour; and the oils of *Canella alba* and cascarilla. In the Montserrat Court the Montserrat Company exhibited a specimen of oil of lime leaves, which had a peculiar fragrance of its own, quite distinct from that of neroli. Apparently the only specimen of oil of bergamot in the Exhibition was shown by the same firm. An oil of wild ginger (*Renealmia sp.?*) was shown in the Dominica Court that possessed a peculiar fragrance of its own. In the Jamaica Court several novelties in essential oils were exhibited, including those of *Critonea Dalea*, which has an odour of new-mown hay; *Hedyosmum nutans* and *Micromeria obovata*, which are not especially attractive in odour, and the oil of *Juniperus Bermudiana* which has a perfume resembling that of oil of cedar. The oil of bay leaves (*Pimenta acris*), used in making bay rum, was exhibited in several of the West Indian courts; it appears to be chiefly sent to the United States.

In the Queensland Court several oils derived from different species of ecualyptus were shown. Of these the oils of *E. Planchoniana* and *E. dealbata* resemble citronelle, and these of *E. Staigeriana*, *E. citriodora* and of *Backhousia citriodora* resemble the oil of lemon grass.

It is remarkable that there appears to be a much larger demand for oil of citronelle than for that of lemon grass, or verbena as it is commonly called, the former being probably more largely used for perfuming soaps. The oil of *Atherosperma moschatum*, exhibited in the Victoria Court, and that of *Nesodaphne obtusifolia* in the Queensland Court, both resembles sassafras in odour; the former, however, in a dose of a very few drops, is, according to Mr. Bosisto, quite poisonous, producing stoppage of the heart's action. Other essential oils worthy of notice are the fine specimens exhibited in the Victoria Court of the oils, of *Eucalyptus amygdalina*, *E. dumosa*, *E. oleosa*, and *E. globulus*. These oils, particularly *E. oleosa*, possess a remarkably solvent action on many resins that are not soluble or only partially so in alcohol, but on account of their high price could only be used for varnishes employed by artists, for which purpose they are said to have the advantage of rendering the colours brighter. According to Mr. Bosisto the oil of *Eucalyptus globulus* soon darkens in colour and becomes oxidized and resinified when exposed to light. A very fragrant essence of the flowers of *Acacia pycnantha*, prepared by enfleurage, was shown in the Victoria Court. It

seemed quite equal in fragrance to the *pommade de cassie* prepared in the South of France. In the North Borneo Court the oil derived from the Borneo camphor tree was exhibited. This also might possibly be useful in dissolving some resins or in rendering them soluble in alcohol.

This oil does not appear to be so well known as the Chinese camphor oil, of which as much as 94,500 lb. is said to have been imported into the United States during the past sixteen months. Chinese camphor was shown only in the India and Hong Kong Courts, and specimens of Borneo camphor in that of North Borneo. Under the supposition that Borneo camphor is probably not preferred by the Chinese without reason, I forwarded some specimens kindly supplied by the Acting Commissioner at the North Borneo Court to Mr. R. Stockman of Edinburgh University. The taste is not so unpleasant as that of Chinese camphor.

Before leaving the subject of essential oils it may be pointed out that nearly all the essential oils obtained from flowers in India are spoiled by mixing them with sandal-wood oil and after with fixed oils. Until prepared in a state of purity they are not likely to come into the demand that might otherwise arise on account of the exquisite fragrance of many of them.

Fixed Oils and Fats.

The principal official oils exhibited were castor oil and olive oil. The former was shown from nearly all the West Indian Courts, British Guiana, South Australia, Ceylon, Fiji, and the Seychelles, but only that from the last-named colony possessed the clearness and brilliancy to which we are accustomed in this country. Olive oil was shewn from South Australia and New South Wales, but as yet it is only prepared in South Australia in commercial quantities. There appears to be no reason why this colony, as well as the Cape and Natal, should not in future years supply a better and purer oil than the too often adulterated product now obtained from the shores of the Mediterranean, especially if the best varieties of the olive be cultivated for the purpose.

Croton oil was shown in the Hong Kong Court, and some very fine specimens of the seeds were noticeable in that of Ceylon. Of the official fats cacao butter occured in the Trinidad Court, but was not of superior quality. Beeswax, obtained either from domesticated or wild bees, was exhibited in nearly every Court, but for the most part the specimens exhibited were very dirty and inferior, some flat circular cakes exhibited by Mr. Fabien in the Trinidad Court being the only presentable specimens that were noticed. A large number of non-official oils were exhibited in the different Courts, some of them being obtainable in large quantities from more than one colony. This was the case with carapa or crab oil, which was shown in the British Guiana and Trinidad Courts, and is a product also of Western Africa. It has a bitter taste, and is used by the natives as an insecticide, a property which, if retained when the oil is saponified, might be turned to useful account.

The oil of *Jatropha Curcas* appears to be largely used in some parts of the Continent. It yields a purgative sweet oil of pale colour, and of a consistence much thinner than castor oil. Probably it might prove valuable as a stimulant hair oil, possessing the advantage over castor oil of being free from any disagreeable odour. It could be obtained in sufficient quantity for soap making and illuminating purposes, the plant being common in all semi-tropical countries.

The oil of various species of *Aleurites* was shown in several Courts, that from Queensland and the Seychelles being almost colourless and quite clear. This oil could be obtained in unlimited quantity, and might also be useful as an illuminating oil or in soap making, being comparatively inexpensive. The oil of *Aleurites cordata*, exhibited by Messrs. A. S. Watson and Co. in the Hong Kong Court under the name of wood oil, is remarkable for its drying properties, which have already been described in the *Pharmaceutical Journal* ([3], xv., p. 636, 637). Other Chinese oils exhibited by the same firm were those of tea seed (*Camellia oleifera*), which is used by the Chinese as a substitute for olive oil, and also as a lamp oil, oil of cabbage seed, oil of peach and apricot kernels, and oil of soy beans, used both for cooking and illuminating purposes, all of the above being obtainable in large quantities. A very pale, sweet and bland oil is obtained both in China and West Africa from the seeds of several varieties of a melon, which yield on an average about 30 per cent of oil. Under the name of "egusi" these seeds are exhibited in the West African Court.

Numerous specimens of coconut oil were shown in several Courts, that from Seychelles being very white, and a specimen in the British Guiana Court was not only very white but unusally solid, and was pronounced by experts to be the best in the exhibition. The yellowish oil of the king coconut was shown in the Ceylon Court. This is remarkable for being free from the odour of the coconut, and is therefore more suitable for use in perfumery.

In the Tobago Court the oils derived from the seeds of the grugru (*Acrocomia sclerocarpa*) and cokerite (*Maximiliana insignis*) palms; in the British Guiana Court, that of the acuyuru palm (*Astrocaryum Tucuma*); and in the British Honduras Court a white semi-solid fat from the seeds of *Attalea Cahune*, known as Cahoon oil, were shown.

In the India Court a large number of oils were exhibited, but many of these from exposure to light had become rancid. The white semi-solid oil derived from the kernels of *Anacardium occidentale* was, however, noticed to be still sweet.

The oil of *Bassia longifolia*, exhibited in the Mauritius Court, is a sweet oil having the colour and consistence of butter, but has a peculiar flavour, although almost free from odour. Another solid oil in the India Court, obtained from the seeds of *Garcinia indica*, is used in India as a substitute for spermaceti ointment, and having hardly any odour and a pleasant bland taste deserves more attention than it has hitherto received.

Myrtle wax, obtained from the berries of *Myrica cordifolia* and other species, was shown in the Cape of Good Hope Court. It is hard but brittle wax.

Oleoresins and Resins.

Of those official in the British Pharmacopœia copaiba was exhibited in the British Guiana Court. The specimens were of a pale colour and good consistence, but it is remarkable that it does not appear to be recognized as a commercial variety in this country. Gamboge was exhibited in the Ceylon Court; guaiacum in that of the West Indies; benzion, of very inferior quality, was but poorly represented in the Straits Settlements Court; and Chian turpentine in the Cyprus Court. The Ceylon gamboge is not as yet well known in this country; a consignment sent to England three years ago fetched £14 5s. per cwt.

A kind of elemi was shown in the British Guiana and West African Courts, but in both cases of too hard a consistence to replace the Manila drug. There was also in several of the West Indian Courts a product resembling elemi in appearance and consistence, but having a more terebinthinate odour that in the St. Lucia Court having a pleasant odour more resembling olibanum. These products are used as incense, the dirty and inferior pieces being made into torches.

Resins suitable for making varnishes were shown by several colonies. Fine specimens of Kauri resin were observed in the New Zealand Court. In the British Guiana Court there was a very hard resin, known as Demerara or Brazilian copal; of this there were two varieties, one pale in colour and evidently of more recent production than the other, which was more yellow and harder. This resin appears to be but little known in English commerce as yet, but I am informed that those who know how to dissolve it find that it makes an excellent copal varnish. I may remark in passing that the oil of *Eucalyptus oleosa* dissolves it perfectly and in considerable quantity. A very white and tolerably hard resin, which said to form an excellent picture varnish, was shown by Dr,

Ondaatje in the Ceylon Court. It is the product of *Doona zeylanica*. A very white specimen of copal resin was shown in the West African Court. But there were many other resins in the Straits Settlements, India, and other Courts that may be worthy of attention, a particularly fine specimen being shown in the North Borneo Court of a yellowish hard copal, soluble in eucalyptus oil.

A remarkable substance shown in the British Guiana Court, called karamanni is deserving of notice on account of its low melting point and its great tenacity. It appears to be a mixture of the yellowish resin known as hog gum, the product of *Moronobea coccinea* and beeswax, and may be compared to marine glue for its usefulness.

Gums.

The India Court was undoubtedly the richest in gums, but many of these are collected so carelessly that their commercial value is much reduced thereby. Only one of them, that of *Anogeissus latifolia*, at all approaches gum arabic in character, but none of those as yet examined appear to be capable of entirely replacing the Soudan gum. For this purpose the gum should be easily soluble in cold water, give a clear mucilage of an adhesive character, should not be darkened by iron salts, and the froth formed in dissolving it should quickly disappear.

A very good sample of gum was shown from Gambia, which bore a strong resemblance to the Soudan gum. From the Cape of Good Hope the gum of *Acacia horrida* was shown. This resembles gum arabic in appearance, but is somewhat yellower and gives a weaker mucilage. A much better gum has, however, recently been sent from the Cape than the sort generally received from that colony.

The Gums shown in the Australian Courts were of the usual dark-coloured characteristic appearance. In the West Indian Court were two gums worthy of notice. One of these, the gum of *Anacardium occidentale*, dissolves but slowly, but makes an adhesive mucilage which is used in Jamaica as a substitute for gum arabic. It is obtainable in large quantities. The other was that described under the name of white cedar gum. It does not possess adhesiveness, but a small piece gives a thick mucilage with a large quantity of water, a quality which if the gum proves to be harmless in character might prove very useful for suspending powders in mixtures, or for sizing purposes.

Saccharine and Dietetic Substances.

Of the official substances of the character, honey was exhibited by the majority of the colonies, but the finest display was that made by Canada, which exhibited two varieties, called clover and linden honey, which in point of colour and flavour left nothing to be desired.

Tamarinds were exhibited in several Courts, those from the West Indian Court being particularly fine.

Lime juice was largely represented by the exhibits of the Montserrat Company, and good specimens were also observed in the Dominica and Trinidad Courts.

In connection with lime juice, a specimen of citrate of calcium shown in the Trinidad Court may be mentioned. It is well known that both lime juice and citrate of calcium gradually lose citric acid, probably through decomposition caused by fungoid growths. Mr. McCarthy claims to have succeeded in preparing the citrate so that it will keep, if not exposed to air and moisture, without loss of the acid.

There were doubtless many food products in the Exhibition, that might be employed either as diets for invalids or in the manufacture of palatable laxatives. I will only mention a few of them. Cassava root, dried and used like arrowroot, has already been experimented with in the National Training School for Cookery at the request of Mr. G. H. Hawtayne, and the Lady Superintendent has reported very highly of its value as a variety for invalid or infant diet. Certain it is that the natives who feed on cassava rapidly put on fat. The curious preparation known as cassareep in British Guiana and the West Indian Islands also deserves notice as a harmless addition to food, possessing at the same time valuable antiseptic properties. Cassareep is prepared by evaporating the poisonous juice of the bitter cassava, which loses during evaporation the prussic acid it contains as well as a volatile poison described by Dr. Peckolt (*Pharm. Journ.*, [3], xvii., p. 267) under the name of manihotoxin; but the antiseptic properties, due to a substance with Dr. Peckolt has named sepsicolytin, or fermentation hinderer, is retained in the cassareep. Albumen to which a small quantity of sepsicolytin had been added is stated to have been kept without deterioration for six months. The value of a harmless antiseptic for preserving food can hardly be overestimated. The advantages of cassareep as an adjuvant to diet is also worthy of investigation.

In conclusion it only remains for me to express my regret that it has been possible to allude to so few of the many very interesting exhibits related directly or indirectly to pharmacy.

I gladly take this opportunity also to thank the several Commissioners for the Colonies, who have so kindly lent a number of valuable specimens for this occasion, without which the remarks that I have made would have been almost valueless.

I desire also to record my most cordial thanks for the courtesy that I have received at the hands of these gentlemen during frequent visits to the Exhibition, in allowing me to examine specimens, and in affording all the information in their power concerning them.

DISCUSSION.

His Excellency C. A. MOLONEY, C. M. G., Governor of Lagos and President of the Gambia Commission, said his only knowledge of pharmacy was that derived from taking cinchona, which, or the quinine derived from it, was a necessity of life in West Africa.

The economic botany of West Africa was comparatively unknown, and its agricultural development was in its infancy; its growth would be mainly dependent on the establishment of either agricultural branches of the Government nursery gardens or some allied institutions in Government hands. Private enterprise had been tried, but it had, it was to be much regretted, signally failed, and the results were comparatively nil. In reference to allusions in the lecture, he would say that Calabar beans could be supplied in any quantity if required. With regard to kino, he himself sent to the Forestry Exhibition in Scotland two years ago a very fair specimen of the extract, but he heard nothing further of it, and therefore presumed it was not wanted. The *Jatropha Curcas*, was grown largely in the Cape Verde Islands, and it grew wild in West Africa, but no particular attention was paid to it, although in the Cape Verde Islands the export of its seed was about 300,000 bushels a year. The melon seeds were used not only for extracting oil from, but also largely as food: he presumed the lecturer referred to egusi seed. The trade in gum was quite in its infancy. For some years there had been a considerable export of it from Sierra Leone, and to a small extent from the Gold Coast, and he was rather surprised, when he was Governor of the Gambia, to find to the right and left of that enormous river the export of gum from Senegal represented by millions of money annually, and that a little further south, at Sierra Leone, there was also a large export; but none from that particular district. From the Gold Coast, further south, the export had been very limited, but the field was very extensive and deserved every encouragement. Now, South of Lagos, his present Government, there was an immense field for the export of a fossil gum, known as Ogea. He had directed attention to this for some time past, but it had had no commercial result as yet. About two-and-a-half years ago he had a few hundredweights sent to England, which was passed through a prominent manufactory, and when he inquired the result, he was told that it was very difficult to introduce a new article, but after some questions he found that it might prove worth from £80 to £120 a ton, and that large quantities could be readily taken.

The two previous speakers had referred to the advisability of investigating the native practice of medicine; as a medical man he had given some attention to that subject, and he found that in India there was very little to learn. A great many of

the preparations used were very much of the type of mummia, and were in fact the most loathsome things that could be imagined. There were in India some two thousand plants of a medicinal nature more or less used by the people, but not more than forty or fifty were worth the least attention. It had been said that many of the specimens in the India Court were very imperfect, and no doubt they were; many were of no interest to anyone but the native doctors who never by any chance used drugs until they were eaten through and through with insects. They stored them until they were perfectly rotten, and in many cases it was impossible to get drugs in any other way than by going to these people. He had forgotten to mention one or two facts with regard to ganja. It was made from the female flower-heads of the plant, and it was a most remarkable thing that if you left one single male flower in a whole field cultivated for ganja not a single particle would be produced. The bhang was obtained entirely from the wild plant, but ganja could not be made from it because in that state the male plants grew with the female; of course by male and female he meant plants with pistillate and staminate flowers. Long before the flowers were produced the native ganja doctor came round to the cultivator, and having agreed on his fee, crawled away underneath the tiny little plants, and with a knife slipped every male plant out of the field. He had often followed the ganja doctor, though without being able to discover, even with a microscope, how he distinguished the plants, but it was marvellous how successful he was, and it was rarely necessary to go after him to remove a male plant. The female plants were allowed to reach maturity, when they were cut down and taken to the manufactory, where they were trodden under foot to produce the flat and round forms. The earth was hollowed out and the plants were all laid with their heads in the hollow and rolled with the feet; he believed that in some way the rolling shook out something in the round form which made it much stronger than the flat; it was more condensed, and a given weight contained more of the extract. Mr. Holmes had referred to pale catechu, meaning he supposed, gambier, which was eaten all over India; but there was another substance which was also used, real pale catechu, or acacia catechu. They had also a form of cutch which was quite as pale as that shown obtained from the acacia catechu, and that also was more extensively eaten than that exhibited. The red cutch was never eaten at all. He did not know exactly the chemical difference, not having examined them with sufficient accuracy to determine, but there was a difference, and the process of preparing the two kinds was quite different. In Pegu the tree was cut down, the bark removed and the hard wood split up into little fragments; these were put into large iron caldrons and boiled down until a thick decoction was obtained; this was then thrown into moulds made of the teak wood leaf and allowed to harden. A layer of leaves was put over the top and another coating thrown on, and thus the ordinary red cutch was obtained. In Northern India, another preparation was made. The plant was treated in the same way, but it was boiled in earthen caldrons and to about one half the extent; the pots were then taken off the fire and a number of twigs put into each, on which the substance crystallized much in the same way as sugar candy on a thread. The twigs were then removed, the crystals shaken off, again put into hot water and made into a sort of mucilage; it was then thrown into moulds and made into cakes like gambier, only larger. This was a more carefully prepared article. The pale cutch of Northern India was in fact very much like gambier and took the same place in pharmacy and as an article of food. Cardamoms were also largely grown in India. The seeds of melons were also used for making oils to a large extent, and so were tea seeds. With reference to the gums, he might say there was a resin in India which was used for a curious purpose. It was from the *Shorea robusta*, known as the saal tree, and was extensively used for soldering broken pots. Any metal pot that got cracked was joined together again with saal resin, and he had seen such vessels in use on a roaring fire years after they had been mended in this way. He should think this resin was worthy of attention.

Mr. BOSISTO, President of the Victorian Commission, said:—It would take too much time to mention all the medicinal plants of Australia, but it had not such a grand field of medical products as India and some other countries. There were the eucalypti, a number of acacias, and some melaleucas, particularly the *M. Leucadendron*, which gave an oil resembling cajuput oil. There were also a great many which yielded aromatizing oils, but he did not think they were of any great value in commerce. Then there was the *Atherosperma moschatum* bark, in common language called the native sassafras bark, but it was not a sassafras. It contained a very fine bitter, and also a volatile oil of high specific gravity, two drops of which would almost stay the action of the heart, and this was well worth attention, and should be brought before the medical men of Great Britain. Many years ago he brought it under the notice of some of the leading medical men in this country, who reported well of its action on diseases of the heart, but it seemed to have been lost sight of again. There were 150 species of *Eucalyptus*, which yielded a vast variety of essential oils that contained many aromas, more particularly one, a native of Queensland, and which was also grown in Victoria, *E. citriodora*. He thought if the colonists would pay more attention to it, it would yield a good profit. There were many other aromas, but they were too far away from population to be brought into commerce. People in England would always speak principally of the *E. globulus*, but the fact was that was considered in Australia to be the worst of the whole lot. *E. dumosa* and *E. amygdalina* were the chief species of value for medicinal purposes. He had had the pleasure of presenting to the Society some essential oils of the ordour, *Myrtaeeæ* which he guaranteed were true to species, and therefore when any of the young men present examined them he hoped they would pay attention to the labels, and not look upon them all as *E. globulus*.

Mr. SHAND, Official Representative of the Ceylon Planters' Association, said he was not a scientific man, but a practical agriculturist, and the drug in which he was principally interested as a producer was cinchona bark. He wished the honorable representatives from West Africa and British Guiana, who laid stress on the utility of this bark, could, without any prejudice to themselves, consume a great deal more of it, because so much was now produced in Ceylon that the markets of the world were completely glutted. Cinchona seed was first brought into Ceylon in 1861 as an experiment, and fortunately it fell into the hands of an excellent scientific man, the late Dr. Thwaites, head of the Royal Botanic Gardens, who from the first recognized the adaptation of the plant to Ceylon, and urged on the planters the desirability of cultivating it. They were all so wedded to coffee at that time that to a great extent they neglected this matter, and for several years the cinchona cultivation was only carried on experimentally. In the years 1874 and 1875 they exported 4,000 lb. of bark, and in the two following years only 15,000 or 16,000 lb.; what led to the great rush of cinchona cultivation was a little enterprise with which he himself was connected. In 1874 he was manager of a group of estates, a small portion of which had been accidentally, devoted to cinchona for the following reason. In Ceylon they suffered periodically from the ravages of rats. There was a jungle tree, the nelu, which periodically died down, and when it did so the rats which had been in the habit of feeding on the pith came into the clearings and attacked the coffee. Almost the first cultivation of cinchona in Ceylon was on a small plot of about two and a half acres where the coffee had been completely spoilt by the ravages of rats. In 1874 the cinchona trees were eight years old, and it fell to his lot to harvest it. The result was most wonderful; from that two and a half acres he reaped 15,000 lb. of good cinchona bark. Not much was known then about the preparation of it, and the only process they knew that was likely to render it marketable was the quilling process, which had now to a great extent been superseded. He took great pains in that matter, getting cinnamon peelers, who formed a special caste in Ceylon, and

the result was a fact almost unprecedented in any agricultural enterprise, for that one harvest resulted in a yield of £600 sterling per acre. That naturally led to what was commonly called a "boom" in cinchona agriculture. He himself came home the following year and telegraphed out at once to his brother to purchase 1,000 acres suitable for cinchona. The history of the cultivation was like that of many others, accompained by disappointments, for although Ceylon planters had flooded the markets of the world, they had not all been successful. If all the cinchonas planted in Ceylon had reached maturity there would be ten times the quantity in the market, and all present would allow there was quite enough, because the unit of cinchona for which when he began he used to get 2*s*. had now fallen to 2½*d*., and did not show much prospect of rising. What he complained of was that though he had to suffer very severely in the prices realized for the bark, when he went into a chemist's shop in London to buy a quarter of an ounce of quinine he had to pay an enormous price for it. He did not know if anything so commercial were within the range of the Society, but if it were he wished they would pay a little attention to it, because it was held out as a great inducement in the beginning.—Never mind how much you send, there will be the grand result of conferring an inestimable boon on humanity, because you will place cheap quinine within the reach of the very poorest people. He hoped for the sake, at any rate, of the cinchona growers in the East, that every effort would be made to disseminate the use of it throughout Great Britain. Cardamoms had been mentioned, and he was sorry to say that they also in Ceylon had been so completely successful that their success led to failure, the price having come down to one-third of what it was two years ago. This would show that they were a go-ahead people in Ceylon, and what he wanted to know was what other drugs they could supply the English markets with. They had suffered very much in the cultivation of coffee from having all their eggs in one basket, and he was very much afraid they were inclined to go to the same extent in tea. He was quite sure that there were many drugs which could be profitably carried out as adjuncts to other enterprises. On one point he was a little in opposition to Dr. Watt, for he must say he attached great value to the native remedies which were in the hands of native doctors. He had derived benefit from them himself, and had thought that the scientific gentlemen who came out from medical colleges to the East made a great mistake in not exchanging ideas with their native brethren, and in looking down upon them too much. In the use of vegetable oils, especially in rheumatic affections, he had derived great benefit. Very often natives possessed remedies and secrets which were still unknown to the Pharmacopœia. Mr. Holmes had been described by Mr. McCarthy as a persistent beggar, but he must say that if so he had deceived him because he came to him a day or two ago in the guise of a borrower. Still he must say, after the privilege he had had of being there that evening, he should be most happy to present to the Museum the samples which were to have returned, and as long as his connection with the Ceylon Court lasted, if there were anything else Mr. Holmes would like to beg or borrow he should be most happy to present it to the Museum.

Mr. Umney drew attention to the very fine samples on the table of vanilla which came from the Seychelles, and it might be interesting to inform the meeting that Dr. Brook, whose name had been so favourably referred to in the paper, had much benefited in the harvesting and curing of his vanillas by a report which appeared in the *Pharmaceutical Journal* some years ago. It would seem, therefore, that even on this side they could be of great service to gentlemen in the colonies. What made the Seychelles exhibit of more interest, also was, that some two or three years since he sent out a pharmaceutical chemist, who for many years was with the old firm of Jacob Bell, and it was through him, under Dr. Brook's direction, that these essential oils had been placed on the table, and when in the Museum he felt sure they would be well worthy of examination. There were essential oils of geen cloves, dried cloves, green stems and dried stems, and chemically there was very little difference between them. He was sorry to say that in the drug market they did not always appreciate these goods when they came in, for only last week a large parcel of essential oil of cloves was offered at the drug auction in Mincing Lane, and with very great difficulty a purchaser was found, because it was thought to be adulterated, coming from abroad. Another exhibit was that of turtle oil, which he looked upon as one of the most nauseating things which could be taken. Dr. Brook assured him that the natives took it in the place of cod liver oil, but its power of repeating probably could not be equalled. He had tried to introduce it, but no one would take it up.

Mr. David Howard said, there were on the table some of the most beautiful specimens of cinchona barks he had ever seen, and they were interesting in two opposite ways. One was about the most typical specimen of what was the very finest calisaya quill bark of his younger days; another was calisaya bark, no doubt of a similar strain, from Perak; but you could hardly have two things less resembling one another, and after a great many years' experience he should have called it a very inferior sample of red bark. Yet he had very little doubt that the analysis would be very satisfactory. One could by no means judge entirely by the eye. Again, there were two samples from Jamaica; they were very familiar to him, one of the very finest strains of succirubra bark he had ever met with, and a very fine specimen of calisaya bark. But in appearance the calisaya bark looked like a very nice sample of red bark, and the succirubra looked like a very fair sample of calisaya. Yet botanically, and as far as tests went, there was no doubt they were each a most excellent strain of its own kind. Mr. Holmes had mentioned the very high prices given for fine quill barks for pharmaceutical purposes, and it was not entirely a mistake to do so. Of course to the manufacturer anything which would give quinine was valuable. He did not much mind how much cinchotannic acid or resin he had to deal with if he could get rid of it; but on the other hand for galenical preparations there was no doubt that fine quills were infinitely better than barks that might be much richer in alkaloid. He did not see any specimens of succirubra, which was now the official bark, but there was the renewed bark, a most interesting and valuable specimen. With regard to the crispa he might say that the knotty appearance was not essential to the true crispa. In some varieties it grew with an exceedingly thin epidermis. This knotty tendency was noticed by Jussieu a good many years ago, but so far as it went it was a disadvantage. The cork did not contain any quinine, as far as could be discovered; only mere traces were found, and he believed they were derived from small portions of the real bark, which it was difficult to remove. The crispa with a fine thin epidermis was really the best. Having forsaken his hereditary pharmacy for chemistry he might put in a word in favour of applying chemistry to some of these new drugs. There was a beautiful sample of coca leaves, and there could not be a better example of how chemistry and pharmacy should work together than the history of cocoa and cocaine. When it was first brought over it was on account of the great value the natives attached to it, and the great benefits they found to arise from it; but curiously enough its first introduction into English therapeutics was comparatively a failure, and it did not appear to have the merits ascribed to it. He believed it was simply because they had hardly discovered what its merits were. It was assumed it was simply a beneficial drug to stay hunger, without having any idea how it was. Then chemistry came in and cocaine was extracted. It was at first a curiosity, but then its anæsthetic property was noticed. He would point out, therefore, that it was entirely owing to chemistry that it had become possible to utilize this property, since a heavy dose of cocoa leaves in the eye would not be wholly desirable before an operatation. It appeared to him that many of these comparatively unknown drugs should not be merely dealt with galenically, but chemically also. If you could get a definite principle from them to operate with you might, as in the case of coca leaves, trace the actual cause of the value which had been discovered by the natives by long practice, and having got the real cause of the value it might be applied far better to pharmacy under altered circumstances than

by merely trusting to the information of native doctors. They were no fools, and had found out by long experience and wonderful skill a great deal more than we gave them credit for, but by taking their experience, and bringing modern science to bear upon it, the best results would be obtained, and it would thus become possible to dispense with some of the elegant forms of pharmacy of which they had heard. The question of new drugs wanted a great deal of study, and a great deal of hard work, but like all other things you never got any good results without hard work, and you never did hard work without some results.

Mr. CHARLES CHRISTY said, that recently some remarkable specimens of gums had been received from India, but up to the present time there was no gum which had come under his notice which would supersede that from the Soudan, known in Commerce under the name of "Turkey sorts." This sold, before the breaking out of the Soudan war, with difficulty at 35*s.* to 40*s.* a hundredweight, but at the present moment it was worth £10 to £11. What was wanted was some gum to replace it, and it seemed a very strange thing that they had not yet been able to find one. What was wanted was a sweet gum, which could be used medicinally as a mucilage. The gums hitherto brought forward were more or less of a bitter nature, containing a large amount of tannin, and the consequence was when used for dyeing purposes, if the dye contained any mixture of iron it turned black. He hoped the gentlemen from the different colonies would bear this in mind. They were getting gums from Australia, but none of them that he knew of were of the sweet character which could be used in pharmacy. The nearest thing to it was the produce of Senegal. The vanillas from Seychelles were much finer than were generally seen in commerce.

Mr. STOCKMAN said he had been carrying on some investigation on the Borneo camphor which Mr. Holmes kindly sent him two or three months ago, but he could only speak at present in a very general way of its action, chiefly in comparing it with ordinary laurel camphor. There was no doubt that the earliest camphor brought to this country was Borneo camphor, and the earliest experiments about one hundred and fifty years ago were probably carried out with this substance, but they had got so mixed up that at the present time it was quite impossible to say which kind was used. Lately, owing to the difficulty of getting Borneo camphor, some experiments which were made in Germany were made with an artificially prepared substance, as it only required two atoms of hydrogen to be added to ordinary camphor to make Borneo camphor. But these experiments were few in number and incomplete, and he believed the investigation he was now carrying on was the first which had been made with Borneo camphor. Physiologists usually began with frogs, and with them the action was very much the same as that of common camphor.

Mr. KEMP (Bombay) said he had been much interested by the remarks on Indian drugs, but the science of modern therapeutics he really believed was in a very early stage, although the materia medica of India was very ancient; many articles had dropped out of use, and might be taken up with great profit for modern investigation. It was said that sandal-wood oil as imported from India was much adulterated. He was not aware that sandal-wood oil was exported from India in any quantity, but it was certainly produced in considerable purity, the only adulterant being moisture. It could be obtained in considerable quantities and good quality, if care were taken in selecting specimens. It was principally distilled in the Mysore territory. In Australia it was preferred in many cases, whether from its superior cheapness or from its quality he could not say. It was not exported in the crude state in which it came into the market, but was either re-distilled or carefully filtered. With regard to the *Cannabis indica* he had no knowledge, but when in India he had had repeated applications from persons in this country for it, as he understood to apply the Cooly markets of the West Indies, and other colonies where it was used in large quantities, and he understood that was its destination. The kind in demand was the round top, generally imported in bundles of 1 lb. each, which was exported from Calcutta and possibly through Bombay from Bengal. The Bombay cannabis, Dr. Watt has said, was of the flat kind, which abounded in stalks and probably that was one reason for its inferiority. Mr. Holmes had also mentioned oil from melon seeds, and he might remark that although melon seeds were obtainable only in small quantities in India, they yielded about 25 per cent of oil and were very good for feeding purposes. The *Jatropha Curcas* was used to a considerable extent in India, and he should like to see it come more into the market. Another drug not mentioned was the *Ipomea cærulea*, one of the convolvulus family, the seeds produced a resin resembling that of the jalap, if not identical with it, and it yielded about four or five per cent. He imagined it would be a profitable source of jalapin. He hoped the scheme of the Institute would be taken up and thoroughly carried out, for really, London being the central market of the world for drugs, there was a better opportunity for studying the Indian materia medica here, both in a theoretical and practical form than there was to any ordinary person in India, and this would be still more the case if the Institute were established. The difficulty in India was to communicate with the depositaries of the native medicines owing to the multifarious languages they spoke, and the different accounts they gave of the different drugs, and the way in which they locked up their medical knowledge in their own breasts. Dr. Dymock, in his recent work, had done a great deal to overcome these difficulties, and his was one of the most accurate and interesting books published on the subject. He had often heard him refer to the great assistance he had derived at various times from Mr. Holmes.

Mr. THOMAS CHRISTY said it was very interesting to see these valuable exhibits, but after all Mr. Howard had really touched the vital point:—How were they to be turned to account? On an occasion like the present he might be allowed to say that although the young men coming on might be able to work at these things, the next thing was to get them used.

Mr. LEOPOLD FIELD said there was only one point which came within his ken as a practical soap and candle maker, and that was the remark made by Mr. Bosisto with regard to the eucalyptus. For the last two years his firm had been trying to get hold of something besides the globulus, but found the Australians unwilling to let them have any, and he did not believe there was one gallon of the dumosa oil to be obtained in the market.

Mr. BOSISTO said they never sent a pound weight of *E. globulus* oil into the market.

Mr. FIELD said it was labelled so at any rate.

Mr. BOSISTO said he must emphatically contradict that. He had only one label, and that label, was rigistered.

Mr. FIELD said he did not allude to Mr. Bosisto personally at all. The oil they obtained always came to them in iron tins holding about fifty-six pounds, and it was labelled *E. globulus*, and sometimes by way of change *E. amygdalina*, for the two things seemed exactly the same. They had had one sample of *E. dumosa*, which was vastly superior, and they had tried to get it again and again, but they had never been able to obtain a similar oil. They had now sent out an extensive order hoping it would induce the distillation of this oil. Naturally their only knowledge was derived from those standards which came under their notice, and if they were supplied with the wrong article, how could their knowledge be correct? With regard to the various scents which the eucalyptus and its isomers were capable of assuming, they were of the greatest value and interest to the soap maker. The lemon-scented iron bark, which he believed was the citriodora, was to him a most interesting substance, and no doubt might if worked into soap give the public very great satisfaction, inasmuch as the odour appeared to be pleasanter than lemon grass, and not so sickly as that of citronelle. All the odours the various eucalypti

were capable of assuming had the peculiar property common to camphoraceous odours, and no doubt the soap maker would be able to utilize them largely. But it all pointed to the necessity there was for some competent authority in these subjects, and especially of having a Museum where these things should be distinctly and correctly labelled. He was not aware that they derived their samples from Mr. Bosisto's firm; they had got them through the London brokers, and did not know where they came from. He knew they had got very different things under the same name, and that what they really wanted they could not obtain at all.

Mr. Hall (of Messrs. Edward Cook and Son) remark that essential oils were of great interest to soap makers. He was also interested in the beautiful specimens of white coconut oil from Trinidad. It would be very desirable to have a coconut oil without any scent, but at the same time it should be of a white colour. Most of those oils could be used by soap makers, but they only came into their hands when produced in such large quantities as to be cheap.

Mr. Holmes, in reply, said he thought the gums referred to by Captain Molony were resins, though they were called gum in commerce. The gum Mr. Christy alluded to was a gum soluble in water, and that was much wanted at present—one which possessed adhesive properties and which would not darken when a little iron of salt was added to it. There was no question that the resins or gums to which Captain Molony alluded were much more largely used than adhesive gums, and were very important articles. Mr. Shand had greatly excited his curiosity with regard to the oils that cured him of rheumatism, and he should be very glad to know what they were. With reference to the cinchona crispa, there was a specimen in the Museum, sent from Madras and analysed by Dr. Paul, which gave very good results, quite within the requirements of Pharmacopœia. He merely alluded to that variety as exhibited to pharmacists because no one could make any mistake about it. Mr. Howard's remark that sometimes specimens came over without that peculiar corkiness interested him very much from a botanical point of view; because anyone who had observed the common birch tree would know that when young it had one of the smoothest barks, though later on it developed cork abundantly. The same might be the case with the cinchona crispa. At all events the corky form was easily recognized, and there could be no mistake about it, because no other cinchona was at all like it. With regard to the coca leaves not being valued when they first came over, he thought it arose in a great degree from the fact that the leaves were of a very bad quality. When the price went up very much better leaves came over. He would direct Mr. Charles Christy's attention to the gums from West Africa in the Gambia Court, which had very much the appearance of gum arabic, and also to some of those from Mexico. With respect to the *E. globulus* he should be glad to show Mr. Field at any time the specimens named true to species which Mr. Bosisto had kindly presented to the Museum, and he would be then able to judge of the kind required. He believed that the *E. globulus* in the English market had come to a certain extent from Nice, and also from San Francisco, but where else he did not know.—*Pharmaceutical Journal.*

WHAT THEY SAY IN "THE LANE."

That they don't want such heavy sales of Indian tea three days before Christmas.

That since the 1st of June there have been about 100,000 packages more Indian and Ceylon tea printed for public sale than in 1885.

That according to reliable estimates this extra quantity sold to date represents nearly the whole increase in the crop over last season.

That the necessary tasting and valuing of such a largely increased quantity has been extremely trying and laborious to both brokers and dealers.

That two weeks cessation of business in the markets whilst travellers were off work, and grocers too busy to look at tea, would have afforded the overworked tea tasters of Mincing Lane a chance of recruiting their energies for the heavy trade of January and February.

That the importers and the selling brokers in forcing on such heavy sales, and thereby curtailing the holidays, have raised up a very unfriendly feeling which far more than counterbalances any supposed gains.

That in consequence of such heavy sales having taken place just on the eve of the holidays, all the buying brokers and dealers are full of stock; and as they have no chance of selling it till the second or third week in January, the new year bids fair to open flatly.

That unless Ceylon planters pack their tea in larger breaks there will soon come a deadlock in Mincing Lane, and a considerable decline in value of Ceylon tea by reason of buyers being unable to see all the little lots.

That those who divide up fairly large-seized breaks in Calcutta into three or four divisions, thereby necessitating fourfold labour on the London tasters when the separate divisions have to be valued in Mincing Lane, deserve condign punishment.

That if the practice be not discontinued, a committee of buyers will be formed to trace all such divided lots and refuse to bid for them.

That the old motto of "Live and let live" has been changed to "Every man for himself and devil take the hindmost."—*H. & C. Mail*, Dec. 31st.

Tea in the Andamans.—Ten years ago the Government tea garden in the Andaman Islands started with an area of 3½ acres, which last year had extended to 288¾ acres. The out-turn of tea during the year amounted to 26,600 lb. and of this quantity 23,273 lb. were sold.—*Madras Mail.*

Granadilla and Tree Tomato.—In Covent Garden Market may now be seen fruits of the tree Tomato, Cyphomandra betacea, labelled as Granadilla, which is an error, as that name applies to the fruit of the Passion-flower. The fruit of the tree Tomato is cooked and made into a kind of jelly. It was highly recommended by Mr. Morris when in the West Indies but it does not find so much favour in India. We believe the market is supplied from the Azores.—*Gardeners' Chronicle.*

Pearl Fishing by Electric Light.—The steam yacht "Chic," belonging to Messrs. Alley and McLellan, engineers, Glasgow, which has been berthed in the Greenock harbour for the past few weeks, has been fitted up with a Brush dynamo for the purpose of suiting her for the pearl fishing in South Australian waters. The "Chic" left on Saturday for the Gareloch, where she will remain until the arrangements are complete for fitting up the electric lamp.—*Electrical Review.*

Another Ceylon Tea Company.—Companies interested directly or indirectly in Ceylon tea are becoming numerous. The Ceylon Tea Growers Limited, is the name of a new undertaking registered a few days since, with a capital of £6,000, divided into 600 shares of £10 each. It is formed to carry on as principals, consignees, agents, or otherwise, the business of importing and dealing in tea, coffee, cocoa, cinchona, and spice, and other produce grown in the island of Ceylon, and other places, and to acquire the business of Messrs. Delmege, Collinson and Whitham, of No. 1, St. Michael's House, Church Alley, E. C., and to acquire certain trade marks. The first subscribers are:—H. Whitham, planter, Ceylon, 1 share; A. Delmege 17, St. Helens-place, E C., 1; J. R. Collinson, planter, Ceylon, 1; R. Godfrey, planter, Ceylon, 1; A. H. Reid, clerk, 17, St. Helens Place, E. C., 1; W. Hollick, 28, Barnsbury Park, N., 1; A. Hutchinson, merchant, Chingford, 1.—*Home and Colonial Mail.*

HOW TO USE GAS-LIME.

This substance should be freely exposed to the air for two or three months before applying to any soil on which is a growing crop, because, besides many sulphides, it contains a compound of sulphur and cyanogen, that is very deadly to plants. In anticipation of a Turnip crop, it may be applied to the fallow up till, say, February, which would allow sufficient time for oxidation to alter the poisonous qualities of the cyanogen. It is, perhaps, best to slightly harrow it into the stubbles after they have been ploughed because in this case the ammonia—or a portion of it—resulting on the conversion of the cyanogen will be retained in the soil if there is in it lime, salt, kainit, or substances containing bases on which the ammonia can form as nitrates. This simple view of it may be borne in mind in making it into composts, for unless there are substances on which the ammonia can form, it will combine with carbonic acid and escape into the air. The compost should therefore contain a little superphosphate, salt, or kainit, or even a small portion of old lime. But in making a compost heap it must be kept well away from a growing fence or the roots of valuable trees, or it will kill them.

I may add that in my experience it is the most effective substance that is to be had for the destruction of fungoid and insect pests in the soils, and applied to the fallow as above, at the rate of about 5 tons per acre, there need be little fear of finger-and-toe.—"FARMER," *in the "North British Agriculturist."*

COCONUT OIL.

Referring to the recent discussion on this subject in our columns, a Merchant who has had longer experience perhaps, than any one in the Island in the Oil trade, informs us that Cochin Oil has always been considered richer in stearine than Ceylon Oil. The fact must, therefore, have been ascertained by analysis in England, where Cochin, we are told, has been mainly used in the manufacture of candles. Ceylon being chiefly used for soaps. Even for the latter purpose, Cochin beats Ceylon owing to its whiteness, which we are now emulating and which, we fancy, can easily be attained by the rejection of smoke-dried and blackened Copperah. Wether this is worth striving for is another matter, the decision on which must depend on results. If it pays the manufacturer better to purchase black and inferior stuff, which generally goes by the name of cart Copperah, at R4 or 5 a candy less than clean white boat Copperah fetches, he will continue to use it in his Mills. The question is whether the difference in price between white Oil and ordinary Oil is sufficient to compensate for the higher rate demanded for clean sun-dried Copperah, for which there is a good inquiry both in continental Europe and in India. The distinction of being first in the list of Oil-producing countries will hardly be sought for by mill-owners at the expense of their pocket.

The question of stearine is different from that of the whiteness of Oil, and it is in respect of the former that the Agricultural Association should institute inquiries. Is the poverty of stearine due to deficiencies in the soil, or to the mode of preparation? If to the former, how can the soil best be enriched in the constituents it needs; if to the latter, what changes in the mode of drying the kernel and extracting the Oil are called for? The services of an Agricultural Chemist are in any case needed, and should be put into requisition, so that by analyses of soils, Oil and Copperah, a solution of the difficulty may be suggested. Even to the unprofessional mind it must seem reasonable that ripe nuts should be richer in stearine than immature ones; but does the mode of drying them also affect the fatty substance in Oil which gives it its special value? If the temperature at which Oil congeals is a test of its richness in stearine, it is worthy of note that cold drawn Oil, or Oil extracted from the kernel slightly dried congeals sooner than ordinary chekkoo or Mill Oil. This would seem to suggest that too much heat, whether in drying the kernel or extracting the Oil reduces the stearine. The inquiry is an interesting one, and may beneficially affect our trade in Oil, and as such deserves the attention of the Association. The normal difference in price between Cochin Oil and Ceylon is, we are assured, only from £3 to £4—the difference of £11 per ton recently reported being confined to London, and due to some jugglery among speculators. Still, a difference of £3 to £4 is not immaterial, and is worth striving for.—Local "Examiner."

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

PARIS, Nov. 27th.

The Marquis de St. Aigan finds fattening calves remunerative. He depends for his success on a special part—substitute for milk, composed of 132 lb. white maize flour, 22 lb. linced meal, 64 lb. cooked pea meal, 2¼ lb. beetroot sugar, 2¼ lb. phosphate of lime,—at a cost of 44 frs. The flour is blended in cold water, then cooked in a *bain marie*, and given to his calves daily during their first month at the rate of six ounces in two-thirds of a gallon of water, mixed with the same quantity of milk. From the thirtieth to the forty-fifth day the milk is diminished and discontinued at the latter date, when the meal-mixture is doubled, and given in 1½ gallon of water. The following twenty days the mixture is raised to 18 ounces and the water to two gallons. Following the season, the calves have always within their reach tender herbage, or cut mangolds dusted with barley meal. After the 75th day, the calves receive no more of the compound; they are given ¾ lb. of maize flour, and the feed of grass or roots is increased. If the season permits they are turned into a meadow. When aged six months the calves are treated as ordinary stock. The Marquis buys the calves in his neighbourhood and they are always the progeny of good Normandy cattle. With four milch cows and the substitute milk diet, he rears 80 calves yearly. He attributes much of his success to his good pasture land. Phosphate of lime is gradually creeping into use as an aliment, the average dose being quarter of an ounce daily. It is best given when mixed with some wetted meal or cooked roots; for poultry, the grain is first moistened and then dusted with the phosphate. The same process for horses.

Some persons maintain that the exuded sap from vines when pruned is not a loss of strength and so not debilitating for the plant. Others view the exudation as a sign of health and strength. Hales proved that the sap which overflows can ascend in a glass tube as high as 21 feet, and could raise a column of mercury to the height of 32 inches. Now when the leaves unfold this sap, ascension diminishes. In pruning the vines the large wounds are often covered with putty, the smaller cicatrise themselves. The development of the roots can diminish the flow of the sap and the Southern exposure of the stems can augment it; but temperature, humidity and rain, exercise an important influence. Sachs laid down that the development of the roots, the capillary force of the cavities of the wood and the changes of temperature act, and differently on the ascent of the sap. However when the leaves commence to function, the roots cease to develop while serving to maintain as well as capillary action, the ascending column of sap. The liquids imbibed flow out at the cut sections when the heat dilates the fluids and gases in the plant.

It is not then a matter of indifference in Spring to judge beforehand when the sap will flow most abundantly. One day nine times more sap will exude than on another. Hence, if the soil permit, prune vines early; if it be necessary to perform the operation later, select a cool day, commencing with those varieties which develop leaves and roots most rapidly. Late cutting tends to produce irregular development, late flowering and hence late ripening.

Plants have two marked and different functions: the leaf-organs by their green matter when acted

upon by the sun decompose carbonic acid and give off oxygen. This is a process of nutrition since by that decomposition the plant assimilates the carbon for its tissue. On the other hand the branches, flowers, fruits and seeds absorb oxygen and emit carbonic acid. Respecting the roots de Saussure has laid down in a general manner that oxygen is indispensable to them. Messrs. Vesgue and Deherain have concluded their experiments showing that the roots must find in the atmosphere of the soil, oxygen, just as the leaves obtain it in the air. The root however disengages but little carbonic acid; thus little, is not due to any decomposition of the plant's organs, but to the regular circulation of the gas in the plant.

How to obtain heavy crops from the soil and at the same time secure for them a good market price, are the problems engrossing all attention. French farmers have been leaning to the raising of cereals, as the road to remunerative culture, but were all to do likewise, France would be a granary of abundance, and excess would reduce profits below zero, then it is never prudent to put one's eggs in a single basket. These considerations lead to the new departure of keeping cattle simultaneously with grain raising, falling back, where required on the market for a supplement of fertilizers.

The question of the exciting property of oats as a measure of their feeding value, is again being discussed. It is admitted that this stimulating or exciting virtue resides in the pericarp of the grain and is highly nitrogenous. It acts powerfully on the motor-nerves. It exists in oats in a different degree varying with the soil on which it grown. Black possess a greater percentage of this stimulating substance than white oats; crushing the grain lessens its stimulating action. The duration of the influence of this exciting influence is estimated to be one-half hour per each pound of whole grain.

Dr. L. Hecht, has tried to produce a cereal by crossing wheat with rye, and thus obtain a grain with a tendency to ripen earlier and perhaps in suiting poor soils might thereby enhance their value. The flower of wheat is hermaphrodite, that is capable of impregnating itself like an oyster. The male and female organs are so enclosed in a capsule that it is extremely difficult for the pollen of any neighbouring ear to penetrate, and still less that of any different plant. Hence it was necessary to artificially impregnate, by opening carefully the flower capsule and remove the stamina when green. When the pistels—left alone—were deemed fit for fecundation the pollen of an ear of rye was shaken on them, the capsule carefully closed, and protected by a papering. The experiment upon ear yielded ten grains of wheat. These were sown in autumn, nine germinated. The sowings were continued. Results: some of the years naked; others bearded—the original wheat was the bearded Armstrong variety—but all resembled more the wheat than the rye. The seed stooled well. The expeiment never can rank higher than a curiosity.

Gum Arabic.—The Soudan rebellion, threatening as far as Wady-Halfa, and thus preventing communication on all the caravan routes, has put a complete stop to exports of gum arabic. The stocks at Cairo, Trieste, Marseilles, and England being nearly exhausted, there is no doubt that the real article will eventually disappear from the general market. From the annual report for 1885 of the Breslau Chamber of Commerce it seems that even if order were re-established (an event which is not likely to happen for a long time) they could not yet rely upon arrivals of any importance, since the small accumulations of gum in the Soudan have partly been used as food and partly destroyed.—*Das Handels-Museum.* [This ought to encourage the collectors of gum from our cadjunut trees in the Cinnamon Gardens and lowcountry generally.—Ed.]

Cactus Spirit.—In Spain Don Fernando de la Camara recommends the employment of the fruit of the Prickly Pear—Opuntia vulgaris—for the manufacture of alcohol. As this plant is very common in many of our tropical and subtropical dependencies it may be worth the consideration of some of our Colonial friends.—*Gardeners' Chronicle.*

Nova-Scotian Apples.—Some idea of the immense consumption of Apples from across the Atlantic may be gathered from the fact that frequently in a single day one auctioneer in Covent Garden Market sells under the hammer 10,000 or more barrels of fruits from Nova Scotia. And the same may be said of other salesmen.—*Gardeners' Chronicle.*

Fruit Development.—The cause of the fertility produced in fruit trees by bending the twigs at an acute angle has been investigated by Professor Sorauer. He finds that the bark on the lower surface of the twig below the bend is thrown into transverse folds, here and there detached from the wood. In these cavities new woody tissue is formed, filled with starch grains and afterwards new woody tissue of a normal character, but always thicker there than elsewhere, and especially on the convex upper surface. The mass of woody tissue checks the flow of water towards the tip of the branch to the great advantage of the bud immediately beneath, which is thus more likely to develop as a fruit bud. Pressor Sorauer does not appear (*Gard. Chron.*, Dec. 18, p. 785) to have taken into cosideration the obstruction to circulation of the sap caused by the partially broken or compressed wood cells at the bent portion. In bending poppy head stems to ripen the heads, this is probably the chief factor in the case, by arresting more or less the upward flow of the sap.—*Pharmaceutical Journal.*

Asimine.—The "North American papaw," or "custard apple" (*Asimina triloba*, Dunal.) is an anonaceous shrub that occurs on the banks of streams in the middle, southern and western states of North America, and probably received one of its names on account of its edible fruit, from negroes who were acquainted with the papaw of the tropics (*Carica Papaya*). The plant is not at present used in medicine, but as the bark and leaves have a disagreeable smell and bitter taste different parts of it have been submitted to examination by Messrs. Lloyd (*Pharm. Runds.*, Dec., p. 269). Only the ordinary constituents were found in all the parts except the seeds, from which an alkaloid was isolated that has been named "asimine." The pure alkaloid is described as being colourless, odourless and tasteless, insoluble in water, readily soluble in alcohol and ether, and less soluble in chloroform or benzol. It could not be obtained in the crystalline form, but the hydrochlorate and some other salts were easily crystallizable. In some of its reactions asimine closely resembles morphine, and it will probably be made the subject of physiological experiments.—*Pharmaceutical Journal.*

A New Medicinal Plant.—A new medicinal plant is referred to in a recent number of the *Therapeutic Gazette* under the name of Cacur, and is said to be used by the Kaffirs in Southern Africa as an emetic. The plant is said to be Cucumis myriocampe, and the green or yellowish-green fruits are the parts used. The form of administration, as pursued by the Kaffirs, is to heat the fruits, and squirting the contents into their mouths, to swallow them. The contents of two fruits are considered a dose for an adult, and one for a child. The plant grows largely in gardens as a weed, especially where Melons and Pumpkins are cultivated, and it produces its fruits very abundantly. These fruits are about the size of a large Gooseberry, at first green but turning yellow on ripening, and covered sparsely with short soft prickles. The soft viscid pulp has a faint odour of Cucumbers and a decidedly bitter taste. From experiments made with the pulp of the fruit it seems to be decidedly emetic in its action and purgative in non-emetic doses. The chemistry of the plant has not yet been satisfactorily ascertained; so far as it has been done there seems to be "no trace of any alkaloid, the activity seeming to depend upon a bitter neutral principle readily soluble in water or in 80 per cent alcohol."—*Gardeners' Chronicle.*

CINCHONA IN JAVA.

[The following Report shews that Mr. Van Romunde is a worthy successor to Mr. Moens, for the interest he takes in his work, and the experiments he carries on, of the results of which we shall hear in future Reports. Mr. Van Romunde's full Report for 1885 covers five pages of the January number of the *Tropical Agriculturist*, and contains much very suggestive information.—ED.]

REPORT ON THE GOVERNMENT CINCHONA GARDENS FOR THE 3RD QUARTER OF 1886.

(*Translated for the "Ceylon Observer."*)

The weather during the past quarter has been pretty dry, though it was occasionally varied by slight showers of rain, which were very beneficial to the young plantations and nurseries. Frosts at nights, which generally take place during severe droughts and strong East winds, were nowhere observed.

In the beginning of this quarter some thousands of strong grafts were put out in the open ground, and are thriving as well as could be wished.

The harvest of 1886 up to the end of September amounted to 300,000 Amsterdam pounds of bark, of which 260,288 pounds were sent to Batavia.

This produce was obtained by thinning out closely planted Ledgeriana and Succirubra plantations, whilst a not unimportant quantity of pharmaceutical bark was harvested by rooting out some old succirubra and Josephiana gardens.

Much care and expense were bestowed on the nurseries of Ledgeriana and Succirubra seedlings for the purpose of replanting the old gardens, which have been uprooted as well as those remaining to be uprooted.

A vigorous commencement has been made in the preparation of the ground for this planting out, as also in the clearing of wooded ground for extending the plantations of the graft planting at Tirtasari, which graft planting will be increased during the coming West monsoon to the extent of 30 bouws.

During the past quarter only a few public sales of cinchona seed were held, the gross proceeds of which amounted only to *f*165·25. The greatest quantity of seed did not begin to ripen till the month of September. At the sale of the 5th October a considerable amount of seed was announced, of which a portion was obtained from grafts of selected mother trees, the bark of which yielded over 10 per cent of quinine. In consequence of combination among private planters, this sale only realized *f*203·50.

Advices have been received of the sale of the second half of the produce of the harvest of 1885 on the 29th September last. The results of the sale are not yet known here.

At the request of parties interested in the cinchona trade, and in concert with the Netherland trading Society, the Minister for the Colonies has decided that as a trial eight sales of cinchona bark, each year, shall be held during 1887 and 1888.

The researches made for ascertaining the influence which the Succirubra stem has on the constitution of the bark of the Ledgeriana grafted thereon, have been carried on during the past quarter, but have not yet been completed, so that the results will not be made known until the next quarterly report shall be sent in.

(Signed) VAN ROMUNDE,

Director of the Government Cinchona Undertaking.

BANDOENG, 7th October, 1886.

STATEMENT SHOWING THE POSITION OF THE GOVERNMENT CINCHONA PLANTATIONS IN JAVA FOR THE 3RD QUARTER 1886.

(8 plantations from 1,250 to 1,900 feet above sea level.)

Plants in the Nurseries :—Total of different kinds.—Ledgeriana, 1,249,000*a*, Succirubra 560,000.

Plants in the Open Ground :—Total of different kinds.—Ledgeriana 755,700*b*, Calisaya en Hasskarliana 74,000, Succirubra en Caloptera 556,000, Officinalis 234,000, Lancifolia 8,000.

Plants in the Nurseries.—Total of all kinds 1,809,000.

Plants in the Open Ground.—Total of all kinds, 1,627,700.

General total number of plants 3,436,700.

a Including grafts.

b Including cuttings and grafts.

(Exclusive of more or less 3,500 original Ledgerianas).

Translated for the "Observer" from the Extra Supplement of the Javasche Courant, ("*Government Gazette*") issued Dec 18th, 1886.

IMPORTANT TEA DELIVERY CASE.

A case of some importance has recently been tried in London in the Queen's Bench, in which the question of short weight was concerned. The plaintiffs, Messrs. Lister and Biggs, purchased of Messrs. Barry & Co, 96 chests of Tea of the declared nett weight of 9,225lb. When the Tea came to be weighed at the London wharf it was found to be 587 lb short. The defence was that the sellers acted simply as agents and were not responsible for the declared garden weights. Although the amount in dispute was only 25 lb, the case is necessarily of considerable importance to owners and Agents here, and it is to be hoped that it may induce more care being exercised as to Garden weighments in future. It would seriously tend to a want of confidence in the home market if such cases were to become at all common. In this case the chests are reported to have been in good condition. The only conclusion that can be come to, therefore, is that the scales at the garden must have been defective, for, of course, intentional fraud in such a matter is quite out of the question. Managers would do well to have their scales periodically tested, as they are liable, of course, to get out of order, and during weighment a European assistant should invariably check the native weighman, with whom, perhaps, inaccuracy of weight sometimes lies. The judge, in summing up, dwelt on the great importance of this case to Tea owners, because, as he remarked, on the one hand there was a sort of imputation that fraudulent conduct had been pursued somewhere, and on the other hand a custom had been set up which was a dangerous one,—a custom which required a great deal of watching. He held that a man buying a given quantity was entitled to receive that quantity, custom or no custom notwithstanding. The jury naturally enough concurred in this view, and found for the plaintiffs with costs and a certificate in a special jury. So that by the time all charges are paid, the expense will not be trifling. That, however, is of less account than the injury which such a case is likely to do to the reputation of Indian shippers. Fortunately, publicity in such matters, is as a rule, avoided, and we think Messrs. Barry & Co. showed an unwise discretion in disputing the claim. Whenever a claim in respect to short weight is made at home, it is almost invariably at once allowed by the wholesale seller, and we think it is only fair that this should be so, even though the loss may have occured through pilfering at the Bonded Warehouse, because the purchaser has nothing to do with this. It is the owner or his agent alone whose business it is to protect his own property, or, if he is unable to do so, to hold himself liable for the loss. That a good deal of pilfering goes on in the bonded warehouses we fully believe, and it is strange that so little heed is paid to the matter. It is not very long ago that a prosecution of some employees of the Bonded Warehouse revealed the fact that tea stealing was constantly carried on there, and wholesale sellers, as we say, were frequently in the habit of allowing, without question, for such deficiencies. We think, however, in justice to their friends on this side, they should not take the matter so easily, but should induce the authorities at the Bonded Warehouse to look a little better after their employees.—*Indian Tea Gazette.*

TRAVELLING SHOW OF AGRICULTURAL IMPLEMENTS IN SOUTHERN INDIA.

The following Resolution of the Madras Board of Revenue, is dated 13th November :—

"The Director's report on the operations of the Travelling Agricultural Show, sanctioned in G. O., dated 10th June 1886, will be submitted to Government. The show, under the superintendence of the Assistant Director, Mr. Benson, travelled for two months, July and August, along the line of the South Indian Railway through the districts of South Arcot, Tanjore, Trichinopoly, Madura and Tinnevelly; it visited some twenty of the more important towns of those districts, and at each place the working of improved ploughs, seed drills, harrows, rice hullers and other appliances was exhibited with success, and, as a result, some 300 ploughs of an improved type were sold by the agent whom Messrs. Massey & Co. had deputed to accompany the expedition. What its cost was does not appear, but, under the orders of Government sanctioning it, that cost will have been met from the allotment provided for the ploughing matches, whose place it takes. The Director recommends that these tours should be continued and the Board support him; he proposes the permanent deputation of a trained student to take charge of them, and the employment of a competent blacksmith, the time of both to be given wholly to the work. The former proposal has the Board's support, the latter has not; it is not desirable that the people should be taught to be dependent on a itinerant Government blacksmith to the discouragement of the local smith, nor, in any case, would it be fair to the latter that the former's work and material should be given gratis. It must be brought home to the people that it is to their profit to buy spare shares, which should be readily available; and, if it cannot be shown that it is to their profit to do so, then the plough stands condemned and the fact should be honestly admitted; if the ploughs cannot command themselves to the public on their own intrinsic merits, without the assistance of gratuitious repairs by Government, then any temporary advance that they may make must be looked on as a mere paper advance, and not as a permanent fact. The Director suggests also that the exhibitions should be limited to the working of ploughs, but this does not appear to the Board to be necessary; the exhibition of ploughs should certainly be the main object of the expedition, but it will not be possible to be ploughing always, and the spare hours may usefully be spent in the exhibition of other appliances, to the existence of which, if not to their use, the native mind will gradually become accustomed."—*Madras Mail.*

NATIVE AGRICULTURE AND AGRICULTURAL EDUCATION IN CEYLON.

From one of the most estimable and intelligent of Sinhalese country gentlemen we are acquainted with—Mudaliyar D. C. Ameresekere of Hanwella, a friend of Sir C. P. Layard—we have received the copy of a letter which he sent to the Public Instruction Office so far back as October 1884. No acknowledgment has been received, but very probably some of the Mudaliyar's ideas have been acted on. We quote as follows:—

1. That the children of the agricultural classes now attending the village schools stay in school for a very limited period and leave it in a helpless condition. The little learning which is not very often more than an imperfect knowledge of reading and writing is of no avail for them to get a permanent livelihood, nor are they accustomed to do any trade that their parents have hitherto done. Moreover, most of the lads at the present day think it a disgrace to work in a field or garden after having been in school for sometime. These lads when they are grown up try to earn food and clothing in various trifling and ineffectual ways and failing to attain their object, they resort to vicious and unlawful means, loathing work and those who work. It is, therefore, perceptible to all, and to me particularly, (being a resident in the interior) that in this manner the island is gradually going down in wealth and civilization.

2. That my opinion as regards the establishment of village schools is summarised as follows:—An allotment of jungle land of the extent of ten acres or more, a sufficient supply of agricultural implements, and a teacher should be given for each school by Government. The parents of the children should fell down the jungle and put up a school bungalow with accommodation for the teacher to reside in. The school should be kept for six hours, three of which should be spent in learning reading, writing and arithmetic (of the native language) and the remaining three for garden work. The land in this case may be divided among the pupils of the school, and be planted with coconut, jak, arecanut and other fruit-bearing trees, together with yams and vegetables of different kinds according to the nature of the soil. When the school is in existence for five years the entire land allotted for the school will in this way be planted and the greater number of the trees will be bearing. An acre of the land will then be worth about R300, the same acre in its wasteful state would not have been disposed of by Government for more than R10. One-half of the planted land should be given to the pupils of the school, the other half to Government. By this means a considerable sum may be added to the revenue also. The schoolmaster should be entitled to half the yams and vegetables grown on the land, and the pupils to the other half. The teacher is here able to raise a considerable sum, hence a schoolmaster who is now working for R20 per mensem will be willing to work for R15, as he will be able to raise over R5 a month by his share of vegetables, &c.

3. When the land has been fully planted, the school may be shifted to a like piece of ground and the same operations being carried on, like results may be obtained. A child who attends school at the age of five will be able to cultivate three pieces of land before he reaches 20. At this age he can leave school as a civilized and experienced cultivator with a certain amount of property which is probably worth more than R500, and with a thorough knowledge of reading, writing, and arithmetic. The descendants of these refined agriculturists will then have reason to think that these two (cultivation and learning) are the natural courses that children have to take up, and will no more entertain that erroneous idea that work is a disgrace.

4. When village agricultural schools are established in the manner I have indicated, the parents of the children in the interior will be too glad to give a helping hand to education for its dissemination. I am of opinion, therefore, that this method will be one of the best plans by means of which the wealth and civilization of the island may be raised to a higher standard. —I remain, dear sir, yours obediently, D. AMERESEKERE.

CEYLON TEA IN AMERICA.

We call attention to the letter of Mr. J. McCombie Murray on this subject, (page 524,) which may be taken as addressed to "The Ceylon Tea Syndicate"—if such a body is still in existence—per favour of the press. We have from the outset maintained that America—the United States and Canada—presented the most favourable field of operations for a Tea Syndicate. Far more so, in our opinion, than the Australasian Colonies with their limited population, less all told than

is contained in many single States of the Western Republic. The United Kingdom is even now effectually worked and private enterprise is likely to do all that is required there in the way of extension. There may be room on the Continent of Europe to make Ceylon teas better known and to endeavour to encourage consumption—to create a demand, now that coffee is getting so dear. But it is surely among the 60 millions of English-speaking people, between the Atlantic and Pacific, most of them tea-drinkers or the descendants of tea-drinkers from our common mother-country, that we may look for encouragement and success from the working of a Tea Syndicate, in placing good sound Teas before the consumers, without the interference of New York buyers or mixers. There may be technical objections to some parts of the scheme of Messrs. Pineo and Murray; but in its broad outlines, it seems to present a feasible plan of working and one by no means unfavourable to the Ceylon producer. We trust it will be taken into the careful consideration of the Planters' Association and the Syndicate Committee. If all large proprietors promised a few thousand lb. of tea each, in support of the experiment, there would not be much difficulty in guaranteeing a sufficient quantity to try the American market thoroughly for a year at least. Perhaps Mr. Rutherford would consent to make the schedule he originally drew up, form the basis of a new guarantee in favour of Messrs Pinoe and Murray. Both these gentlemen are too well-known in Ceylon, and have too close a connection with the island, to be otherwise than sincerely and wholeheartedly anxious to do their best for our produce. Indeed, there would be the best of guarantees to this effect, namely, that their own interests would be indentical with those of the Ceylon planters. We trust, therefore, that the present opportunity of getting a fair trial for our teas on the Continent of North America, and especially in the middle and Western States, may not be slighted, but that through the good offices of the Planters' Association and its Committee, steps towards the establishment of a Syndicate for this purpose, may shortly be taken.

CEYLON UPCOUNTRY PLANTING REPORT:

CURING OF TEA IN COLOMBO—RAMASAMI'S IDEA OF PUNCTUALITY.

17th Jan. 1887.

Is the curing of tea in Colombo which is already being tried, the beginning of a big thing or an expiring effort of the old system? If fuel is going to become expensive and hard for estates to get, the sending of green leaf by train to Colombo, may be one way to yet over the difficulties. Anyhow, thirteen cents a lb. which I understand is paid at present, should suit some of the low-country places, and with a cheap freight and a night train even some that are higher up. If fuel has to be imported, it may become a question whether it would not be cheaper to have large factories in Colombo for the manufacture of tea. To meet the freight of the leaf, there would be the saving on the carriage of lead, fuel and manufactured tea. Of course it would be only estates near a railway which could avail themselves of this plan. There would require also to be special trucks for the carriage of the leaf to allow a man to pass through them, who might stir up the leaf to prevent its heating; and the factory to take delivery from the planter at the railway station. By this means one man travelling with the train might look after the pluckings of a good many places, and land them in good condition at the terminus.

Now that the cooly is feeling that he is again becoming of some importance in Ceylon, he is waking up to a sense of his rights, and is evidently not to be trifled with. A striking illustration of this I heard the other day. A head kangani presented his "durai" with a Waterbury watch so that he might blow the horn regularly at four!

PEPPERCORN.

COFFEE DISEASE IN THE PROVINCE OF RIO DE JANEIRO.

On the 18th Nov. the president of the province addressed a circular to the various municipal chambers calling attention to the report of Sr. Glaziou, in which he claims to have discovered the origin of the coffee disease. Sr. Glaziou's report is of sufficient interest to warrant our translating it in full.

To the Coffee Planters:—

After repeated investigations I have had the fortune to discover, on the plantations of "Boa Esperanca" belonging to Major Belieni and "Serra Vermelha" belonging to Sr. Francisco Dias Ferreira, in the municipality of Cantagallo, on October 22nd and 23rd ulto. the manner in which arises the propagation of and the inoculation by the parasitic insect constituting the present disease of the coffee trees in Brazil; and, what is better, a positive and practical manner to destroy it in little time. The cause of so lamentable a damage is a microscopic insect which lives and grows in the filiform roots of the coffee tree, introducing itself into its radical spongioles where it destroys the cellular structure of the plant in search of food, and when adult it creates in these same roots its nests, formed into knots, which reach a diameter of one to three millimetres. In these knots, or nests, the insect deposits its thousands of eggs. Concurrently the small radical fibres attacked by the insect rot away, dropping into the surrounding ground the thousands of eggs deposited by the insect and which may be compared to the *sporidia* of a certain group of mushrooms, as well from the exterior appearance as from their incalculable number.

It is in consequence of this pest that one sees the coffee plant wither, assume a yellowish color, lose its new leaves at the extremities of the branches and drop its fruit, already blighted by the deviation of the sap which the nutritive organs had condensed from the soil for the benefit of the normal life of the tree. Thus attacked the plant quickly dies, bequeathing to the soil the totality of the evil which has caused its destruction.

Such cases have occupied my attention for some five years, and even more the manner in which planters might free themselves of them, and this I have positively discovered. It is this: examining with my own eyes through a microscope, excavating the soil myself in the coffee plantations, I recognized that the cause of this lamentable disease exists in the heaps of weeds hoed up, and nearly always drawn around the coffee shrub. There these weeds rot, forming little heaps of humus very light and very fertile, which attract the newer roots of the coffee plant, and as there they are more tender and more vigorous than in any other place, they are immediately invaded by the pest up to the very smallest fibres in a most disheartening manner. The heaps of humus formed by the residuum of decomposition of these weeds are later on dissipated by the rain and scattered in all the depressions of the soil, and thence their animal contents penetrate so much deeper into the porous soil, as this is proportionately fertile. The penetration is less frequent in compact, argilaceous and dry soils.

Convinced of this fact, I hasten to recommend to interested planters never to heap the weeds and leave them to rot around the coffee trees, but to scatter them between the rows, where there is sufficient sun, that they may be dried as speedily as possible, and once dried to collect them into heaps and burn them, leaving the soil of the coffee orchards perfectly clean. If there be any difficulty in burning the weeds, it is absolutely necessary to carry them out of the orchards

and place them in uncultivated spots, far from the plantations, and above all from orange trees, for these latter are also liable to attacks, from and destruction by this same pest which so miserably destroys the coffee plants; the same thing occurs with the *pawpaw* (*mamoeiro*) where I have also discovered the pest. By following these indications, I am convinced that, in less than two years, the coffee orchards of the municipality of Cantagallo and of others will return to their pristine condition, maintaining a favorable position and repaying to planters and to the State a return for their labors. —*Augusto Francisco Maria Glaziou.*—"Rio News."

Artificial Fuel for Tea Curing.—We regret to learn that the result of enquiries is to shew that although crude Kerosene oil could be applied as an efficient heating agent, the cost of carriage would bring the cost up to double the price of coals, while coals seem to be in most cases twice the cost of wood fuel. Our own hope is in the residuum of coal wells, compressed into bricks, the freight of which, as ballast for ships, might be very ow. In any case we cannot doubt that a cheap artificial fuel will, ere long, be discovered.

Coffee Disease in Brazil.—We call attention to an interesting extract on our last page, from the *Rio News* by which it will be seen that a Brazilian attributes the coffee disease which has ravaged the province of Rio, to a minute insect, fostered by heaps of decaying weeds. We suppose this is the *Cemiostoma* referred to by the late Mr. Cruwell in his letters to us from Brazil, although no scientific name is given by M. Glaziou. We doubt very much whether this gentleman's remedy will be as successful as he anticipates.

Cheap Quinine: A Practical Question.—Can any of our readers find out through relatives or friends, whether the people in the Fen districts of England or away down in Essex and Kent about Gravesend and the mouth of the Thames, have benefited at all by the cheapness of quinine? Quinine is of as much consequence to them as to the people in the Southern States of America. Do the resident clergymen, and other ministers and philanthropic people generally, know that quinine can be got for 2s 6d or 3s per ounce? Who will enquire?

The Advance in Kowrie Gum.—For a number of years past statements regarding the growing difficulty of gathering kowrie gum have reached this market at different times, almost invariably with the result of causing a stiffening of prices here. Recently similar reports have been received, with the added information that the diggers have now to seek for the gum so far from the settlements that the expense of transportstion adds materially to the cost of the article when put upon the market. The long depression in trade in New Zealand has induced a large number of people who engage in the occupation only as a last resort to go to work at digging for the gum. Still, notwithstanding the increased number of diggers, supplies come in very slowly from the interior. —*New Field Drug Reporter.* [Gums of all kinds are advancing in price.—Ed.]

Kapok.—Under this Malayan name the Silk-cotton tree of India and the Archipelago, and which is indeed common throughout the tropics, is known. Botanically it is the Eriodendron anfractuosum, a plant well known to botanists, and, when collecting seed-vessels was in vogue some forty years ago, to amateurs also. It was always a mystery why the silky fibres attached to the seeds of this plant in such profusion, were not utilised. Certainly it was from no fault of the botanists. Now we learn that it forms a large item in Australian trade, Melbourne being now supplied from India and Ceylon. It is chiefly used for upholstery purposes. In 1886, 7,995 bales, worth between £26,000 and £27,000, were imported, principally from Java, where special care is taken in cleansing and packing the fibre.—*Gardeners' Chronicle.*

Correspondence.

To the Editor of the "Ceylon Observer."

CEYLON TEA IN AMERICA.

Philadelphia, Pa., 12th Dec. 1886.

Dear Sir,—Your editorial "*re* The Ceylon Tea Syndicate" appearing in the Overland issue of the 29th October has been read with interest. That "it is to a Syndicate of the main body of those interested in tea-growing in the Colony that we look for the full realization of our desire" is, perhaps, a matter of fact more easily understood than fully realized, that is if any dependence is to be placed by the Ceylon growers upon the American market as a fall-back. Before advancing any arguments, let me mention that I am indebted to the invaluable information afforded me by Mr. Pineo (with whom I am about to co-operate) for a more or less intimate knowledge of the tea trade as carried on in America. You refer in your editorial to the practices of "unscrupulous parties" in Britain to the unscrupulous means used for trade purposes in dealing with our Ceylon teas. A passing glance at the American tea market would turn the *veryest* abuses in England into the most honest trade. I speak of what I *see* and what I see, I *believe*. There are two classes of people who are identified with the tea trade—the seller and the buyer, or, I may say, the seller and the sold. It is difficult to understand how a people, proverbially sharp in business and oftimes unscrupulous, can themselves be so easily swindled in their turn, but so it is. Fortunately for us, we are yet in the position of power. We *might* be deceivers if we *would*, but to be so there is no call, and we cannot be deceived ourselves so long as we act with wisdom and forethought.

Our Indian rivals, as I intend showing, were unfortunate inasmuch as they failed to *hold* their position by throwing their produce *en bloc* upon the American market. The value of the same was, from that moment, a matter for the Americans to decide, the result as may be expected a heavy loss to the members of the Indian Syndicate, and a marked improvement in the *Japan* teas without the shadow of benefit to the name of India as a tea-producing country.

It surprized me to hear from as interested and acute an observer as Mr. Pineo, that to his knowledge there has not been a pound of Indian or Ceylon tea retailed in the country, save what came through his hands. Is not this sufficient proof that the means used by the Indian Syndicate were inadequate to serve the real interests of the Indian tea trade, or to meet the requirements which a *proper introduction* calls for? As the result has proved, the energies of the Indian Tea Syndicate have been most successfully devoted to raising the value of *Japan* teas in the opinion of the American people and nothing more. If I might make so bold a surmise, I should say another cause of the failure of the Indian Tea Syndicate might have been a very half-hearted interest, in, if not actual discouragement of the business on the part of the Calcutta Agents, who natuarally enough, would take no favourable interest in a scheme which took business past their portals.

Do I hear the Ceylon producer say: "The more reason why the Ceylon Tea Syndicate should die a natural death—we'd better let well alone! As for myself I'll send *my* tea to the London market as long as I get prices that pay." Just so! Every seller is at perfect liberty to sell in the market of his choice, but that in no way interferes with the abuse of your tea in America. Your tea is bought

today by Americans for *mixing* purposes, but *that* in no way assists in the introduction of your produce into America. It merely aids in placing the rubbishy Japan teas *on a higher level*. Is *this* the end for which you work? Be assured of this, O proprietor, (and you can place this letter in a safe place for reference about three years hence) that should you find prices go down in England, you will have considerable difficulty in disposing of your produce profitably when you find that you *are obliged* to sell your tea, unintroduced to the consumer, in the open American market or sell as best you can in Mincing Lane.

Unless Ceylon tea is very soon placed before the American people as *a specialty;* unless the taste of the American people is educated to it, and thereby a *demand* for it *created*, it will yet have to play second fiddle to Indian tea as a medium for mixing, and share with it the *honour* of raising Japan tea to a higher standard and securing for it the monopoly in the country. We have considered the fate of Indian tea, as also the probable fate of our Ceylon teas in this country. If I am right in what I say, it behoves us to consider how best to avoid such a fate for the produce in which we are all so deeply interested. My ideas and opinions have already appeared in your columns, and I fear I must repeat myself to a certain extent:—

First.—Interested agents must be appointed in America, whose business will be to sell pure Ceylon tea in registered packets only.

Why *interested* agents? Because no tea-dealer in America would undertake to *push* a tea which affords him less profit than the tea he deals in. The profits on Japan teas are larger than can be made on Ceylons. Why *should* the jobber disorganize his usual trade to please the Ceylon producer? It would entail talk, trouble and energy to no profitable end. His trade would be less, his profits would not and *could* not be increased one whit. On the contrary, they would be diminished.

Second.—The Syndicate, if formed at all, must provide itself with a certain amount of capital like any other business; and, moreover, it must be so organized that tea can be collected when called for, bulked, sifted, packed and dispatched at regular intervals, and in such quantities as may be demanded by the consignees. Any Syndicate formed on a basis of a less business-like nature will, to my mind, prove a failure if indeed anyone could be found on this side to take it up at all. It remains for the planting community to decide what they are to do in the matter. Personally, I have no pecuniary interest in the result as Mr. Pineo and myself have arranged to work on an independent basis. I do not mean to infer that we would not be willing to further the scheme. Nay, even devote our *entire* energies to further the ends of the Ceylon Tea Syndicate, but we could only do so on such terms as would prove remunerative to us as well as a reliable business to undertake.

That we could serve the interests of our own brand simultaneously with those of the Syndicate teas is impossible.

On the other hand we would be willing to *lend*, so to speak, the entire privilege of using our brand free of any charge, we ourselves looking for remuneration which will accrue from the advertisement of the same, and the benefit we derive therefrom when the Syndicate shall have ceased to exist.

Our brand I may say has been got up at considerable expense. The trade mark is a representation of the ubiquitous "Kootee" plucking a tea bush.

Let me here say that this subject was selected by Mr. Pineo some eighteen months ago and acted upon some six months back, so that there has been no piratical action in the matter. Neither party can be effected in any way by the coincidence, so there is no call for regret. As a guarantee that no loss will be sustained by the members of the Syndicate, we are willing to pay 10 per cent over the London valuation of tea consigned to us provided:—

First.—That the valuators be nominated with the common consent of both parties.

Second.—That the charges on such valuation be paid by the Syndicate.

Third.—That freight and all shipping charges to Philadelphia be pre-paid.

Fourth.—That the members of the Syndicate agree to wait for returns for each consignment until such consignment be sold out.

Fifth.—That we have the Sole Agency in America, with power to appoint sub-Agents wherever we may deem it advisable.

Sixth.—That the Syndicate guarantee to provide us with tea at *regular* intervals in such qualities as may be required by us, and that the quality of the same be kept up to their original standard.

We on the other hand agree to protect in every way the tea consigned to us. To push the sales of the same in our registered packets through our own retail trade, and that of all respectable grocers in the United States and Canada. To expedite in every way the sale of your tea, and pay in full the value of the same with the addition of 10 per cent on the valuation, on each consignment being disposed of

In conclusion let me add, that we know ourselves to be in a position, by the foregoing means, to dispose of almost an unlimited amount of Ceylon tea, and that the extent of business done will only be limited by the members of the Syndicate themselves. At the same time the aforesaid provisions would have to be rigorously enforced, especially Prov. No. 6, as any shortcoming on the part of the Syndicate would be a deathblow to the success of the undertaking.

I have already given you reasons why, with the exception of ourselves, no one will take in hand to push your interests. In corroboration of the assertion let me quote the expression of the principals of the well-known firm of Acker, Merril & Condit, when conversing with Mr. Pineo:—"We would not be bothered, or try to introduce Ceylon tea; nor would we even look at it unless a demand was created. Then, and then only would we handle it." In making the foregoing proposal to the members of the Syndicate, we are influenced not so much by the expectation of great pecuniary remuneration at first, but by a strong desire that Ceylon tea should be properly introduced into America; that it should be placed in the position of standing on its own merits and *eventually*, prove as it *must* if properly treated, remunerative to all who handle it and ultimately take its place as the *nonpareil* tea of the world! The teas required here would be of three grades (1) a Pekoe about 1s 5d to 1s. 6d, (2) a Pekoe Souchong about 1s. 1d. to 1s. 2d. and (3) a Souchong about 10d. to 11d. London valuation. All teas would have to be shipped to Philadelphia until further notice. It may not be generally known that our fine plantation coffee has yet to be introduced into America. Grocers are very much struck with the very regular and handsome appearance of the same when a sample is shewn them. We would like to have the assistance of the Syndicate in this line also, as we are sure we could do good business in it.

The matter may now be left in the hands of the Syndicate for consideration.—Yours faithfully,

J. McCOMBIE MURRAY.

P. S.—I enclose a table shewing how every member of the Syndicate can get his due according to

the valuation of exports in Ceylon. I expressed my views on this subject in a previous letter to the *Observer* while resident in the Island :—

		lb.	Valued in Ceylon at	Total Valuation	Proportion of each consignt. to whole	We suppose the 3 samples are valued in London and average 1s 2d per lb. The addition of 10 per cent would have to be added and freight and other charges to be subtracted, but we will suppose that the proceeds amount to 1s 2d per lb. all over. Value in London at 1s 2d.=	Proceeds in pence	Price received per lb.
A	Sends	500	13d	6,500d	·0924		6,726·72	13·45
B	do	250	13½d	3,375d	·0480		3,494·40	13·97
C	do	400	14d	5,900d	·0796		5,794·88	14·48
D	do	600	12½d	7,500d	·1066		7,760·43	12·93
E	do	750	14½d	10,875d	·1546		11,254·83	15·00
F	do	800	13d	10,400d	·1478		10,759·34	13·45
G	do	900	14d	12,600d	·1791		13,038·48	14·49
H	do	1000	13½d	13,500d	·1919		13,970·52	13·97
		5200	13·53	70,350d	10,000	72,850	72,300·00	

PLANTATIONS AND INSECT VISITORS.

Lawrence, Dikoya, Dec. 1886.

Dear Sir,—Today's post takes you a tea tree branch, on the leaves of which you will perceive a yellowish bug-like insect. Can you tell what it is, or refer it to some one who can ?—I am, dear sir, yours faithfully, WALTER AGAR.

[Our referee's report : "19th Jan. 1887.—The males of a scale bug, species unknown to me. After being kept for about ten days, they became winged insects."—Ed.]

COFFEE AND INSECTS IN HAPUTALE.

Haldummulla, 31st Dec. 1886.

Dear Sir,—I send you by this post an insect I found on a coffee tree. I don't remember seeing one like it before. It was on a coffee tree which had a bad attack of "green" bug, and I can't help thinking, it may have something to do with that terrible pest. Perhaps your entomologist will tell us if it is the queen green bug or not! It much resembles the bug in form and colour, though, of course, much larger. I fear I killed the insect in catching it. Wishing you all a very happy New Year. HAPUTALE PLANTER.

[Our entomologist referee says :—"17th Jan. 1887 :—The larva of an insect belonging to the order *Homoptera*, family *Cerespidæ*, and allied to the 'frog-hopper.' It lives on the juices of plants, and can do no harm to coffee or tea, being seldom found in large numbers."—Ed]

THE HIGHEST PRICE OF COFFEE.

Colombo, 5th January 1887.

Dear Sir,—Since 1870 the highest price paid in Colombo for coffee per bushel is 27s (R13·50) : this for "Amunamulla" and "Rahatungoda." I am not quite sure about the f. o. b. price, but think a little over 125s (R62·50) was realized.—Yours faithfully,

E. JOHN, per REGINALD JOHN.

"BULKED UNASSORTED TEAS": MESSRS. RUCKER AND BENCRAFT KINDLY REQUESTED TO EXPLAIN MORE FULLY

St. Leys, Dikoya, January 10th 1887.

Dear Sir,—I read Messrs. Rucker and Bencraft's remarks regarding the break of tea referred to in my former letter, with much interest. The funny simile of the Doctor's prescription, is, I fear, wasted this time—for there was no attempt at special "Blending" with the lot of "Unassorted" in question. It was simply the *Bulk*, minus red leaf and dust, broken up, and thoroughly mixed. So the "exact proportions of fine and common teas" would be precisely the same as in the assorted lot, both being from the same bulk. A *new* light is evidently about to dawn on us—for I do not think I was alone, in having understood the meaning of "Bulked Unassorted" to be what the words imply. I hope, however, that Messrs. Rucker and Bencraft will act on your suggestion and more fully explain what *they* mean by it, and then we can try again.—Yours truly,

JAS. W. HOLT.

THE RELIEF OF THE "GOYAS:" LAGALLA DISTRICT AND SOME PRACTICAL ACTION.

Hoolankande, Madulkele, 16th Jan. 1887.

Dear Sir,—I read with interest A. G. K. B's. suggestions for the relief of the "goya" in the outlying and poorer villages.

I have for some time past been in communication with the Government on this subject more especially, with a view to obtain measures of relief for the villagers of the Lagalla and Tamankaduwa and Gongala districts.

It will interest you to know that the Government has already offered a grant of land for the establishment of an Experimental Garden; and as far as my experience goes, the officials—from the Col. Secretary to the Assistant Agent—seem to be desirous of carrying out any reasonable and practical measures for the furtherance of the object in question. The Wesleyan Mission has a fairly successful establishment in Lagalla, and I have no doubt that their aid would be freely extended to any undertaking, having for its object the relief of the poorer Sinhalese or their mental and moral improvement.

It is not difficult to propose measures of relief, without number; the difficulty lies in persuading the native to take advantage of them; experimental gardens hitherto have not met with much success; pepper, oranges, vanilla etc., are pretty things to see growing in a garden; but the native is of an enquiring mind and would like to see some one growing them to pay.

Nevertheless, as far as it is possible to see, an advance of cultivation and industry is the only remedy for poverty and its natural concomitants and to this alone must we look for a solution of the difficulty.

Besides the growing of economic products, the native should be encouraged to engage in minor industries, such as basket-making, carving in wood, rope-making etc.: carpentry above all should be encouraged. A man with a good house over his head, is altogether more of a man than his neighbour in the hovel. All these industries would require teachers, and the teachers would require pay, and a responsible person would be indispensable to watch the work, who would also require pay—altogether a good deal of money must be shelled out; but the work is worth the doing. Those interested should now communicate and obtain touch. You, sir, will doubtless use your influence on keeping the subject under discussion.—Yours faithfully E. G. B.

EFFECTS OF TOBACCO ON LAND.

There may be great profits in growing Tobacco (for a while), but I do not think we can keep it up long unless we are willing to spend a good share of the proceeds of sales in the purchase of manure and fertilisers to keep the yield up. So far as my observation and experience goes, I find Tobacco very exhausting to the soil. A heavy coat of manure is needed for every crop, and that is something that can hardly be said of any other farm product. We often read and hear it said that any soil that will grow a good fair crop of corn is all right for Tobacco. I do not find this to be the case. A very good crop of corn can be grown where Tobacco would be a comparative failure. Not only does the crop require an immense amount of fertilising material, but it seems to have a bad effect on the land for succeeding crops. As "Uncle Jotham Sparrow-grass" used to say through "Tim Bunker's" papers, "it seems to pizen the land." One of my neighbours raised last year an acre of Tobacco, putting on the land after it was ploughed a very heavy coat of fine manure, hauled at considerable expense from a neighbouring village. This was cultivated and dragged in thoroughly, so that there could have been no loss to speak of from evaporation or washing. That acre is the corner of a field which he has planted this year to corn—last year's Tobacco land and all. He told me several times that he expected a big crop of corn on that acre. I have seen the field almost daily during the season, and if anything, the acre corner is under the average of the field, notwithstanding it received so heavy a coat of manure while the balance of the field received none. It hardly seems possible that the one crop of Tobacco could have absorbed the manure applied. Until I find a more scientific and satisfactory explanation, I must fall in with "Uncle Jotham" when he says "it pizens the land." Unless the farmer makes a speciality of it, and buys manures constantly to keep his land up, I think the less he has to do with Tobacco the better off will his land be. It is no fit factor in ordinary farm operations with regard to rotation or aught else. While it is no doubt of a more permanent nature it is something like the Hop craze that went through the country a few years ago—every one is rushing into Tobacco growing. Even away up north of the 44th degree, where a crop is never safe from frost, people are expending thousands of dollars for outfits. The business will not wear long under these unfavourable conditions.—W. D. BOYNTON, in "*Farmers' Review*," Oct. 23.

BRICK TEA.

(BY "PERIPATETIC PLANTER.")

I hear that enquiries are afloat in London among the makers of tea-compressing machinery for a press for a firm in India. Now this is a matter *requiring special* information, or a well conceived idea may be shipwrecked by being directed along the wrong course. Compressed-tea, it is as well to make clear at once, is quite a different thing from brick-tea. Compressed-tea will do for the Russian market, and for certain colonies, and for the mercantile marine, but it will *not* do for Thibet. I am personally acquainted with the different kinds of tea-compressing machinery, and I know the traps that exist, in the path of the unwary, or indeed of the wary but uninitiated, here. If the enquiry, mentioned above from India, is with a view to making brick-tea for Thibet, *none* of the existing machinery for making "compressed" tea will be of the least use, and for reasons which it would take too much space to give in detail here. There are two or three types of hydraulic machinery for *compressing* tea and one mechanical press, all capable of exerting 60 tons pressure on the cake of tea, one of these I know to be admirable, another useless as deficient in speed, and in cost of the dies—these costing £70 the set alone—as to the mechanical press only one I believe has ever been constructed expressly for tea, and that was sent out to China, and no report has been received here as to its work. Another press, not included in the above remarks, was forwarded to India through the India office here, ostensibly for the Russian trade, but in reality I understand for commissariat purposes. I have only recently got upon its track, but shall soon have all the facts concerning it too; at present I know nothing except the makers' name. Compressing tea improves its quality at the cost of setting free additional tannin. The tea is compressed simply by the tremendous pressure to which it is exposed for a second, nothing whatever is mixed with it. It is as pure as when it leaves the tea-house, and is as hard as leather. It takes a green appearance as all the calcined black surface is pressed into the bulk of the leaf. Tea thus pressed is in an excellent condition for withstanding a damp climate or for campaigning or for use at sea, as the damp has only a small surface to act upon, which can be scraped off. But this, as I have said, is not brick-tea, nor is it what the Russians have been accustomed to, though prejudice with them would not be the barrier that it would be in the case of the Thibetans, the size of whose bricks of tea has become established with all the force which protects an article that is used as currency in place of money. In the case of Russia, too, it would doubtless pay to study custom and to offer a brick of the usual size. To make such bricks as well for Thibet as for Russia requires a special press. No such press exists, though specifications for such a press exist, and bricks of tea, one being in my possession, have been made on the principle involved in that specification merely as samples by an adapted press just to prove the process, but not as a commercial venture, as of course in an adapted press arranged merely for sampling purposes speed of outturn was no object. To make such bricks at a remunerative speed requires the application of heat, for which no existing presses are constructed. I have gone into this matter very thoroughly, and I have been induced by that inquiry from India, and from other signs of a movement being on foot in this direction to dwell on this subject here, and I may return to it again hereafter, as it is an important one. There is doubtless a great future for brick-tea before Indian planters, and it would be a pity to find that money was being wasted by a start being made in a wrong direction, especially as the machinery being somewhat costly, failure might frighten others and nip the new enterprise in the bud. Should any firm be thinking seriously of going into this matter, I should be very pleased to show their representatives here the brick I hold, which cannot be beaten for Russia—other shapes would be required for Thibet, which is merely a detail in the construction of the moulds. This brick will surprise anybody who sees it for the first time. I should also be very glad to give the necessary particulars, if the applicant really means business. The firm to whom I should have to send such applicant to see trials, &c., being a busy one, I cannot presume upon their time by sending people whose only object is the gratification of a pardonable curiosity. The time may come when Indian planters will find a market for their prunings. —*Indian Planters' Gazette.*

[Note.—We shall be glad to forward any communications addressed to "Peripatetic Planter" on this subject.—ED. *I. P. G.*]

PRINTING BY ELECTRICITY.—The *American Inventor*, of Cincinnati, a large monthly journal, says: —"We print this month's issue for the first time by means of electricity. The Sprague motor is used and is an immense advance on any other kind of power. We are running four presses with a single motor, and it is quite a novelty in action. The motor is built in a very substantial manner, and there are no parts that wear rapidly even with ordinary care. The expense for repairs cannot amount to 10 per cent. of that required for either steam, gas, or hot-air engines, and we now see no reason why it will not give, for many years to come, as good results as at present."

"FRUGES CONSUMERE NATI."

[A Vegetarian Restaurant has been opened in the Strand opposite the Royal Courts of Justice.]

I have always loved a vegetable dinner, I delight
In the Crécy soup or Conde on the *menu* of the night;
The Potato needs no praises, there is rapture too I ween
On the face of every *gourmet* at the mention of the Bean;
And, likewise Sir Henry Thompson, I can feel my heart aglow
At the thought of all the merits of the pleasant Haricot.

I am very fond of Cabbage, and the tender Spinach begs,
Though it isn't quite *en règle*, to be served up with poached eggs;
Then the Cauliflower is charming, and the Celery when viewed
Fresh and crisp from out the garden, or artistically stewed.
While surely on one esculent we're all unanimous,
Is there aught that's more entrancing than thy taste—Asparagus!

All must love the lively Lettuce; we have reason too to bless
Cruciferæ for sending us the piquant Watercress;
Upon any list of salads let the true Tomato stand,
With the Endive and the Beetroot as supporters of each hand;
There the Cucumber awaits us, and we fain would keep alive
Both the Tarragon and Chervil and insinuating Chive.

There is poetry in Mushrooms, and the Lentil too can please,
And a thrill goes through my midriff at the thought of early Peas;
I am grateful to the Turnip and the Parsnip looking pale:
There's the Salsify seductive and the delicate Seakale;
But the bard shrinks back from one task, for no mortal ever can
Do full justice to the comfort that the Onion is to man;

Then we'll hasten to the Griffin, for a little way beyond
Are the Vegetarian dining-rooms of Messrs. Spiers and Pond;
And the Doctors too are with us, men of note in London town,
Risdon Bennet, Milner Fothergill, and also Crichton-Browne;
They have told us very plainly that of health we should be winners,
If we ate less meat, indulging in more vegetable dinners.

—"*Punch*," *November* 20.

SOURCES OF NITROGEN AS PLANT FOOD.

A correspondent ("P. T. I.") in asking the following questions opens up a wide and an important enquiry:—

1. Nitrate of ammonia being the chief compound from which the roots of plants absorb nitrogen, is the greater amount of it formed in the air (and carried to the earth by rain) or in the earth?

2. In reference to the nitrate of ammonia formed in the soil, how is its nitric acid formed, and how is its ammonia formed? Is its ammonia chiefly produced by the decay of organic substances, or absorbed from the air, or brought down by rain?

3. Do the roots of plants absorb ammonia uncombined with any other substances, but merely dissolved in water?

4. Do the roots of plants absorb sulphates, carbonates, and phosphates of ammonia in a state of Nature?

5. Is ammonia, uncombined with any other substances, brought down to the earth by rain?

6. In reference to the ammonia present in the soil, is the chief amount of it (*a*) brought down to the earth by rain, (*b*) absorbed from the air by the soil, or (*c*) produced by the decay of organic substances in the soil?

Plants obtain the elements of which they are built up partly from the atmosphere and partly from the soil. The water and most of the organic matter, making on an average from 90 to 95 per cent of the total weight of the plant, comes from the atmosphere, either directly through the leaves or indirectly from the soil by rain, and then to the plant through its roots. Nitrogen exists in soils in three combinations—with carbon, with hydrogen, and with oxygen. When in combination with carbon it is very insoluble in water, and it is in this form that we find by far the greater part of the nitrogen that exists in soils. The nitrogenous organic matter of the soil has been derived either entirely from the decay of vegetable *débris* left in the land by preceding generations of plants, or possibly to some extent from past applications of farmyard or of other organic manures. It is also a fact that besides the residues of crops soils receive certain amounts of nitrogen from the atmosphere in the form of ammonia and nitric acid, but the quantity of these substances contributed annually by rain varies in different years and places. The average of many experiments on the Continent gives 10·23 lb. of nitrogen per acre. The average of some English experiments is but 7·29 lb. Rain also furnishes small quantities of alkaline chlorides, especially in the neighbourhood of the sea, and about 18 lb. per acre per annum of sulphuric acid. Although the amount of ammonia directly absorbed by the soil from the atmosphere may in some soils be much larger than is shown by the analysis of the rain, yet the total nitrogen acquired, though most important as tending to counterbalance the losses of plant-food which the soil annually suffers, will have little effect on the present fertility in comparison with the large accumulation of nitrogenous matter resulting from previous crop residues, and decay of animal refuse. In all kinds of soils there exist very minute underground organisms, called "bacteria," invisible to the eye, the function of which is to separate the carbon and hydrogen from the nitrogen, and to unite it with oxygen. But to effect this lime must be present in the soil, and the compound so formed is called nitrate of lime. Nitrogen in combination with hydrogen forms ammonia, and the substance with which most gardeners are acquainted as ammonia-salts is obtained from an extinct vegetation. Nitrogen in combination with oxygen forms nitric acid, these combine under the influence of the electric discharges in the atmosphere, nitrous acid being formed; this is converted into nitric acid by the action of ozone, or peroxide of hydrogen, and is brought down by rain. Ammonia cannot exist as such for any length of time in the soil, neither is it taken up by plants in that form. The facility with which ammonia and other nitrogenous substances are converted into nitric acid by the oxygen of the soil is so great, that nitrates become by far the most important source of plant food. The uncombined nitrogen of the atmosphere is not appropriated by plants. Plant roots take up all the diffusible substances which are present in the water which they draw from the soil; but the feeding power of roots is by no means confined to the taking up of ready formed solutions, for they are also capable of attacking some of the solid ingredients of the soil which they render soluble and then appropriate, for the building up of their vegetable fabric. The best of all manurial applications are those which supply both phosphates and ammonia or nitrogen.—*Gardeners' Chronicle.*

Gow's Tea Withering Machine has been erected on Mariawatte and, as telegraphed yesterday, pirvate trial was made of it yesterday, to be followed by a public exhibition of its capacities tomorrow. According, to one account, it is claimed for this machine that, by its means, perfectly cured tea can be packed within four hours of the green flush having been taken from the trees. If so, the machine will turn all existing ideas of fermenting and manufacture upside down.

TEA WITHERING AND MANUFACTURE:

THE PRESENT PRACTICE TO BE REVOLUTIONISED BY GOW'S PATENT TEA LEAF WITHERING AND FERMENTING MACHINE.

We call special attention to the very full and interesting report supplied by the Manager of Mariawatte estate on page 527, on the trial of Mr. Gow's new Machine on Saturday last. We have been waiting for an authentic statement of this kind before referring again to an invention which, from all we have been hearing of it lately, seems to possess "the promise and potency" of an entire revolution in the work of tea preparation. It cannot be denied that a good deal of scepticism has attended Mr. Gow's patient and prolonged experimental work in Ceylon, albeit he came amongst us with the highest recommendations of practical experience as a planter in India, as a tea-broker and merchant in London, and as one who has given special attention in conjunction with home scientists to the chemistry of tea preparation, the changes wrought in the process of fermentation more particularly. The expectation that Mr. Gow would work out a machine capable of placing the tea-maker in a better position even than if the weather for withering was all that he could desire—a machine that would save a great deal of the time, labour and space now required for the withering process—and, moreover, that would ensure as good, nay better results in manufacture,—was generally received with a smile of incredulity both in Colombo and upcountry. And we must confess that the first specimen of the machine erected at the Colombo Ironworks and the trial that took place with tea-leaf from Kalutara—even though the resulting samples of tea were well reported on—did not appear to have much "promise and potency" about it. It was regarded by some as clumsy, inconvenient, expensive and doubtful in results. With Mr. Jamieson's letter before the public and in the face of the many practical tea-planters present at Saturday's trial, Mr. Gow and his Agents, Messrs. John Walker & Co., may, however, now well say *Nous avons changé tout cela*. But before any experiment was made in Ceylon, the new Patent had been tested in the planting districts of India with results which may best be judged from the following testimonials:—

Extract from a letter from J. H. Warren Esq. Manager Teendaria tea estate, Darjeeling district, who was present at a trial of the "Monarch" Withering Machine.

1. The machine can keep two rolling machines going with withered leaf, whereas to do this on the old system of withering lofts would entail great expense in the erection of withering godowns. Gow's machine only occupies a very nominal space.

2. With wet leaf Gow's machine can give good withering in a very little longer time than with dry leaf, whereas under old system, wet leaf sometimes lies for days before it can be properly withered, and then all flavour has vanished.

3. By the evaporation of the excessive moisture in the leaf in Gow's machine, the constituent parts which give good flavour are not carried off in the rolling process as under the old system they were, again the roll in Gow's machine comes from the rolling machine in a sticky and half dry condition and can be more rapidly dried, this gives briskness to the out-turn not to mention the saving in fuel to dry the roll with. Under the old system the roll comes out very wet and the expense in drying into pucca tea is very considerably augmented.

4. Lastly in old tea concerns where there is any amount of withering accommodation, Gow's machine might not be so much required, but in continual rainy weather, even in such places, they would be invaluable in so far that they place you in a position of independence of climate, and manufacture can always be carried on without a hitch. In new concerns where large factories have not been built nor withering godowns erected, expense might be avoided in the matter of building by purchasing Gow's withering machine, as they fit into a small space.

Springside Tea Co., Ltd. Kurseong, 4th June, 1886.

Messrs. Mitchell & Co. Calcutta, Dear Sirs,—I am in receipt of your Mr. Mitchell's letter of the 1st. The agents of this Company were good enough to allow Mr. Gow to erect a small Model of his withering and fermenting machine at this factory last year, and I worked it steadily for nearly two months. After this a full sized one 8' by 8' was put up at Mohurgong in the Terai, and was worked there for some little time with great success.

The results were good, and I think the machine improves the Teas very much. Mr. Gow in his pamphlet has stated what the machine will do, and I can only say that the statements he has made are perfectly correct.

I expect you will have a large and increasing sale for the "Monarch" when known. I regret very much that the first one has been removed from Mohurgong, as no doubt the Teas were much improved when passed through the machine. I found the withering done well and fermentation perfect, and also the percentage of fine Teas was larger.—Yours faithfully,

ALFRED H. WATHEN, Manager.

Apart from the satisfactory result obtained in the appearance and quality of the Mariawatte tea—and the test of the home market is alone required to establish this result—the importance of the Withering and Fermenting Machine is best realized from the great saving of labour and of withering space it will effect in average factories. In these respects alone the cost of a machine ought very soon to be repaid, to judge by Mr. Jamieson's letter. But the true value of the Machine can scarcely be judged in a factory like that of Mariawatte where, we suppose already, there is every convenience for tea preparation which a first-class garden can possess. And in Gampola and our lower districts generally the weather is seldom of such a character as to interfere with the process of withering. Very different is the experience in our wet seasons in the higher districts, and it is from Ambagamuwa up to Nuwera Eliya and again in Kellebokka, the Knuckles and Rangalla districts, that Mr. Gow's invention ought to be specially appreciated. It comes just in time too, for a large number of planters who are planning or have yet to plan, their factory arrangements and the direct economy offered in respect of ordinary withering arrangements should go far in turning the scale in favour of the inclusion of one of the new Machines in the Factory requisites of such gentlemen. Nothing could be more satisfactory in appearance and flavour to the ordinary lay judgment, than the tea samples Mr. Gow laid before us in the *Observer* Office two days ago, and we suppose professional reports will substantiate the general opinion. A trial of a Monarch Machine has been suggested on Abbotsford—as a typical high estate on which due "withering" during the monsoon months is attended with some uncertainty,—and we feel sure the proprietors would welcome such a trial and that they will not be behind in availing themselves of the help now offered by Mr. Gow in overcoming one of the few obstacles in the way of tea planters in high districts in Ceylon, so soon as they have satisfied themselves by examination of the working of the machine.

"The Withering and Fermenting Machine" is not to be Mr. Gow's only patent; he has already

entered another, in company with Mr. H. C. Harrison of Awisawella, for a Sifting and Sorting machine to cost from R350 to R400 which ought to effect a further marked saving in factory labour besides securing better work. This is to be called "The Elston Patent Tea Sifting Machine."

Mr. Gow leaves for England by the S. S. "India" on Monday, Jany. 24, but he hopes to return erelong to Ceylon in which as a tea country he has taken so much interest, and with which, through his patents and other circumstances, we trust he will, in the future, become still more closely identified.

PLANTING AND COFFEE IN JAMAICA.

A gentleman who is pleased to give a very high character for information and usefulness, to our *Tropical Agriculturist*, affords some interesting information respecting his experience past and present as a coffee planter in Jamaica. He has, of course, never been in Ceylon; but his estimates and mode of working will interest many of our readers:—

I have a coffee plantation here. Crops have been poor for the last two years, only fiftyfour tierces 1885-6 and about the same this year, 1886-7. In 1884-5 we made eighty tierces of 850 lb. each, not much of a return, seeing I weed 180 acres and "bill out" several patches of old coffee.

I have just planted 60 acres of virgin woodland with coffee, and found it no small undertaking. The practice in this part of the island (Manchester Hills) is to give out the land to the Negros rent free for three years, they undertaking to cut down and clean up and get the land in order for lining and pegging; after the pegging they are allowed to plant their provisions, yams, bananas etc., and when the coffee is planted, keep it free from weeds and give it up at the end of the three years, quite clean. The fencing is done by the Negros and very well done too as the estate's horses, mules and cattle would, if once they got into the coffee piece, make short work of the provisions.

I append the expenses of planting the 60 acres:—

Surveying, and planting pimento trees at the acre poles	£12	0	0
Lining and pegging	7	6	10½
Planting and pulling suckers	22	7	9
Cutting pegs, making coffee lines &c. ...	5	13	0
Making intervals (roads)	3	9	6
	£50	16	1½

The trees are planted 6 feet apart and topped at 4' 6".

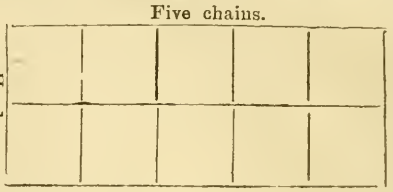
We are about 2,200 feet above the sea with a normal rainfall of 80 inches. I have found it considerably less till the last two years, 1883 not quite 40 inches; 1884 60·60; 1885 89·06; and to the end of October this year we have had 142 inches (nearly 50 of it fell in June, 36 inches between the 9th and 11th)

My coffee is fair plantation, the bulk of it realizing about 60s per cwt.; this year the peaberry sold for 78s. My separator (Gordon's) gave me 6 per cent peaberry, the machinery is of the "old time" sort and worked by mule-power 2, (there are no rivers in this part of the island) and it has the advantage, in these times of low prices, of being inexpensive. I can pulp 60 boxes an hour, our box holds 96 quarts; we calculate that 40 boxes of cherry give a tierce of good coffee plus the triage.

The barbecues are a flight of 25 each, 40 feet square. All my fields are quite a mile and-a-half from the works, but I pick quite 80 per cent of my coffee at 1s a box and the balance at 1s 3d and 1s 6d, the rat coffee at 2s: the latter amounts to about 4 per cent of the crop. Labor is plentiful enough. I manage to weed the whole of my fields in four weeks and at a heavy ripening have had 250 hands in the fields and have picked in over 400 boxes equal to 10 tierces in a week, that is up to Thursday afternoon. Quashie objects to work on Friday; they take that day for working their own grounds and on Saturday they go to market.

I find my coffee costs me within a fraction of 20s per tierce from the time it is thrown into the pulper loft to the time it is ready for the tierce; the tierce costs (including nails) 5s; cartage to railway 13 miles off, 10s; and the railway freight at 22s 7d per ton (gross), another 10s making a total for pulping, drying, grinding, fanning, sizing, hand-picking, tiercing and sending to the Wharf at Kingston of 45s per tierce of 850 lb.

All the weeding is done by tasks, which vary from 5 to 8 or 9 rows for a shilling; the rows are counted from the head of the acre, thus:—



The pruning is done by task at an average cost of 5s per acre. The management consists of a manager (Busha,* he is called by the natives) three rangers or headmen and myself. The climate is an excellent one, the mean temperature being 79° in the shade. All the flowers and most of the vegetables of Europe grow readily. There is plenty of fine timber still left such as cedar, bullet tree, mastic, bloodwood and bitterwood, the latter an excellent wood for indoor work as no insects will attack it and one nibble is quite enough for our friends, the rats. Mandeville, the nearest post-town and principal place in these mountains, is a charming spot very much like an English village. Church, school, stores all round the green, there are fine Municipal offices too, a good stone Court House, a Constabulary Barrack, &c., and a Post and Telegraph Office. The post is tri-weekly, eastward and westward alternate days and a fortnightly packet. Mandeville has become quite a fashionable health resort, every year an increasing number of Europeans and Americans come for the winter. There are Club, Lawn Tennis and Cricket Clubs and a Race-course and the roads are excellent.

[The cost of work as shown by our correspondent is not high; but nothing is said about draining which with a liability to 50 inches of rain a month (36 inches in 2 or 3 days!) ought to be an important work. Coffee yielding up to 3½ to 4 cwt. an acre is certainly not heavy bearing, more especially as the prices differ so widely from those paid for the famous "Blue Mountain Coffee." Our correspondent should tell us something about his Pimento cultivation and market.—Ed.]

ON THE EMPLOYMENT OF THE SEDIMENT OF COFFEE FOR STRENGTHENING THE PRODUCING POWER OF THE COFFEE TREES.

A German correspondent, formerly in Ceylon, writing from London by a recent mail, propounds rather an interesting idea in reference to the use of coffee grounds for restoring fertility to coffee trees and enough might be collected in Ceylon to try an experiment. As a manure, a substance containing 2·73 per cent of ammonia, could not but be helpful, but phosphate of lime is low and no potash is indicated. As an ordinary manure, we fear so great a bulk of inert matter would scarcely pay the cost of local carriage and application far less its collection in Europe and transmission here. But an experiment might be tried. Our correspondent's letter is as follows:—

To the Editor, Ceylon Observer.

I have the honor to submit for your information my ideas laid down in the enclosed treatise suggesting reimportation and the use of coffee grounds for the amelioration and the restitution of the coffee

* "Bass"!—Ed.

growth. It would give me great satisfaction, if my endeavours for the supply in the Colonies with coffee grounds as fertilizing substitutes shall bring me in a beneficial connexion again with your fine island, the connexion with which will always be considered by me as a source of life and intelligence.—S. Bensinger.

London, 20th December, 1886.

When intelligence of the deplorable effects of leaf disease and parasitical damage had been received some years ago, it was already tried by those interested in the growing of the valuable produce, coffee, to find out a remedy by which the weakened condition of the estates could be ameliorated. The continued deficiencies in the crops and their confining influence on trade now more sternly urge that means have to be found to restore the culture to its former healthy state and appearance, supplying it at moderate expenses with manuring matter, collected in the consuming countries and supplying it to those fields, where the indispensable fructiferous nourishment cannot sufficiently be derived from the soil.

It is obvious that the impoverishment of the coffee soil, which its alternate owners more or less caused by exhaustion of its properties, cannot be continued without proving still more fatal, and it is intended herewith to draw attention to that stuff, which, (after the roasted beans having been made use of for the preparation of the favorite stimulating drink)—becomes unfit for direct food-giving, but still possesses a great deal of reproductive qualities, hardly contained in any other fructifying application.

It will be understood, that it is not meant to promote forcibly the growth of the trees direct and solely by the material, a proceeding which was to be regarded not less offensive to production as the alluded exaction. It is left to the discernment of the planters to decide when and how those grounds may be applied as a manure, and if properly used they will prove a "merestone" in the coffee cultivation, by which future enterprises will find a hold especially in those tracts of ancient producing countries, where in the last decennium such great disappointment had to be endured for want of such means. Where the mischief has gone too far, the reposition of the fields with a lighter culture and with strengthening the ground for the later re-production of the coffee berry will be the mode applied with most success. Wherever the state of culture has not been too much affected and injured, the introduction of the sediment of coffee in its natural or prepared quality as a manure besides those being already in use, will surely repay its cost and when properly applied, it will not only store nourishment for the trees own requirements, but also support and restrain its parasite and nibbling enemies, rats, insects, etc., to which in its weak and unprotected state the plants could offer no resistance.

It may be hoped that the parties most nearly interested with the cultivation of coffee will consider the value, the great manuring strength and reproductive power to be derived from those many hundred thousands hundred-weights of coffee grounds obtainable every year and make use of them to the best advantage of their plantations.

S. Bensinger.

Analytic composition of dry coffee grounds.

Organic matter		98 54
containing: *Nitrogen*	2·25*	
Mineral matter		
containing:		
Silica	·10	
Phosphate of Lime	·42	
Carbonate of Lime	·23	
Alkalies and Magnesia	·71	1 46
		100

* Equal to Ammonia 2·73.

"NEW GALWAY" DISTRICT REVISITED:

Coffee—Tea—Cinchona—Wattles—Hakgala.

The name being derived from Ireland,—(a Scotchman suggested it in compiling the "Ceylon Directory" for 1875 in honour of the Irish Governor, Sir Wm. Gregory,)—something in the nature of a bull is permissible, and as a matter of fact we could not revisit "New Galway," as that designation was not given to the group of estates of which The Ambawella Valley is the centre and the grand Hakgalla mountain the presiding monarch, until many years subsequent to our original visit in 1865 (22 years ago). We went under the auspices of good old Mark Kellow, a "Cornish" boy, true to the traditions of the twenty thousand who in the reign of James the Seventh were determined, if a Trelawney was to die, that they should "know the reason why." Mr. Kellow saw no reason why he should not open a coffee estate in the Ambawella Valley and call it "New Cornwall." The compiler of Ferguson's Ceylon Directory was surely as heedless of geography as the characters in "The Jackdaw of Rheims" were of grammar, when he included "New Cornwall" and "Warwick" in "New Galway." But "what's in a name?" as Shakespeare, (who by the way knew something of Warwick,) made one of his characters pertinently ask, especially when those chiefly interested take kindly to that name? Of one thing there can be no doubt: that the scenery and productions of "New Galway" as closely resemble what is to be seen on the ocean shores of old Galway, as they do the cliffs of Cornwall and the battlements of the castle of Guy of Warwick and their vegetation. It is a pleasant characteristic of the British race, Celtic as well as Saxon, to revive, in the far-off scenes of their migration and sojourn, names associated with pleasant remembrances of the old country, with its white cliffs, its "brown heath and shaggy wood," its fat pasture and exquisitely beautiful green sward, dotted with buttercups and daisies, and though last not least its dear old lanes, shaded by elms and brightened by hawthorn, woodbine and wild-rose. The traditions and the associations connected with the imported names given to estates in Ceylon, traverse the whole domain of the history and topography of the British Isles, "from the Land's End to John O' Groats,—and more especially Aberdeenshire and the Channel Islands, with their contrasted dialects of most ancient Saxon and Norman French patois respectively. [Of course English is spoken by one here and there even in "Aberdeen Awa," and since Victor Hugo's enforced residence in the Channel Islands, some of the inhabitants have learned pure French,—as pure as a language can be in which the people "call their mothers *mares* and their sisters *fillies*." N.B.—This note is meant to be conciliatory, but, of course it will give great offence to people who believe they speak the best English and the best French in the world. The best English and the best Gaelic (which is really the best French) are, of course, spoken at Inverness and the adjacent northern parts of Ross-shire !]

But "to return to our muttons" as the eminently pastoral French say and to our visit to the Ambawella Valley in 1865. En route from Nuwara Eliya we then called in at the scene, below the 1,500 feet sheer precipice of Hakgala (the jaw mountain,) which, from the resemblance of the hemate and country to what he had seen and ex-

perienced in the American homes of the fever plants (fever-curing, rather,) had been chosen by Mr. Clements Markham, for the introduction and cultivation of the cinchona trees in Ceylon. There we found poor, thin, delicate MacNicol hard at work propagating the precious plants by bedded cuttings, the commencement of a process which covered the mountains of Ceylon with more millions of *C. Succirubra* and *C. Officinalis*, and hybrids between the two and between them and the Calisayas than ever existed in the native habitat of the plants amidst the forests of the Andes,—the ultimate results being the swamping of the bark market and the cheapening of the most valuable febrifuge and tonic in the vegetable kingdom, so as to place it within reach of the millions of poor and suffering human beings. The work which MacNicol began, was well and efficiently carried on by Edward Thwaites, whose title to be remembered in connection with Hakgala is mainly connected with the work, remunerative to the Government and profitable to the country to which he was compelled to devote most of his time and of the money placed at his disposal. Even in his time, with what he was enabled to do under the direction of his accomplished brother, in introducing rare trees, flowers and fruits, Hakgala was an attractive resort to residents at and visitors to the neighbouring sanitarium. But to compare the Gardens of even a few years ago, to what Mr. Nock has now made them, (the changes and improvements in even in the past six months being wonderful,) would be to compare an ordinary garden plot to Paradise. The 14th of Jan. 1887, the day on which we started from Upper Dimbula, for our re-visit, was unmistakeably a rainy day. We met the rain and the cold wind which had accompanied it down the gorges from Nuwara Eliya soon after we commenced the magnificent ascent of Longden Road, but neither on our upward journey, in skirting the Lake, which is beautiful even in its shorn proportions out of regard for the race course, nor in the steep descent from "Baker's Farm" to Hakgala, did the weather prevent us from enjoying and admiring the beautiful mountain woodland, dressed in the tints of spring. Those tints, which by March will have passed into brilliant reds and crimsons, now present a soft, lovely plum colour, which contrasts exquisitely with the light green of the *Michaelias* and the orange and copper colours of individual trees, the blossoming *nilu* still brightening the jungle undergrowth. Soon after leaving the top of the pass near Baker's Farm we could not help wondering why fire, as it appeared to us, had been applied to the ferns, the balsams, the "Californian daisies" and other way-side plants, but we were more especially concerned at the blackened and apparently dead appearance of the cinchona plants on the edge of a fine plot about a mile below Nuwara Eliya. Tea at a higher elevation showed no sign of having suffered from the frost which was the real agency that had applied "decay's effacing fingers." Later in the day we noticed, that while cinchonas amidst coffee had portions of their foliage blackened, (this was a full mile below Hakgala, with an elevation of probably 4,700 feet,) the sheltered coffee underneath had escaped. It is cold, tearing wind and not frost, from which coffee suffers, as we had fresh opportunity of noticing in the Ambawela Valley, where the contrast between cultivation in places sheltered from the cold, fierce winds which swept over Ceylon in December, and that in exposed positions was most striking. There can be no question that while cold wind undoubtedly affects tea, especially when the plants are putting forth their tender flush after pruning, yet the power of the full-grown, vigorous tea plant, to resist cold winds and even frost (the latter practically unknown on the western side of the Nuwara Eliya range) is far superior to that of coffee and cinchonas. En route to New Galway we could not resist the temptation of turning in to have a look at Mr. Nock's revolutionary dealings with the Hakgala Gardens, and our exclamations of admiration and delight were loud and frequent as we found ourselves approaching the bungalow by a new drive, the raised embankments of which were beautifully turfed. A second lakelet has also been added to reflect ferns and other plants, as well as the stupendous precipice of the mountain face. We had scarcely got into the shelter of Mr. Nock's hospitable bungalow, rendered cheerful by the presence of children as fresh and healthy looking as their parents, when down came a regular rainstorm, lasting nearly an hour. We kept hoping that at least the ghost of the rainfall had crossed the range to Dimbula and our hopes were not disappointed, as we found on our return. During our enforced but pleasant stay, we learned from Mr. Nock that his experience leads him to look for at least ten rainy days after Christmas. As a rule it is not an over-plus, but a paucity of rain which is the trouble at Hakgala with its genial Uva climate, and the multiplication of little lakelets in the Gardens is desirable, not only on æsthetic principles, but for the storage of water. As soon as the rain had abated, we spent another delightful hour under Mr. Nock's guidance, examining his improvements and admiring next to the green sward embankments, the borders and beds of vari-coloured plants and flowers which were contrasted against them. I cannot dwell on details, but I have no hesitation in affirming that when all the improvements projected and in progress are carried out to completion, the Hakgala Gardens with their combination of mountain, valley, forest, ornamental plant, fern and flower scenery, will, for grandeur and beauty, vie with any in the eastern world. Nuwara Eliya, as a health resort, has attractions of its own, but extraneous to it and yet easily attainable are amongst other pleasant places, these gardens "beautiful exceedingly" in themselves, and additionally attractive from the views they command of the grand mountain on whose bosom they rest and of the forested ranges which close in the vast-stretching grass lands and rice fields of the vale of Uva.

I suppose it is the hope of placing the Forest Department on a complete footing which has so long delayed a grant being placed at Mr. Nock's disposal for experiments calculated to prove which are the best trees to grow on the patanas that adjoin and stretch away on every side from Hakgala. Meantime private enterprise has interposed and on Albion estate, about 1½ mile below the Gardens, has obtained some very striking results. Here amongst the limestone formations, there is a small coffee estate in full bearing, which we found laden with "cherries" after the fashion common when coffee was really monarch, unaffected or but inappreciably affected by the fatal fungus. There was but little sign of leaf-disease on this coffee, which is at the foot of the property and close to the road side. Up the patana-covered hillsides above, stretch, at pretty close intervals, shelter belts of *Acacia dealbata*, the so-called "silver wattle," from its silvery foliage. The growth of those trees, in height and density, in the four years of their existence, is somethin

marvellous; in density more especially. As most of our readers are aware, the marked characteristic of this species of acacia is to send up shoots, which in their turn become trees, from every horizontal root, and the roots are many and stretch to great distances. All that is wanted in growing these trees on the patanas, to encourage their tendency to form dense groves, is to clear away the grass from the surface soil in their neighbourhood. The tendency to send up innumerable shoots, indeed, is embarassing where paths are a necessity. In going down the sides of the belts on Albion we literally trod on a carpetting of young acacia shoots. From Mr. Wm. Cotton, who, with Mr. W. A. T. Kellow, accompanied us, we learned, as the result of his experience, that as a timber tree, *Acacia dealbata*, is excellent for all such purposes as hoe and axe handles, while nothing is better for charcoal. The bearing of these facts and of the rapid original growth and recuperative powers of the tree when coppiced, on the future supply of fuel for the tea enterprise, has an importance which can scarcely be exaggerated. Failing the discovery, or pending it, of a cheap artificial fuel, firewood or charcoal from hundreds of square miles of *Acacia dealbata* groves might be supplied! Of course other trees can be grown on the mountain prairies of Ceylon, and in Mr. Kellow's case the success of the black wattle, *Acacia Melanoxylon*, has been such, during the four years, that he has indented on Australia for large supplies of seed. This species of wattle grows into a fine, tall pyramidal tree, the tendency to send up shoots in its case being slight and easily repressed. So much is the "blackwood" timber of this tree valued in Australia, that when the eucalypts are "ringed" and destroyed, these acacias are carefully preserved. Nor need the selection of trees for the patanas be confined to natives of Australia, for amongst the wattles we saw, growing luxuriantly, numerous specimens of the European cherry tree which we were interested to find, grows readily from cuttings. Cherry tree wood is much valued in Britain. There can be little doubt the *Cryptomerio Japonica* and other pines, with *Toona cedrela*, and many other plants of various species and from different regions of the world, would flourish on and render profitable the at present vast expanses of waste patanas in Uva and elsewhere amidst the mountains of Ceylon.

(*Continued on page 537.*)

THE BRAZIL COFFEE PROSPECTS.

It is very perplexing to find Ceylon coffee falling, even though it be only one shilling per cwt., at the very time we expected it to rise. We refer to the following report published in the latest *Public Ledger* to hand, from a firm that evidently claims to be an authority on the subject of Brazil crops, to shew what we mean. It will be observed that the report winds up by saying that prices are bound to rise rapidly in January and to advance until the rates of 1873-4-5 are reached:—

(From the "Public Ledger" Dec. 28th.)

(From Messrs. Lacerda & Co.'s Report.)

We think it advisable, under present circumstances to supplement the remarks we had the honor of laying before you in our circular of 7th inst., with some further observations in reference to more recent occurrences; and in doing this we rely as we did in our earlier reports, on the knowledge and experience we possess of the cultivation of coffee in Brazil.

At the date above referred to we showed that o account of the circumstances being entirely differe nt there was no reason at all for expecting this year a late flowering in December-January, as happened in January, 1880, attributable to the drought which prevailed from May-June to October, 1879. Since the month of May last the rains have been regular and occasionally excessive. We propose submitting to you certain considerations which may afford you means of arriving at sound conclusions in spite of contradictory reports and rumours more or less unreliable, professing to gives estimates of the Brazilian crops.

After so many over-confident assertions, we think that a few observations concerning the method and conditions of production in Brazil may not be out of place here.

And, as a commencement, it may be of assistance to point out the order of the seasons in the Southern hemisphere where Spring commences on the 24th September, and does not end until 21st December, when it gives place to summer, which terminates on the 20th March, followed by Autumn, which holds sway until 21st June, which date marks the advent of winter.

It will be worth while also to recall the fact that coffee crops are alternately heavy and short, as is well known, at least to all those who understand the difference between cultivation by means of periodical sowings, and cultivation by plantation; in the former case the soil only is exhausted by production, whilst in the latter the exhaustion of the plant is added to that of the soil, which has a direct and sometimes long-continued influence on a production invariably of the same nature.

It will be equally to the point if we introduce here a few remarks on the subject of the influence of age on coffee plants in connection with their power to bear fruit.

Considerable time is required to bring a coffee plant into condition to bear fruit, and this period is generally calculated at from four to five years. From four to eighteen years of age the plant gives a regular yearly product and remunerates the planter.

From eighteen to thirty years of age the production becomes alternately good and poor, that is to say a year in which the plant gives a satisfactory return is followed by one in which the production is small.

When once this latter period is passed, the crops from such trees become more and more irregular and according to the geological and climatic conditions of the plantations, the productive power of the coffee plants goes on diminishing, and finally almost or entirely disappears.

It would be wrong also to omit any reference to what has been described as the disease of coffee plant. On this subject the *Jornal do Commercio* of Rio Janeiro, in its issue of 4th June last published the following:—

"Disease in the Coffee Plant.—The Minister of Agriculture despatched the day before yesterday the following notification to the Director-General of the National Museum.

"As it is desirable to obtain precise information respecting the cause of the disease which is devastating the coffee plants throughout a large extent of the province of Rio Janeiro, chiefly in the municipalities of Santa Maria Magdalena, S. Fidelis and Cantagallo, I have determined to charge Professor Emilio Goldi, sub-director of your museum, with the duty of following up this matter in the districts named, and after all necessary investigations, I wish him to present a detailed report on the subject, indicating at the same time the measures which he may judge to be expedient in order to diminish the effects of the disease, to arrest its further development, as well as to attack it in its very origin.

"The Professor alluded to will receive from you such instructions as you may deem useful, and you will please to demand of this department such facilities as may secure the success of the commission herein indicated."

The disease which is here alluded to is not attributable in our opinion to anything more than the advanced age of the Coffee plants, and to the fact that the oil is worn out, for it is to be observed that the municipalities to which reference is made are especially hose in which the cultivation of Coffee was first devel-

oped, after the primitive culture in the Serra abaixo, which was generally abandoned on account of the failure in the production.

In addition it may be remarked that this state of things is not confined to Brazil, for the diminution of the production in Ceylon must be in like manner attributed to the same cause.

These plantations, infected alike in Ceylon as well as in Brazil, give undeniable proof that the Coffee plant does not bear fruit for an unlimited period and that in this branch of cultivation after a certain period has elapsed, the soil becomes worn out, and as the plants become old and give a return continually diminishing the planters find that they can no longer get any result worth having, and are obliged to abandon the plantations.

In Java the production has also fallen off, a fact which calls for similar comment, and we cannot but believe that there also a like effect is being produced by a similar cause.

It is this also which should induce us to give due consideration to the statistics respecting the production of Coffee in Asia, that is to say, in Java, Ceylon, in British East India, &c.

In effect we see, on looking over these statistics, that in Asia the average production which during the quinquennial period from 1872-73 to 1876-77 was 2,519,400 bags, had fallen to 2,383,000 bags during the succeeding quinquennial period—1877-78 to 1881-82—preparatory to a further diminution during the triennial period from 1882-83 to 1885-86, as regards which the disastrous result of the last season leaves no doubt whatever.

The falling-off in the production, as given by these figures, is a fact beyond all dispute. The recurrence of heavy crops in Brazil takes place about every three years, whilst between these come crops of only medium size.

But in addition, there are also to be taken into account meteorological occurrences, which, as regards the plantations, may produce consequences of the highest importance, and which are nearly always entirely unforeseen, as, for instance, rain, hail, frost, or drought.

It is possible, therefore, for any one acquainted with the facts to determine in advance, with more or less exactness, what the crops will produce, and this even before the period of flowering.

It is clear that unless there is a wish to hazard estimates, at once capricious and badly supported, there can be no great differences of opinion in regard to our crops; it is of course expedient to employ in such a matter very great prudence, and to watch the course of events in order thereby to modify in case of need, the opinion one may have formed. This is certainly the course which we ourselves follow.

Let us now examine the actual position of things, and in order to illustrate by example what we have previously stated, let us go back to what happened last year. In 1885 the season of blossoming was full of promise, but the drought, which continued until the autumn, spoilt everything. Nevertheless, in the province of San Paulo, whose rich uplands are covered with plantations of recent growth and considerably exposed, where vegation is relatively more vigorous, the fears which at first were entertained were only partially realised.

If then for this last crop the plants have had to suffer from the drought, which was prolonged from spring to autumn, and if this drought has exhausted them to such an extent as to involve a partial failure in the fructification; if these plants, weakened already, have been unable to recover themselves in the rigorous, season which has followed, for indeed vegetation suffers a period of suspension during winter, how can it be maintained that we can have a good flowering this year, and consequently a good crop.

It is for these reasons, and after inspecting the plantations, that all persons who are authorities on this question of coffee cultivation in Brazil have arrived at the conclusion that this year the crop will be small, and that this opinion, which is also our own, is now shared by the most influential and most experienced of the houses engaged in the export trade from Brazil.

In effect, in response to our inquiries on the same subject, our friends in Brazil, Messrs. J. F. de Lacerda and Co., have communicated to us the following telegraphic reports, upon which comment is needless.

From Rio Janeiro: However favorable circumstances may turn out, we do not think the crop can exceed 3,000,000 bags.

From Santos: Advices in regard to the crop are generally unfavorable, the damage is serious, and we estimate the coming crop at 1,500,000 bags.

Summing up these arguments then, we may state as a fact established very clearly now that the production in Brazil, which sufficed to make up for the deficiencies caused by the diminished production in Asia, cannot any longer do this in view of the bad seasons of 1885-6 and 1886-7, which fact indeed is rendered sufficently evident by the general diminution in the stocks in the consuming countries. In addition to this, the reduced volume of the next crop will render the statistical position of the article yet more favorable, by making clearer than ever the progressive diminution already indicated in the production of Coffee.

It is therefore with very good reason that we reaffirm our entire confidence, and maintain what we stated in our recent circular, repeating strongly our advice to our friends to make continued purchases at the very fountain head, seeing that during this season those who, up to the present, have made direct importations of Brazil Coffees, cost and freight, have done extremely well, and because, in the course of next January, every one will have to admit the force of our arguments, and the rise will be so rapid that there will be little opportunity of making ready for it. It is necessary therefore that our own immediate connection should take every precaution to protect their interests, by making direct purchases, cost and freight.

In our judgment there is no reason to trouble ourselves about speculative fluctuations; as we said recently, we are convinced that the rise will carry us to the prices of 1873, 1874 and 1875.

Bullock Gearing for Tea Rollers.—Hearing that Mr. Alfred Scovell of Bitterne, Maskeliya, was using Bullock gearing for driving a Barber's Tea Roller, we wrote to him asking for some information about it, and received the following reply:—"In answer to your enquiry, I have been working a Barber's roller (converted Thompson's) by means of a cattle mill, during the last few weeks, and quite successfully. "The mill takes 8 cattle at a time, and I have been getting through 250 lb. withered leaf per hour on an average, and very good work at the same time; revolutions of the dishes being about 35 per minute. No doubt on estates where water and fuel are scarce, provided facilities for keeping up a fairly good cattle establishment are present, a cattle mill would prove to be an economic motor. The bullocks require some training and must be shod." We are very pleased to find Mr. Scovell has made such progress in the training of his bullocks as to enable him to obtain an outturn of 250 lb. per hour from his machine. We should, however, like to know how many bullocks are used *at same time* to drive the mill. In India only two are worked at one time, and after two hours' work they are replaced by others. Seeing the very low cost of bullock mills, we anticipate they will be more generally used in Ceylon than at present, more particularly for Barber's Rollers which require so little power to drive them. For the guidance of Planters we give the following approximate prices for bullock gearing in Colombo:—

Light one Bullock or horse gear with doubled speed	R225·00
Two bullocks gear, double speed ...	260·00
Two bullock gear extra strong ...	275·00
Above arranged for three bullocks ...	300,00
Four bullock gear, exceedingly strong ...	475,00

—"Local Advertiser.

Correspondence.

To the Editor of the "Ceylon Observer."

THE APPLICATION OF LIME TO CEYLON PLANTATIONS.

Watagama, Jan. 20th.

DEAR SIR,—I have to thank you for kind notice of my favorite district in which I have worked the last 28 years with such good success, *Panwila and Watagama*. I am glad Mr. Hughes has brought forward the great benefit to be derived from the application of lime, for I can without fear of contradiction say it has been more by the application of country-burnt coarse lime with small quantities of manure when wanted, and forking now and again, close draining at 1 in 30, not 1 in 15, using the soil* out of drains with the manure when forking, that Maria first and now Raxawa (a fine tea and cinchona estate near Panwila) have been made valuable and paying properties. I propose for the soil that is hard or stiff in coffee, tea, cinchona or cacao, to use burnt country-lime which as a rule is coarse, in preference to the finely burnt coral lime; as I found in practice the former proved the most beneficial and acting on the soil much longer. In working up soil with lime for grain culture no doubt, Mr. Hughes' recommendation of fine lime is best. In Ceylon, and in the low-country particularly, it is well once every five years to sow kurakkan seed and when 6 inches high to give a lime dressing and then fork it in. This I have proved a great success and not very expensive; this here takes the place of clover in England. I also find that 20 bushels per acre is quite sufficient to act on the soil to be repeated after two years. You must, however, either apply compost manure or fork in young kurakkan when required.—Yours truly, J. HOLLOWAY.

GOW'S PATENT TEA MANUFACTURING MACHINE, "THE MONARCH."

Mariawatte, Gampola, Jan. 21st, 1887.

DEAR SIR,—The above machine has been erected in Mariawatte factory by permission of Mr. Rutherford, and was tried under Mr. Gow's personal supervision, on the 15th and 16th instant, with satisfactory results, the work on the 15th being done in the presence of the following gentlemen amongst others:—Messrs. Megginson, Davidson (Kalutara), W. D. Bosanquet, Blackett, T. N. Orchard, J. Drummond, T. C. Owen, J. Anderson (Matale), S. Hayes, Carry, Gibbon, J. C. Ferguson, &c.

Notes having been more carefully taken on the 16th than on the 15th, it will be best to give particulars of that day's work. The leaf plucked on the 15th amounted to 4,000 lb., and a commencement was made at 9 o'clock a.m. on the 16th, with a charge of 350 lb. about a quarter withered, which, after being worked in the "Monarch" for 45 minutes was ready for rolling. The whole of the leaf was worked off in charges increasing from 350 to 628 lb., according to the progress of the natural wither, the last charge (628 lb. of nearly full-withered leaf) being ready for rolling at 3 o'clock p.m., after being 30 minutes in the "Monarch."

The leaf was rolled heavily, and, when taken out of the rollers, broken up, sifted &c., was ready for the dryer, the usual time taken to ferment being thus saved.

The first charge consisted of part of the previous afternoon's leaf, the last charge being part of the morning leaf, so that the last of the leaf was put into the rollers about the time when, according to the ordinary system of manufacture, the first of it would have been only fully withered. As there seems to be an impression that leaf can be brought in from the field and manufactured at once by means of this machine, it may be well to mention that it must be partially withered on the tats before the work can be begun. Green tea can, by means of the "Monarch," be made from newly plucked leaf.

The consumption of fuel to make 1,000 lb. tea was as follows:—For the boiler 3 cubic yards, for the "Monarch" 4 cubic feet, for the "Victoria" 2½ cubic yards. It took only 10 to 15 minutes to get the heat in the "Monarch" up to 180°, and it was kept at 140° to 180° during the work with the above quantity of wood.

The machine takes about 2 horse-power to drive it.

The tea made was of a good black colour, with a fine show of bright tip, and the liquor was pungent and flavoury, and creamed down well, while the fermentation was bright and even. Some of the advantages claimed for this machine, which in this trial seem to be borne out by the results, are:—That it perfects the withering and fermentation by artificial means, and thus saves time in manufacture, obviating the necessity, in wet weather, of keeping the leaf on the withering tats for more than one day; that it gives a good, even fermentation within a given time; that, after commencing manufacture, the leaf can be worked straight through all the other processes without any intermediate delay; that, with the machinery used here, a great saving can be effected in fuel for the boiler and "Victoria" dryer, owing to the continuity of the manufacture; and that night work can, to a great entent, be avoided.

Mr. Gow also contends that the leaf, in consequence of its gummy condition on leaving the "Monarch," rolls better, and that this advantage is apparent in the sorting; that the tips are multiplied by the opening of the convoluted buds in the fermenting process in the "Monarch."

The great test that remains to complete the success of the machine is the London Market, and if teas made on this system pass muster favourably there, I think Mr. Gow may well be congratulated, and will deserve the thanks of tea planters for having conferred such a boon on them. —Yours faithfully, GEO. D. JAMIESON.

NOTES ON COFEEE AND TEA (BY A TEA PLANTER).—Have been for a long trip upcountry and was surprised to see a lot of coffee looking A1 over Dimbula and Dikoya. Tea ideas are again being turned topsy-turvy: Mr. Gow says he will make as good tea as can be made, in a few hours from plucking and certainly his experiment was "fearfully and wonderfully made" according to old ideas. Some men are discarding the spheroid in Barber's Roller and two men told me that it rolled better without spheroid.

TEA.—It is curious to note that, in spite of the rivalry of Indian gardens, the Chinese find it profitable to export a by no means inconsiderable quantity of tea to Calcutta. During the last official year they sent us 52,123 lb. The trade is said to owe its existence solely to the very inferior quality of the tea, which is sold at a correspondingly low price; a principal consideration with many who from choice or necessity regard its cheapness as the first essential of a purchase. The trade, however, is steadily declining, and ten years ago the importation amounted to 692,852 lb. —*Times of India.*

* Soils were not considered good by some, but I know the soil and what I could do with it in our district.

THE UNIVERSAL FIBRE DECORTICATOR.

The want of a thoroughly adaptable fibre-cleaning machine has long been felt in India. Handsome rewards have, from time to time, been offered for the best decorticator, and it was only in December 1884, that the Bengal Government awarded the prize of R2,000 to Messrs. Death and Ellwood of Leicester, for their Universal Fibre-cleaning Machine, invented by a Mr. H. C. Smith, as being the best out of nine machines tried at Calcutta, under the management of two gentlemen appointed by the Government of India to carry out the experiments with these machines. When this award was made, it was thought that perfection had been reached as far as it was possible to attain that distinction, and it was confidently expected that Messrs. Death and Elwood's machine would hold the foremost place among decorticators. But the New Orleans World's Exposition has taxed the inventive genius of the American nation, and there is every reason to believe that a powerful rival to Death and Ellwood's invention has been on exhibition at the New Orleans Exposition. The American papers are full of descriptions of this machine, which are so flattering to its general usefulness and adaptability that we have from time to time noticed it in these pages; but as it promises to excel all other fibre-cleaning machines, our readers will perhaps wish to know something in detail about it.

Mr. Jules Juvenal, who recently lectured at the New Orleans Exposition on ramie, or rhea, describes this machine, which is called the Universal Fibre Decorticator, as consisting essentially of three pairs of rolls and a pair of endless aprons. The machines are of two styles. One is designed so as to enable the feeder to deliver the stalks. The other requires a workman at the rear end of the machine to take the cleaned fibre, the feeder being constantly employed in supplying the machine with material. In the first style the front rolls are smooth; the second are fluted, running about seventeen revolutions per minute. The third pair are armed with scraping blades, rigidly fixed to their periphery and winding spirally around the rolls. These rolls are also hollow, with perforations through their shell, through which water is allowed to flow for the purpose of keeping blades clean from gum; also to wash the fibre, running 300 revolutions per minute. The material is placed on the table, and is passed half-way or more into the machine, then run back on the table, reversed, and the other end cleaned in the same manner. The second style of machine has scraping rolls in place of the smooth rolls, as in the first style. These rolls perform the office of feeding rolls, and also of cleaning the passing ends of the material by reversing the pairs of rolls, instead of the material being operated on.

This gentleman does not pay a high compliment to the experiments conducted at Calcutta under the auspices of the Government of India in 1884, which awarded the prize of R2,000 to Death and Ellwood for their Fibre-cleaning machine; nor does he hold this machine in very high estimation. He says:—

The competition at Calcutta, made under impossible conditions, retarded the invention of a practical machine; for, besides the difficulties presented by distance and the absence of material for experiment, the European mechanics were asked to produce machinery which could accomplish the delicate and tedious hand labor of the Chinese workmen, who made a pound of ramie a day by scraping with a wooden knife a part of the gummy and resinous matters. If experiments had been made in London instead of Calcutta on green stalks coming from Jersey, the absurdity would have been quickly ascertained of asking of practical machinery more than the mere separation of the fibre, which in the green state is easily accomplished, leaving for chemical agents the task of eliminating the gummy and resinous matter adhering to the bark. There lies the whole secret. If all inventors of decorticating machines some of whom are very clever, have heretofore failed, it is because they have aimed at filling the conditions imposed for the Calcutta competition; that is, to make a machine capable of producing directly the China grass. This, nevertheless, came near being accomplished last year at Calcutta; but with what paltry results! The Smith machine, of London, which obtained a prize of 2,000 rupees, or (£1,000) (£200?) produces, with two men and a three-horse power, sixty pounds a day.

Under such conditions ramie would be twice as high as silk. What is needed is a combination by which production, cleaning and fabrication will give a silky fibre ready for the loom at a cost from twenty to twenty-five cents, about the price of first rate flax. —*Indian Agriculturist.*

Cinchona Seed from Java.—No apology is needed for calling attention to Mr. du Perron's consignment—which is becoming an annual institution—of some of his finest cinchona seed for sale here. Some enterprising Ceylon Planters should after a similar fashion try the Java market, for there can be no doubt that an interchange of seed is calculated to be beneficial to both countries. We do not suppose that discouraging as recent prices for bark may be, the cultivation of cinchona will be given up in Ceylon and there can be no question of the advantage of using not only foreign seed, but seed from high-class trees such as Mr. du Perron sends for sale by Messrs. Somerville & Co., next Tuesday, Jany. 25.

A New Witherer.—Mr. Gibbons has devised a simpler form of his Tea Witherer. He says "these machines are so constructed as to combine strength and economy, and are provided with shelves placed at such an angle as just suffices to move the leaves gently without lifting or bruising them. The leaves being fed in at one end pass out at the other ready for the tea rollers. These revolving Witherers can be packed in very compact form for shipment, and are easily put together on arrival, and can be supplied at the most moderate cost. For example, a small one for use with the hand fan, suitable for the smallest gardens, could be shipped f. o. b. at £25, and from that price upwards they will range from £40 to £200. The larger sizes being calculated to save an enormous amount both in labour, delay, and waste." -*Indian Tea Gazette.*

Diphtheria and Kerosine.—A contemporary says :—"The latest discovery in the etiology of disease is rather startling. It is nothing less than that kerosine oil is one of the causes of diptheria. Owing to the prevalence of the disease in Connecticut, an enquiry was instituted by the State Board of Health, and the result is that the insiduous enemy has been detected. The observations were conducted at Meriden, where diphtheria was rife, and it was found that not a single case occurred in any house that was lighted with gas or candle. The Board maintains that the discovery is fully established, and if so, there can be no doubt that it is a matter of great importance. Kerosine oil has come as a boon and a blessing to India, but it has probably never been suspected of promoting illness. What with salicated Pilsener and deleterious kerosine, a new terror is added to Indian life, and the responsibility rests with the medical faculty."—*Pioneer.*

Root Pruning.—In the Saharunpur Botanic Garden an experiment was tried in root-pruning upon young and over-vigorous Peach trees. A plantation of these was formed three years ago in a very rich piece of ground formerly used for vegetable cultivation. The trees were of astonishing size for their age, but their vigour all went to stimulate the production of wood rather than fruit: thus they were fit subjects for the experiment. A trench 2 feet wide, 2 feet deep, and 3 feet from the trunk of the trees, was dug around them in December, and every root met with was cut by the spade. The soil was thrown back liberally mixed with manure, and frequent waterings were given for sometime afterwards; at the same time the branches were thinned out and shortened where necessary for symmetry, but not in any way severely pruned, as native gardeners are in the habit of doing. The treatment given has been quite successful, as every branch and twig is now laden with fruit. —*Gardeners' Chronicle.*

"NEW GALWAY" DISTRICT REVISITED.

(*Concluded from page 533.*)

Before leaving Albion I must notice the limestone formations which crop out here so abundantly and from the "white cliffs" of which, the estate probably derives its name? On the soil which is doubtless largely impregnated by decayed calcareous matter, the natives cultivate considerable quantities of onions (the small species which subdivides, identical with that which is so largely produced on the recent lime formations of the Jaffna Peninsula,) and garlic. Mr. Alexander Dixon was of opinion that the Uva dolomite, passing under the Nuwara Eliya and Dimbula ranges, crops out again opposite Gongalla in the shape of the Meddecombra cliffs. The limestone formation is valuable wherever it occurs, being better we were told as a mortar than coral lime, although the latter is superior for finishing off and for whitewashing. The coral limestone, too, (almost pure carbonate of lime, with no admixture of magnesia,) is superior as a fertilizer, were the carriage not so expensive. But the great interest to us of the limestone on Albion was the presence in it, not of gold coloured iron pyrites as is usual, but of a wealth of beautiful sapphire-blue crystals of spinel. We spent a considerable time in selecting and loading a cooly with a basket of exquisite specimens, in which the deep blue of the spinel contrasted beautifully with the white of the limestone and the bright-glancing mirror-like crystals of mica. As ornaments for a drawing-room mantlepiece, or a boudoir or as cabinet specimens, there are few things so beautiful and interesting, and we were not surprised to find that Mr. Kellow has many requests for specimens. Our previous attempts to get pieces polished into paper weights at the Colombo cemetery works, were not a success, the limestone taking a dark colour in the process of smoothing; but persons obtaining specimens of the spinel limestone will be interested to learn that the intensity of the blue of the spinel crystals and the brilliancy of the mica can be greatly heightened by smartly rubbing a piece of clean chamois leather, over the rough specimens, as blasted or hammered. As yet Mr. Kellow has blasted only one large boulder, we believe, but the probability is, judging by analogy, that the spinel permeates much of the limestone and that regular spinel sapphires have been found or can be found in the detritus below. It does not seem likely that a people so much given to gem-digging as the Sinhalese, have neglected search in this formation, but there can be equally little doubt that the supply, especially in the rock matrix, cannot be exhausted. The intrinsic value of sapphires and rubies found in limestone is low in comparison with the prices paid for crystallized and coloured clay, but spinel gems if large and flawless, have a value of their own. Not long ago, when Mr. Kellow showed us his first specimens, we gave full and detailed information on the subject, including the alleged facts that very large and pure spinel sapphires and rubies from Burma had sold in the European market at prices equal to those realized by the gems derived from the crystallization of argillaceous matter. Mr Kellow has had door-weights made of the Albion spinel limestone, and flower-pots cemented over with small fragments look very beautiful, hung in the verandah of his bungalow. It would be preferable, however, we think, to form vases thus ornamented in which to place ordinary porous flower pots. But for the weight of the material, (our collection severely tried two coolies), a good market for the beautiful blue-crystalled mountain limestone might thus be opened up. It is possible, too, notwithstanding the failure of our experiment, that slabs for tables may yet be sawn and successfully polished. Contrasted specimens of masses of red garnets which we collected on the Blackwater slip, and the blue-crystalled limestone which we took from the vein below Hakgala, on Albion estate, have excited great admiration, each being beautiful in its own way. While on the subject of mineralogical specimens I must not forget to mention that on the occasion of my original visit to New Cornwall, under the auspices of the late Mr. Mark Kellow, he led me down through the bottom of the valley, by a path long since disused, to a formation near the outlet of the stream, known then and still known as "the plum-pudding rock." Some conglomerate, no doubt, but whether ironstone, as is probable, or some form of quartz or limestone, I cannot say as, on this latter occasion, I was not able to get to the position of the plum-pudding rock. A curious peculiarity of the specially rich soil of this limestone region is its very dark chocolate colour. This dark shade must indicate the presence of fertilizing substances specially favourable to the growth of coffee, for the stems which we saw as we descended the steep sides of the cup-like Valley of Ambawella, thick as a stout man's thigh, were wonderful contrasts to the best growths we had ever seen in Dimbula.* Produce in the prime of this secluded district, (reminding me strongly of the scene of the richest gold mine in the world, the Walhalla in Gipps Land, Victoria,) was in proportion, and Messrs. Cotton and Kellow, still shew splendid coffee, Mr. Kellow indeed adhering to his first love, coffee, and not yet "going in" for tea. Mr. Cotton, however, has gone on the two-string theory, while the proprietors of Ambawella are scattering tea in all directions: in the valley; on its rim and down outside of it, until the high road below Hakgala is reached. There can be no doubt that where coffee grew so well tea will also flourish. Looking at the soil, I said to my companion, "We have soil over the range quite as deep, quite as free; the difference with us is the lighter colour, brown inclining to yellow, in which coffee, but for leaf disease, would have done fairly and in which tea luxuriates." I had just been reading Dr. Griffith's account of the expedition of Dr. Wallich and himself to the habitat of the indigenous tea in Assam, nearly sixty years ago, and I did not fail to note that where a group of tea trees was found growing in the Assam and Upper Burma jungles, the almost invariable description of the colour of the soil was "yellow." The fact seems to be that tea, with its powerful tap-root, rejoices in a pretty stiff clayey

* At the distance of nearly twenty-two years, I have the most distinct and vivid recollection of the exquisite scene which greeted two of my senses, as I rose on the morning of the second day of my visit in April 1865. The whole expanse of coffee spread over the valley appeared as if during the night fairy agencies had been at work, showering over the trees a dense covering of jasmin-scented snow-flakes. As I walked through this scene of amazing beauty and powerful perfume, I gathered specimens of a small, indolent bee-like beetle which, in immense numbers, was feeding on the nectar of the flowers. I sent the insects to the late Mr. Neitner (Author of "Enemies of the Coffee Tree,") who assured me, that the beetles were innocuous. Alas, that a similar verdict could not apply to the fungus which four years subsequently developed with such fatal fecundity and destructive energy, over similar vast expanses of once profitable but then doomed coffee culture, the contemptible pest, breaking not merely fortunes but human hearts!

soil with a proportion of iron in it which coffee did not like. Outside the Ambawella Valley I saw tea growing well in patana soil and learned from my good friend, Mr. Cotton, that although there is some difficulty at first in reconciling the plants to the grass-land soil, they seem at once to be at home when the tap-root gets well down into the subsoil. Unless Mr. Kellow resolves to devote his patana land on Albion to timber tree growth, I cannot doubt that tea will do well between his shelter belts of wattle, and the result of my revisit to New Galway and its neighbourhood and what I saw, is to convince me more strongly than ever that a very considerable proportion of the better patana lands of Uva are calculated to grow, not only timber trees but tea, well and profitably. All Ceylon knows about the splendid fruit, peaches and especially plums grown by Mr. W. Cotton on Warwick. The large Ootacamund plums are especially famous and Mr. Nock is grafting this kind on the smaller plum, which has about as great a tendency to send up shoots as has the silver wattle. Here, as at Hakgala, we were struck with the magnificent foliage of the tree tomato. As an ornamental plant, it is worth growing; but the fruits are really nice (much like gooseberries) when ripe and eaten for dessert; while as a stew or jam, it is most difficult to distinguish them from apricot. The tree tomato and the *cho-cho* are great successes with Messrs. Cotton and Kellow (whose bungalows are in close proximity, while the stores of the three estates are also close together at the bottom of the valley); indeed the *cho-cho*, (the cooked fruit of which closely resembles vegetable marrow,) is so prolific that the surplus fruits are already used to feed pigs. The tree tomato, the *cho-cho* and the edible passion fruit, are great acquisitions on estates and seem to flourish everywhere at high altitudes. A gentleman from Assam tells us that there the gigantic passion flower, the grenadilla of the West Indies is common and the fruit largely used. We do not know why this fruit has gone out of view in Ceylon. We remember its introduction, (by Mr. David Baird Lindsay of Rajawella * we think,) more than 40 years ago, and it used to be grown at Colombo, climbing up jak trees. For many years we have seen it only as an escape in the Holnicot jungle above Nawalapittiya. From New Galway we brought a gigantic citron, weighing 3 lb which may for this week be seen (and scented, the smell being delicate lemon) at the *Observer* Office. —Although we could not revisit the plum-pudding rock in the depths of the Ambawella Valley, Mr. Kellow led us to "View Point" at the mouth of the Valley, whence we looked out upon the larger portion of Haputale, the Church and some of the stores gleaming white in the sunlight. Up above the deep Ambawella Valley we got a glimpse of the patana on which the Ambawella station of the long delayed Uva railway is to be placed, and from "View Point" we saw well into the Idulgashena Gap, through which the line will pass on to the shelving grassy range along which it will seek its present terminus on the Haputale pass. Here and in our journey to Albion we enjoyed views of the different divisions of Uva, which, in the fine weather which followed the rain, were inexpressibly grand and beautiful: while in passing upwards between the massive Hakgala and the beautiful wooded and patana ridges opposite it, the scenery was in some places sublime. But from "View Point" it was sad to look down on the remains of the first and second Ambawella bungalows: there is now a third in quite a different position. In the earliest built of all, in April 1865, my brother Highlander, Mr. Allister MacLellan, "in the dress of old Gaul" entertained me to pipe music,—music which is heard to chief advantage amidst the echoings of mountain valleys. I fancy I appreciated Mr. MacLellan's music more than the late Mr. Cruwell is said to have done. "That will do! that will do! that is beautiful! that is enough!" the musical German is described as exclaiming in ill-concealed agony, while MacLellan responded, "Man, I have not yet begun the *chune*! That is only the over—*chure*!" The Highlander probably did not think the German "capable of giving an *opeenyon*" on the music so dear to the sons of the Gael. Alas! Cruwell and MacLellan, and my original host and guide the elder Kellow, and so many more, are all gone, so that "the place which once knew them, shall know them no more for ever." I heard of a roll of names including about a score of Superintendents on Ambawella, the larger proportion being dead. I, close on my 71st birthday, paid a pathetic visit to the elder Cotton, bed-ridden from an accident in his 77th year. Here on Warwick, besides the kindest hospitality, I thus met three successive generations of Europeans connected with Ceylon. Old Mr. Cotton came to the island in 1844, never again leaving it, I believe. His son William born in Ceylon, I imagine, married a Scotch lady from Aberdeenshire, and they have children in Ceylon and "at home." To one of them, a young lady just returned from "Home,'; we were indebted for "low and sweet" strains of song and piano music, the most complete possible contrasts to poor Allister MacLellan's "skirling" pibrochs of twenty-two years ago. With this pleasing reminiscence it is fitting and congenial I should close my record of "New Galway Revisited."

* It is flourishing on Pallikelle still.

BRITISH INDUSTRY IN CENTRAL AFRICA.

A telegram in *The Times* of Tuesday informs us that the German East African Company mean to start plantations of coffee, sugar, and other cultures in the immense territory (70,000 square miles) recently acquired by them from the Sultan of Zanzibar. In this connexion it will be of interest to give some account of what has been done further south in the Lake Nyassa region by an English company, the "African Lakes Company," who have been working quietly for eight years, with very marked success—a success, indeed, which seldom accompanies enterprise in Africa.

Those familiar with Livingstone's later explorations will remember that this investigations resulted in the discovery of the great Lake Nyassa, which empties its waters into the Zambesi, the Shiré serving as a conduit. The dream of his life was to utilize the extensive waterway for the introduction of commerce, in order that the tribes which furnish by far the largest quota of human chattles to the slave-trader of East Africa might have a chance in turning the natural wealth of their country to good account, and not be dependent on a bloodthirsty set of half-castes for every yard of calico or string of beads. But Livingstone's purse was a very short one as African expenditure goes nowadays. He nevertheless sank nearly his whole means of developing this idea, which had but one result—his failure showed to those who were to come after just what should be avoided in the future, and what insisted upon. As a reconnoissance it was all valuable; but it sorely crippled him. In common with all African rivers the Shiré has its staircase of cataracts, and thus a clear run from the Indian Ocean up from the Zambesi to Lake Nyassa is impossible. A "portage" of 75 miles half-way between the lake and the Zambesi is a necessity. However, there were plenty of Livingstone's countrymen north of the Tweed who had such faith in the doctor's hard-headed wisdom that, with

the help of some of his old comrades, a new attempt was resolved upon in the year 1878. Mr. E. D. Young a gunner in the Royal Navy and Livingstone's factotum had seen just where the breaking point lay previously and when he was invited to assist in resuscitating plans all tending to relieve the natives of the Shire highlands from the incubus which lay upon them, he rendered invaluable service. Sent out by the Royal Geographical Society to investigate the story of Livingstone's reported murder in 1866, he was able to try tho oughly the experiment of transporting boats in sections. "Mild steel" was then in its infancy, and, if we are not mistaken, Mr. Young's boat, the "Search," was the first vessel of any kind constructed of this material. She was put together at Chatham under the supervision of the Admiralty authorities, and proved a perfect success during Mr. Young's well-known and most successful adventure. With the experience of this last trip in hand Mr. Young received a commission from the Established and Free Churches of Scotland to provide them with a steam vessel made of the same material. Mr. Yarrow built the Ilala under Mr. Young's immediate directions, and again with undaunted perseverance he placed her on Lake Nyassa at the service of the missionaries who accompanied him. It is right to mention this because we now hear of steam vessels on most of the great inland seas of Africa, and notably the Congo river, but to Mr. Young's energy is due the fact that the Ilala led the way in 1876. Sir Samuel Baker's steamers were second in order on the Albert Nyanza in General Gordon's service. It speaks well for the future when we now learn that Emin Pasha has the abovenamed vessel still afloat. The Ilala is reported "tight as a bottle" after ten years of amateur and professional seamanship, during which she had to weather many a heavy gale and many a bump.

The African Lakes Company took shape in 1878, not as a mere trading venture, but to assist the various missions which were then established, and to work out Livingstone's schemes. It had its ups and downs, its days of small things and its successes. Now it can boast of steady development through all. Twenty-five Europeans are dotted about at trading stations stretching from Quillimane on the coast to a point half-way between the Lakes Nyassa and Tanganyika. These stations are 12 in number, and three steamers ply on lake and river with very great regularity. At a pinch the company has shown itself equal to conveying a steam vessel in sections across from Lake Nyassa by the Stevenson road (of the company's engineering), and she is now on Lake Tanganyika with the staff of the London Missionary Society. But the point which the company has settled is this:—During the eight years in which it has extended the ramification of its trade over this immense distance, it has proved that it is possible to trade in indiarubber, wax, oilseeds, and in ivory to an enormous amount, without defiling the list of their barter goods with a single keg of trade rum, or the all-representative "square face" of the West Coast trade. It is something to have established proof before us that it is not necessary to carry ruin and desolation headed up in Hamburg casks and Dutch gin bottles to a new country before you can hope to see tusks and dividends. The Messrs. Moir, who are intrusted with the concerns of the company, testify that they have already exported (December, 1885) 40,815 lb. of ivory, and not imported a glass of spirits. We can only trust that when some of the ventures which are in the air take form and shape, either on the Congo or in the Soudan, this invaluable precedent may encourage or shame as occasion may require.

Little short of romantic are some of the incidents connected, with the company's progress. Making very bad weather of it for many years, two little stunted coffee plants led a miserable existence in the Edinburgh Botanical Gardens. It was a happy and kindly thought a ways when the Curator asked Mr. John Moir to take them away with him to the Shire highlands. In due time they arrived; the fittest survived. Too much happiness, perhaps, killed the other. The survivor took a new lease of life, struck deep roots into the warm, red soil of the hills, and burst out with berries and cuttings in the glorious air of the highlands. Photographs lie before us in which plantations filled with heavy-laden coffee trees are depicted. The gardens on Mount Zomba, of the Buchanan Brothers, are a thing to see, and it was stated in *The Times* some years since that samples of their produce had been priced very highly in Mincing-lane. But to this old patriarch of the Edinburgh Gardens is every berry traceable. It is computed that 100,000 trees claim direct descent from him, and Scotland may claim to have put some of her own energy and pluck into his fibre. Nothing seems to be such a favourite article of barter with the natives as soap. Equal to the occasion, the Lakes Company contemplate making both soap and candles for the market which already exists. They express abundant oil for their steamers as it is from ground-nuts, which do not pay to export. But the company pride themselves on the alteration they are bringing about in the ivory trade of the interior. Hitherto it has been the custom of the Arabs to buy, or more often to seize, such stores of ivory as they know of in the country. The tusks are generally borne to the coast by unfortunate slaves, who after a tramp of several hundred miles are got rid of for what they will fetch. The burden the man has carried may bring in from £25 to £30; the bearer may change hands for $5. Now the trading stations of the Lakes Company "cut" this traffic half-way; the Arabs are glad to dispose of their ivory midway at the lake. We much regret that it is not in our power to report any diminution in the traffic in slaves across Lake Nyassa, coastwards bound. On the contrary, it seems that it is increasing largely. The slave trade is in the hands of Arab agents and powerful lake chiefs, with whom the company has no licence, even if it had the power, to interfere.

The very existence of the large mission stations of the Scotch Churches and the Church of England on and around the lake depends on communication with the outer world, and this becomes only a second charge on the company's exertions. To keep up with requirements under this heading a large sternwheel steamer is just being put together on the Zambesi, whither she has been borne in sections from the Clyde. It would be very interesting to point to the work, both industrial and evangelical, which is being carried out in these regions, but it hardly comes within bounds, nor can we do more than mention again the fact that, with the company's operations as a basis, some very excellent Scotch farmers and engineers have founded a flourishing settlement on Mount Zomba—perhaps one of the healthiest and most picturesque spots in Central Africa. With abundant streams and a network of irrigation, not only do they dispose of their coffee, sugar, and oil seeds to the Company, but some of the rarer drugs and spices are being brought under hand. Surely the very spirit of Livingstone must wander now and again through those regular lines of coffee trees? He dared to dream and to talk of such possibilities in his lifetime; his hard-headed, energetic countrymen have indeed given a backbone to his visions since he died on the shores of the neighbouring lake. But a great deal too much harm has been done already by picturing tropical Africa as the coming colony for Europeans of all classes. It is murderous folly to entice men on to its alluvial lands and swamps to dig and delve, to plough and sow. Only here and there can such things be done; even then the white man must manage and direct alone. But, rightly understood, this very fact tells in favour of the natives. Born cultivators are they; no new discovery this, as Cuba, Brazil, and the Southern States of old can tell; but heads for such details as the merchant's ledger requires will not ache over figures for a generation or two. Then there is no prospect of the African being elbowed off his own land by the incoming settler, be he of the "Ma Dutchi" tribe (as the natives already call the Germans) or from Ireland, England, or Sweden. The natives must command their own price; they do now at the company's stations and on Mount Zomba, but it is not in rum, we repeat.

Pleasant would it be to round off such a story of brave experiment, and, let us add, monetary success, without dropping a hint of care and embarrassment, but then it would not be Africa. Nothing goes right in Africa," is a proverb from Cape Town to Cairo, and the Lakes Company has its troubles. Ever since Lord Palmerston's day the Portuguese have endeavoured to claim everything and everybody situated behind their seaboard on the east coast, and so across the continent to the western side of Africa—a pretension which has been as often contested. It will be seen that the country in which the company's operations lie falls within this section. The recent "scramble for Africa" has made the dry bones of these old disputes have their say. Germany has treated them in her own off-hand way. It was enough, surely, that poor Livingstone discovered with chagrin that he had only been exploring for the purposes of convicts and slavedealers at Senna, Mette, and Quillimane; it would be too much now to witness any attempt made to nullify this true-hearted effort to emancipate the natives from their wrongs, and the countrymen of Livingstone must look to it and see that it does not take shape to the detriment of the new industries.

[We have the impression that the late British Consul, Captain Moore, R.N., indented on Ceylon not only for cinchona seed, but for coffee, and we can only hope that the fungus was not carried with the coffee.—Ed.]

CUPS THAT CHEER.

Botanic beer can hardly be erased from the list of our national beverages without a struggle. The Excise has lately declared against it, with the support of the Courts, but surely some effort will be made to reverse the judgment. We know nothing of the compound more specially in question; and of "herb beer" we can say no more than that we believe it to be well meant. It is understood to be teetotal in its tendency, and in the nature of a pious fraud. It has something to the colour of the lighter beer, and well shaken, it evolves a lather, which enthusiasm may call a head. With a pipe of herb tobacco it completes the outfit of the blameless, intent on "going it" without a headache. It may be all very well, yet, it ought not to represent the final effort of invention to improve the quality of our non-intoxicating drinks. There is no more reason why a certain person should have all the nice beverages to himself than why he should have all the nice tunes. The coffee palaces are, no doubt, admirable institutions, but the coffee they sell leaves much to be desired. The same thing may be said of their tea. If they only brewed with half the scientific care of the brewer they might sooner drive him out of the field. They would certainly confer a great boon on all of us, for where they led, the kitchen might follow, and in time we should have tea and coffee fit to drink. As it is, people make both of these beverages with an appalling lightness of heart. Some own to a sense of responsibility as to coffee, but it is a common belief that anybody can make a cup of good tea. Sages have not been of that opinion. The late Mr. Ayrton, who had better claims to that title than it is now the fashion to admit, made tea as seriously as he audited a public balance-sheet. He had thought it all out, as he had thought out Indian administration, and the result was a certain solemnity of preparation not unsuggestive of a Hindu rite. He made tea with awe; and those who denied him the quality of reverence had never called on him in the afternoon. He made only just as much tea as he wanted—no more—and he had a rich variety of teapots to enable him to take the measure of every need. He allowed the tea to stand for five minutes, and then drank it all up, or at least poured it all out, at once. It was delicious. If he could have made tea for Sir J. Hooker they might have been friends for ever. The poor man's cup, and especially the poor woman's, often stews on the hob for hours, and it is really not much more than a decoction of tannic acid when all is done. Tea should never be a decoction, but only an infusion. Even the tea of the drawing-room usually stands too long. The replenishing of the teapot with fresh water, common both to the mansion and the cottage, is a positive abuse of the gifts of nature. There can be no good gossip on the stimulus of drink so made. The finest talk must degenerate into tattle when the tea has stood for more than seven minutes at the outside.

With our tea a comparative failure, our coffee is, of course, almost past praying for. Our very pretensions go no further than tea. We lose a good deal by the meanness of our ambition. Good coffee is the finest drink in the world, and it would surely defeat half the intoxicants on their own ground. It is the most generous of stimulants, and it induces activity and alertness of brain without the faintest trace of elevation. Should any further recommendation be wanted, we may add that, like pure water, it will kill, if you take enough of it, or, rather, too much. Mürger died of excessive coffee—not unflavoured with cognac—but far more people have to thank it for the prolongation of their lives. It is far beyond tea as a dietetic, though perhaps nobody but Merlatti could wisely venture to make it his sole support. Indeed, high authorities say that it should never be taken without something solid, as an accompaniment. Anything will do—a piece of bread, or, failing that, even a waistcoat button, according to the Oriental proverb quoted in an admirable lecture on the subject at the Parkes Museum. It improves with age like the other generous drinks, though not of course when it is in the state of infusion. The green berry may be kept for fifteen or twenty years, and it will gain in flavour every day. Brown Java, which leaves Mocha far in the shade, is supposed to owe a good deal to its long sojourn in the island before exportation. It lies in store sometimes for seven years.* The roasting should always be deferred to the very last moment. Roast, and brew at once is the golden rule. First get your Brown Java—for that matter, one of half a dozen other kinds will do. Then make a smokeless fire, of coal, or gas; toss your green berries into an earthenware pipkin, if you have nothing better at hand, and there need be nothing better; hold it over the flame for fifteen or twenty minutes, to dry it merely, not to burn it, stirring it all the time, and your task is done. Grind or pound in a mortar—pounding, they say, is better. The Turks find that the pestles improve with use, as the coffee improves with age, and they sell the old ones at a high figure. Two ounces of coffee to the pint of water is the happy mean, and those who want it weaker had better weaken it after the brew. A common jug and a strainer are all you need for the final rite, but people who like to part with their money often insist on more.

Coffee is best with absolutely no adulteration, but some plead for chicory with it, owing to vices in their bringing up. Dandelion root, roasted acorns, dried cabbage stumps, "or any other form of vegetable offal," ought certainly to be left out of the pot. And, if there must be chicory, let us have it pure. There is often an adulteration of the adulteration, in the shape of an admixture of venetian red, roasted pulse, damaged wheat, mangel wurzel, oak-bark tan, logwood, dog biscuit, or baked liver of horse. But for the greater facility of adulteration, coffee might be as largely used in this country as tea. Tea is better protected because it is easier to protect. We seem to drink less and less coffee every year. Some go so far as to say that the adulteration is systematically encouraged by the Government, but this seems unfair. It does appear to be systematically endured. The Customs have been known to advise their officers not to attempt to distinguish dandelion roots from chicory "on their own responsibility." They ought not to let themselves off so easily. A people that had once tasted really good coffee could never afford to forget that joy. It is much rarer in England than almost

* If this were true, which we do not believe, twice the ordinary price would not pay the producer—Ed.

any other delicacy. The exporters, no doubt, send us of their best, but we do not know what to do with it when we have it. The Turks might send us a coffee mission, or even, if this unhappy business in Egypt were settled, the French. The taste is ready, and it only awaits the means of gratification. The only proprietor of an English coffee-house who knew how to make coffee as it is drunk in favoured localities abroad soon realised a fortune. If the French would but teach us how to make coffee we might teach them to improve their make of tea, on the principle of an exchange of lessons. They are wofully benighted in this matter, even in the centre of civilization. In the outlying districts they have a rooted idea that tea is physic, and they have been known to offer it, pending the arrival of the doctor, for the relief of a broken limb. They never make it strong enough; their tea is emphatically but hot water bewitched. And the instrument of witchery is apparently the old familiar one of a birch-broom.—*Daily News.*

INDIAN COFFEE CULTURE.

BY AN EX-PLANTER.

Though the cultivation of coffee by Englishmen is of no great antiquity, yet for the last 50 or 60 years, it has had a peculiar fascination for our ambitious "younger sons," and that this charm still holds good the captains of outward-bound passenger steamers know full well. It is for those whose thoughts have thus turned down this new and curious road to fortune that these notes are put together. For them we attempt a suggestive and sufficient sketch of this attractive labour, as well as profitable enterprise; while others, whose connection with coffee is confined to the refreshing matutinal draught or after-dinner digestive sip, may be curious to see how their sons or brothers defy malaria and fever, living a life of hardship and adventure imperfectly pictured by those at home.

Coffee thrives in many parts of the world. A map coloured to show the regions where its cultivation is profitably carried out would exhibit a broad zone of habitation on both sides of the Equator completely circling the globe. One or two districts thus included, by some happy combination of climate and soil, have attained to fame through this product alone. There is Brazil, in South America, where scores of hundreds of miles of admirable volcanic soil are clothed with bushes, and the revenue of an empire fluctuates with its good or bad seasons. In Jamaica, under the British flag, this mild beverage has almost eclipsed the profitable production of a stronger drink for which the island has been famous. On the opposite African coast, again, the negro state of Liberia rears a lowland species named after the locality, and indigenous. Caffa, on the Abyssinian tablelands, is held by many to be the native home of coffee, and it is still grown there in a rough-and-ready way. But from sandy Syrian terraces above Mocha comes perhaps the most famous growth of coffee—that variety which made the beverage famous in Constantinople and Europe more than two hundred years ago. Its superlative strength and aroma are due largely to the care exercised by Arab cultivators in marketing only the ripest and choicest cherries. Many of the lesser Pacific islands grow coffee, but in a scattered, careless fashion, amongst those teeming jungles where the sunbirds flash and parrots nest, so brilliant in feather that one might well believe nature had used them to wipe her most lavish paint box out with.

Fiji, since the annexation, has become prosperous. Its coffee is rising in estimation, but there crops up in an acute form the labour difficulty, perhaps the most serious question of all those which can vex a planter.* Home labour in this delightful island is instinctively lazy, and, moreover, pampered by a well-meaning but "grandmotherly" Government. Consequently, resource is had to labour ships, which scour the Pacific picking up every man or boy who is willing to apprentice himself for three years. But for this single matter we should say to the hesitating novice, "Try Fiji!" The climate is pleasant and the land is unquestionably of wonderful fertility.

But it is to Ceylon and India that most young men's eyes turn when they think of seeking this manner of fortune in new lands. Ceylon, "the brightest jewel in the English Crown," has been a very Garden of Eden to the tropical adventurer: in our opinion its soil is to-day as unexhausted as it ever has been. True, the island is not just now so vividly prosperous as some years ago, but this in great measure is the result of overdoing the coffee enterprise, and flooding the high-class labour market with an endless stream of "chick dorees," all willing enough to work, only without a particle of practical knowledge. But the great shadow that has been upon Ceylon is that of the dreaded *leaf disease*. This terrible little fungus spots coffee leaves with yellow, finally stripping and killing the bushes over whole mountain ranges. It has sent down the value of estates 50 per cent all over the island. Before the disease appeared you could hardly grow coffee in any style without realizing something of a profit. On certain estates—"on Patna soil"—40 per cent for money invested has been returned year after year; and now—well, some cynical proprietors, well qualified to speak, say the only way to make coffee pay in Ceylon is to pull every bush up, planting tea in its stead.

Good coffee is grown in Southern India. Here labour is generally fairly abundant, and very good in quality. In most districts the climate is healthy: "jungle fever" may be reduced to a minimum by a cautious planter, and there is generally some sport to be had near at times.

It is with a by no means unpleasant sense of freedom the wanderer goes up to his jungles, his last link with home broken when the big ship that has borne him over seas went down on the horizon, and all the rich future opening before him. He goes up-country as far as the railway will take him, and then has to rely upon country carts, the muchlah or hammock suspended from a pole, or horseback if he can get a mount.

The first evening alone in his Traveller's Bungalow is the pause before the curtain rises to-morrow, and he sees those hills and gorges in which he must live and work for the next 10 or 20 years—which perhaps, indeed, he may never quit; but he puts away this latter thought if he be of stuff stout enough for a pioneer, and gives himself up keenly to the novelty of his surroundings. Blasé indeed must be the wanderer who has forgotten how dark was that Indian evening under the fig trees of the little English station, how obsequious the native attendants seemed, how the multitudinous voices of the night, the jackals yelping on the maidan, the squirrels chirruping overhead amongst the rafters, bats and owls outside, and a world of insects in the brushwood, combined in one continuous concert. Fire-flies hovered about the trellis of the verandah, and inside the heavy monotonous flap of the punkah overhead lulled him to repose; for the rest, all he remembers of his first evening is that it seemed he had hardly sought the shelter of sheets and mosquito curtains when his servant shook him gently by the shoulder and thrust a suggestive cup of hot coffee upon his attention.

Making a start by moonlight—that wonderful silver radiance that floods a tropical landscape with mellow light—or, perhaps, at very earliest dawn, he has turned his face to the blue hills that tower before him long ere the sun is due in the East. Through slumbering hamlets, in their heavy green shrouding of bananas, he passes, disturbing a cooly or two asleep before the doorstep of some better-housed countryman, and the peasants start up to stare, or salaam—if they can get their wits about them in time—as the sahib canters by, his heavy baggage in country carts, drawn by amiable white oxen, trundling after him. Broad rivers are crossed, all black and silver in the moonlight, where the carts go into the flood up to their axles or higher, and the cattle drink as they plunge and sniff through their sparkling bath, while each driver shouts and twists their tails until they may

* More serious in the case of coffee is the introduction in its very infancy of the fatal leaf fungus.—ED.

be heard to crack audibly. Deep groves of figs are passed, where shadows are so dense we cannot see our horses' ears or the first man, who chants monotonously as he staggers under our hammock pole, and the exit at the end of the avenue tunnel shines with a dazzling brilliancy, and then dawn comes as the foot hills are reached; the thin curls of aromatic blue smoke go up from the hotels of wayside huts, parroquets rush tumultuously screeching from palm tope to palm tope, the hum of the night-time drones into silence; and while the sky overhead of lavender is shot with fiery yellows and crimsons, the day comes, the bee-eaters take up their perches, the great black and crimson swallow-tail butterflies hover amongst the yellow cactus flowers, and the "gorgeous East" is awake again.

The best coffee lands lie for the most part above the bamboo region, which rings the hills, and to reach it we have to pass through a waving forest of that giant grass. Zigzaging up the Ghaut road, we come at last to a plateau, three or four thousand feet above the sea; and here, all around us, in these undulating glens and corries, clothed in dense and gigantic jungle, is the chosen soil and congenial home of the coffee bush. Lonely, indeed, will be the lot for a time of him who goes to a really brand-new region, where the foot of man has never before penetrated. But, to tell the truth, such places are scarce nowadays, and we may safely suppose there is a friendly, though strange, hand to welcome the newcomer to the woods, and give him shelter and food until he shall have had a chance to establish himself. This previous settler will put the "Griffin" up in the local regulations, and smoke a cheroot or two over the best spot for a new garden, and the formalities attending its purchase.

Much the same method of taking up land holds good on all Crown forests. The would-be purchaser, if he is bent on opening forest for himself, "prospects" until he finds what he thinks will be a likely bit. This is notified to the local authorities, who fix a day and put the hillside up to public auction at a reserve price of from 10*s.* to 2*l.* per acre. The hardship of this arrangement is that occasionally the man who has been to all the trouble of making a selection is outbidden by some wealthier rival, who carries off the prize. But suppose it falls to the prospector proper, at a price which will vary infinitely with soil, climate, aspect, accessibility, neighbourhood, &c., but may approximately be put at 2*l.* to 3*l.* per acre; then the owner pays down 10 or 12 per cent, and enters into practical possession. A Government surveyor comes up and marks out the limits of the land by clearing a broad path or "blaze" through the forest all round, and for this about 4*s* (R2.) per acre is charged.

Then the Englishman sets to work. If there is another planter within a mile or two of the jungles which are going to blossom with coffee an arrangement is generally made by which the new chum stays with him for a time, going to and fro every day; but if the district is quite unsettled, the "Griffin" must establish himself. The first necessity is some labourers. To obtain these recourse is generally had to maistries or headmen—gangers we call them here in England—who are well known on the outskirts of all agricultural districts. They wait upon the sahib, and, with much salaaming, hear how many men he wants, and when. For each man, woman and child they promise to produce by a stipulated date in the future garden an advance of three or four rupees has to be made. Much of this goes straight into their own pockets, no doubt, but the rest enables the coolie labourers to provide a few necessaries for their migration. It is an eventful day when they come streaming up the rocky hill roads, 50 or 60 of them, perhaps, in Indian file, carrying on their heads and shoulders an infinite variety of baggage and movable property, with bags of rice slung across the backs of bullocks, a choice assortment of little black and brown native sheep, and bunches of miserable cocks and hens hung in festoons, heads downwards, from bamboos. They encamp, and, under the energetic supervision of their maistries, set to work erecting long rows of low sheds, or lines, as they are locally called. These are very roughly made for the time of strong uprights fixed in the ground, walls of matting made of split rattan cane, and heavy roofs coming low down to the ground of lemon-grass or fan-palm leaves. The Englishman's first hut is a few score yards away, and only a little more carefully finished than the natives.' Round it are the stables for his pony, the tool sheds and store houses. The site for such a settlement should be carefully chosen. Hollows must be unconditionally avoided, so should windy gaps too high up. The best place is a spot on the open grass hillside, by the side of a good stream, with natural drainage, and well above the level of the tree tops in the valley below. The planter cannot take too much care of his men, or treat them with too much consideration and justice. They are no more "niggers" than they are Esquimaux! And he might remember with advantage how many of them belong to races distinguished for valor and culture when his own ancestors were still in the barbarism of woad and wolf skins. It is, besides, wise policy to cultivate a good repute with them, for they are great gossips, canvassing their chief's peculiarities and habits very keenly over their evening fires, and transferring their alliance and labour to other quarters very readily when they are ill-used. Himself and his men hutted, his provisions and his tools arrived, the Englishman commences the interesting part of his enterprize—an adventure in which we hardly know whether to say the pleasures or the pains are on the average, in the ascendant, but one certainly with no lack of picturesqueness about it.

Perhaps it will give a better idea of a coffee garden if we say that as a general rule it may be taken that there is no level ground in a district where the plants flourish; everywhere the ground undulates with more or less steepness. The typical plantation is one clothing a rugged hillside, where the rich soil lies in pockets between rocks, or the hollows between ridges, and the plants cover the rise and falls with their glossy leaves, between which show up stones and those scattered logs and stumps once forming the primeval forest. Of course, this "jungle" while it stands, is a considerable obstacle to any sort of cultivation, and has to be brought down in whole or in part. The great trees—the teaks, the sals, the cedars, or yellow-wooded "Jack"—are by nature sown close together, and consequently reach a great height before they branch, then making a canopy overhead often almost impenetrable even by an Indian sun. Then creepers form festoons from branch to branch, and curious orchids, with star-like white and yellow flowers blossom, after the rains, far out of reach overhead. In the nullahs or watercourses wild sago grows in waving beds, and a little higher up the banks white-rooted ginger and the tall sticks of broad-leafed, pleasant-barked cinnamon flourish. This is the kind of land to grow coffee and make our fortunes! A good, deep, peaty soil of chocolate colour, generally characterised by such vegetation as the above, and an aspect neither too much exposed to winds or the mid-day sun, are the great desiderata.

Perhaps the first thing to be done is to make a nursery plot for young plants, to be subsequently put out into the open. A nice piece of ground is chosen somewhere about the middle of the estate, and within a few yards of a perennial water supply. All underwood and litter is then put back from a space of about an acre or so, some of the trees taken down, and the ground very carefully dug up, before being divided into long narrow rows parallel with each other. In these we sow, when the annual wet weather is expected, the little coffee beans in the parchment or thin silver skin covering them. In a few weeks they are up and making little glossy leaves, but they are not properly ready to plant until their primaries or first branches have been formed. Constant watering in dry weather, careful weeding, and artificial protection from a meridian sun, are requisite here, repaying the active planter by a stock of strong, healthy young plants, which it will be a pleasure for him to plant out. While these are growing he has to get his clearings ready. With a compass, a surveyor's theodolite, and a long cord divided by coloured rags at

regular intervals, according to the distance apart his future bushes are to be, he laboriously, day after day, marks out in the still standing forest long parallel lines, punctuated at regular intervals with 18-inch bamboo pegs. In a single clearing, if we are going to have the coffee 5 feet by 4 feet apart, there may be room for 22,000 of these pegs. When this "pegging" is done comes the "pitting," *i.e.*, holes 18 inches square being made where every peg stands, and the good top soil of vegetable mould hidden away from the conflagration that follows.

Many a long day have we spent in the green arcades of the forest superintending these ant-like labours of our men, or armed with compass and theodolite, enjoyed the broaching of quiet valleys that no foot but the silent sambours had ever troddeu before, and the pioneering of shady hollows that had kept their repose unbroken since the beginning. Such a wealth of tree, fern, and pendant creeper swings overhead, and casts a shifting patchwork of light and shadow on the ground as the light breezes swing them. But, alas, our errand was generally one of destruction. We came not to admire and withdraw, but wage remorseless war with fire and steel. A belt having been drawn round the jungle, the work of clearing commences. The first trees cut are along the line of the lowest ground, and then another tier above them is deeply notched, but none of these are cut through completely. Half a clearing will be thus treated on a still and windless day. When all is ready the first axeman goes above the highest rank of forest giants, and, with a few vigorous blows, topples over a medium-sized sapling. In its fall it brings two others with it. These are matted together by rattans with others, which give way under the sudden strain, and so tier after tier rocks and swings as the stress spreads, the bamboo clumps splinter and crackle like a winter fire, the big trees toss their arms aloft, the great yellow rents fly up the bark of the "Jacks," and you can hear the innermost sinews of the cedars cracking like pistol shots —and then suddenly, with a mightly roar, the hillside is unlaced, and a thousand years of timber go to perdition with one huge, far-resounding crash that startles the ruminating sambour to his feet a mile down the glen, and sends the wild sheep flying over the grass ledges of those blue crags away in the distance that catch and echo the gigantic disaster!

For six long hot Indian weeks the prone timber lies baking, and then comes a period of animation. Choosing a warm morning, with a steady breeze blowing, the planter goes to a windward corner, and striking a match, drops it into a cluster of withered leaves. The first thin blue smoke curls up to the sky in a delicate blue spiral laced with flame, and then, as the wind bends it down, the twigs sparkle and the sparks fly, the flame seething out into the open, gathering strength as it goes, and, advancing in line of battle, storms and carries every log-encumbered hillock, and runs across giant stems that bridge the streams, until the whole "clearing" is a witches' caldron, and from the neighbouring heights looks like the fiery crater of Etna. But, fierce as the conflagration is by day, it is infinitely more startling and grand in the night time, when the standing jungle—ebony in the shadows and copper where the light catches cliff and trunk—surrounds such another rocking "pillar of smoke and fire" as that one which rested before the Israelites at "Elim in the desert."

Planting out the tender green coffee bushes after the burn, when we hunt for and draw those deposits of leaf mould we have made in the unfelled woodlands, is pleasant and grateful work, the long lines of greenness winding in our track across the hills, and the weather being at this "planting season" mild and showery. Staking the plants, making roads, opening new forests, building bungalows and "lines" for the natives, with elaborate and costly pulping houses, drying sheds, "godowns," and cattle houses, occupy the planter's time very fully, until he has been at work three long years, and his first maiden crop—the earliest reward he can look to for labour and money expended—is at hand.

He wakes up one morning during the third spring to a pleasant sight. From the steps of his verandah to the sal trees half a mile away, the rows of bushes on which he depends for fortune are loaded with white blossoms, jasmine-like and strongly scented, crowning the bushes with their stars, near by and extending in the distance like long lines of breakers upon a sandy shore. The planter breakfasts at his window, and prays for sunshine. It all goes well, in a month or two a rich crop of fruit, resembling cherries, has succeeded to the brief floral display, and he watches them change in the hot sunshine through green and yellow to crimson and purple.

By the time they have reached the latter stage, the increasing attacks of animals and birds suggest to their owner it would be as well to get them into safety. Big black monkeys come down from the hill tops in organised gangs, under leadership of an experienced white-bearded patriarch; delicate little squirrels, who still bear the four stripes on their backs which Vishnu's caressing fingers left, chirrup and scamper down the fallen logs with "cherries" in their mouths; jackals and sambour deer stroll along the rows under the moonlight, pillaging the ruddy crop while the planter is safely enveloped in his mosquito curtains. Even elephants like coffee thus *au naturel*: so for a busy month we put it beyond their reach, and all day long the encouraging shout of the maistries echoes over the clearings, the white-turbaned coolies sing as they send down an endless stream of crimson berries to the pulping mills, and at night there goes up with the smoke of their wood fires shouting and laughter, and the clash of wild music as they grow cheerful over their accumulating "extra pay." Two more operations, and that ever memorable and delightful first cheque for "crop received" comes to hand from our agents in the lowlands. The soft fruit we have brought in to our stores—it may be some fifteen or twenty tons for a maiden crop—is soaked in great vats, then "pulped"—*i.e.*, the flesh separated from the kernel by pressure between gigantic revolving nutmeg-graters —dried again, and finally peeled in a stone mill worked by steam or water, when the parchment, a thin brittle skin, is cracked off, and our merchandise—the unroasted coffee of our shops—is ready (after a final winnowing) for the bags and shipboard.

If our lonely friend gives a sigh of relief as the long file of white bullocks paces off down the Ghaut road to the plains, it is hardly to be wondered at. He has worked hard enough in all truth for that precious grey freight they carry. Up every morning at 6 a.m., he is off to "the good greenwood" while the shadows are still purple in the hollows, and the lower grounds are hidden in a silver sea of mist, through which rock pinnacle and bamboo stump pierce, like islands in some strange pearly ocean. The forest paths are cool enough while the day is young; jungle fowl crow and scratch in the undergrowth, little hog deer trip timidly home through the long grass, spiders of extraordinary colours shine amongst the dewdrops and cozen incautious flies, orchids bloom overhead, and ground thrushes in lavender and green, epauletted with sky-blue, chuckle on the stumps. But the sun of the hot weather "wipes out" this pleasant morning interlude. By mid-day the planter's world grasps, for breath, and breakfast at noon is an effort with "the sky as brass and the earth as iron." The "tub" preceding the meal is a pleasant item, it must be owned; so is the running postman, who generally appears jogging down the path as we sit with slippers and lightest coat in the verandah awaiting his arrival and breakfast.

With good health we may do all the hard work—the planning, the overseeing and the conceiving of an estate in its earlier years—without any great discomfort. It is when the malaria rises in May or June, and fever lays hold upon us, that we groan at the sultry length of the Indian days; and as we toss restlessly to and fro on our charpoys, consumed with a purgatorial thirst there is no quenching, are tempted to curse those giant creepers that swing so monotonously from the branches, and those villanous

insects of the sunshine that keep the grove all tremulous with their eternal hum—

. . . and the day has a sun
That shall make thee wish it done.

But evening brings relief to the fiercer stages of "junge fever" as to the ordinary work of a plantation. At sundown a stalwart coolie exercises his vigour in oscillating the clapper of a heavy bell that hangs between two posts at a central spot, and from all quarters converge the ready coolies, who have been squatting on their heels and waiting for this sound for some time. Men, women and children, they file in, collecting in a great circle round the rough backwoods desk, where the owner is ready with his day book, and everyone's work is entered against his name as he answers to it. If it be pay day, then a glittering heap of silver coin percolates from the log counter to the dusky hands of the labourers—two-pence a day for the men,* a penny for the women, and a "retaining salary" for the little children, who come up in turn, and duck their shaven heads in comical homage to the great white sahib as they hold out small brown hands for the price those same hands are supposed to have earned at a halfpenny a day. When he has seen his horse fed, has locked up his stores and sheds, counted back his tools, and doctored, perhaps, a dozen of coolies, who come up to his verandah steps to be cured of every sort of ailment of which Asiatic nature is capable, the planter has a spell of well-earned repose.

The hardest part of his life is this first part. As soon as his prosperity is assured his way lies amongst pleasant places. His permanent bungalow crowns some palm-fringed hilltop, and courts the winds of Heaven to play amongst the cuscus-grass mats that serve instead of doors: perhaps it is his good fortune to have a wife there with him, and half the sting of exile vanishes in the glamour of her presence. He will enjoy more time, too, for sport when the land is planted up—ridding the district of a rogue elephant, on whose vindictive tusks perhaps half a dozen men have been spitted, and following such a beast through the mazes of the forest on foot is as thrilling a sport as could be desired. Or a tiger may work havoc amongst our herds of tame cattle, and then we sit over a recent "kill" and watch while the stars describe a parabola overhead, for the soundless approach of the lordly beast, who dies forthwith upon the body of his victim. Deer are generally abundant in new regions. In India there is the sambour, a noble example of his kind, given to stealing at twilight into the coffee—moreover, generally coming down to drink at the same stream night after night. A successful shot at a "stag" often will stock the district for a week or more, utterly discomfiting the native butcher, and respiting his flock of tough, meagre, brown shearlings. The spotted deer lives a peaceful life amongst the bamboo thickets. While the "ibex" or hill-sheep of the planter, tempts him up to the breezy crags, where lemon grass waves in endless savannas, and the climate resembles that of an English April. This is about all the big game he sees though "bison"—the exile's nomenclature is very careless—of glossy black hide, brown hill-bears and wild pig share the jungles with larger species. For lighter amusement there are abundant jungle fowl—no bad imitation of pheasants, but hard to bag, owing to dense cover—pigeons of gorgeous hue, a dozen of which we have often tumbled out of one fig tree which without quitting our verandah, and plenty of lesser birds for the amusement of him who is blessed with a solacing love of natural history.

His chances of social relaxation depend much on where he may be located. But he must have got very deep indeed into the wilderness if he does not manage to bestride his hill pony every other Sunday, and, with his rifle across his knees, to trot down to some country-man's shanty, where the news of the day is to be heard, and an hour or two whiled away in friendly gossip and discussion of crops and prospects. To "the hills," where English society congregates in the scorching summer, he looks throughout eleven months of the year with longing and affection. It is there those tender children of his go to school and cultivate a little colour on their pale cheeks in an air approaching that to which they were born. It is there his club is—that elysium of good fellowship—and the church where he can slip a gold mohur into the alms bag to condone fifty enforced absences. Saxon girls, it may be added, never seem so fair as after a long dwelling amongst those whose complexion is "the swarthy livery of the burnished sun," and his countrywomen, whether in ball room, tennis court, or galloping after jackal across the rolling hill pastures, are not the least pleasant of the memories which the bachelor squatter takes back to his lonely hut from Ooty, Simla, or wherever he may have spent a delightful month in touch with civilisation.

In this brief chapter we may not enter into the technical details of the curious art of coffee planting—a tortuous but (if carefully followed) promising road to fortune. Those who would know more should consult some modern handbook on the subject, such as the well-known firm of Whittingham, in Gracechurch Street, can supply, and study at their leisure all the details of the craft. In these few lines we have only attempted to show that there is more romance and "adventure by field and flood" represented in such a fragrant cup of coffee as that we sip at breakfast or after dinner than is perhaps generally known. How hard our "younger sons" (and some older ones too) work for it, is often little suspected; and to touch in, though hastily, the lights and shadows of their rough life, and to show how they cut a way, against overwhelming difficulties, to an honourable ambition, has been the purpose of this little sketch.—*Colonies and India*.

* A long obsolete rate of wages.—Ed.

Sugar and Fruit in Fiji.—Amid the surrounding depression, the sugar output continues most satisfactory. The mill managers, shareholders, and proprietors speak with hopeful confidence of the future, and they have evidently derived a very considerable accession of this confidence from the perusal of the article on "The Position of the Sugar Industry," which appeared in the *Australasian* of September 26th. On the Rewa, even the crushing power of the Colonial Sugar Refinery Company's machinery, which collectively constitutes the largest mill in the world, is found to be insufficient for requirements, and the erection of what will virtually be the fourth mill under the one roof, is to be proceeded with almost immediately. The works at Koronivia and at Ba are progressing slowly, but in both cases there is a very large area planted up, which will be fit for the rollers when the new mills are ready. On the Dreketi River, Vanua Levu, the collapse of the little old worn-out Pioneer mill did not long suspend operations. Another mill has already been erected in its place, and it is reported that it commenced crushing last week with admirable results. Unlike the sugar growers and manufacturers the fruit cultivators and shippers are still experiencing the cold shadow of adversity. The banana disease is spreading. It smites the tree as with a curse. The leaves put forth half developed, with a wrinkled and unmatured appearance; The calyx bursts prematurely. The flower comes out blighted. The fruit forms black and blasted, and never approaches maturity. The trunk swells half-way down, and from it bursts an untimely growth of puny leaves in tuft, which never attainto one-twentieth of normal dimensions. The tree is in every part of it as brittle as a dry twig, and its whole aspect is that of an unprofitable deformity. The Suva Chamber of Commerce has taken the matter in hand, and it has forwarded diseased and healthy trees, with respective soils, for examination and report by competent authorities. The immediate cross for the fruit-shipper is the quarantine of the Sydney boat at this end, which has spoiled every case and bunch of fruit brought in for her. By the law of compensation there should be a very bright future in store for Fiji, for it would certainly seem as if for the past few years even the stars in their courses have been fighting against her.—*Australasian*.

CEYLON AND ITS PLANTING INDUSTRIES.

(TO THE EDITOR, "THE ECONOMIST.")

SIR,—The Ceylon commercial season closes on the 30th September each year, and the Colombo Chamber of Commerce tables are made up as soon after as possible.

The actual results arrived at for our staple export trade cannot fail to be of much interest to those who have watched the gradual development of other planting industries since appearance of the leaf fungus, which so wofully affected our coffee. Having drawn the attention of West Indian planters, through the columns of the London *Times*, in August, 1884, to the way in which Ceylon planters had developed "new products," to make up for the failure in coffee, I would again venture to trouble the home Press with a few figures, in support and illustration of the position I then took up.

Tea is rapidly becoming the main staple of the planters of Ceylon, and everything points to our export of this important new product rivalling that of India in about ten years time. So far, it is comparatively the day of small things, but the following figures show the beginning of an important enterprise. It will be observed that the export progresses more nearly in a geometrical than an arithmetical ratio. The Ceylon exports of tea have developed as follows:—

TEA.

						lb.
Total exports from	1st Oct.	1885	to	30th Sept.	1886...	7,170,329
do	do	1884	do		1885...	3,796,684
do	do	1883	do		1884...	2,262,539
do	do	1882	do		1883...	1,522,882
do	do	1881	do		1882...	623,292
do	do	1880	do		1881...	277,590
do	do	1879	do		1880...	103,624
do	do	1878	do		1879...	81,595
do	do	1877	do		1878...	3,515
do	do	1876	do		1877...	1,775

Cinchona bark shows the next chief development among new products, as the following figures will show :—

CINCHONA.

						Branch and Trunk lb.
Total exports from	1st Oct.	1885	to	30th Sept.	1886...	15,364,912
do	do	1884	do		1885...	11,678,360
do	do	1883	do		1884...	11,492,947
do	do	1882	do		1883 ..	6,925,595
do	do	1881	do		1882...	3,099,895
do	do	1880	do		1881 ..	1,207,720
do	do	1879	do		1880...	1,203,518
do	do	1878	do		1879...	373,511
do	do	1877	do		1878...	173,497
do	do	1876	do		1877...	56,589

For a medicinal bark, and the preparations therefrom, there is no such scope for demand and consumption as in the case of tea. But to a fairly remunerative market it is believed that Ceylon can supply 7 to 10 million lb. of cinchona bark annually without any difficulty; while if there were only the market, the export of the past season could probably be maintained for some years to come.

Cacao, or the cocoa or chocolate-yielding plant, has not succeeded quite so widely as was expected in Ceylon, but there are certain districts in which the cultivation has proved very successful. Some mistakes were made at first in the mode of planting but these are now generally rectified and there is the fair promise of increasing returns. This is especially the case during the present year, the weather having been very favourable to cacao. The annual exports have been as follows:—

CACAO.

						Cwts.
Total exports from	1st Oct.	1885	to	30th Sept.	1886 ...	13,347
do	do	1884	do		1885 ...	6,758
do	do	1883	do		1884 ...	9,563
do	do	1882	do		1883 ...	3,588
do	do	1881	do		1882 ...	1,018
do	do	1880	do		1881 ...	479
do	do	1879	do		1880 ...	122

Cardamoms had been for many years quite a minor article among our products, but since the European planter has given his attention to this spice, the colony has taken the foremost rank for its export—Ceylon, in fact, now ruling the European market for cardamoms as well as for cinchona bark. The exports of this spice have risen as follows:—

CARDAMOMS.

						lb.
Total exports from	1st Oct.	1885	to	30th Sept	1886 ...	236,056
do	do	1884	do		1885 ...	152,405
do	do	1883	do		1884 ...	66,319
do	do	1882	do		1883 ...	21,655
do	do	1881	do		1882 ...	23,127
do	do	1880	do		1881 ...	16,069

In contrast with these evidences of steady, continuous progress, with what may be called "new products," I have to place the return for our old staple, coffee, showing an equally steady decline, consequent on the weakening effects of the fatal leaf fungus. The export figures are as follows:—

COFFEE.

						Plantation Cwt.	Natives Cwt.	Total Cwt
Total exports from —								
1st Oct.	1885	to	30th Sept.	1886	...	215,576	8,117	223,693
do	1884	do		1885	...	294,506	20,305	314,811
do	1883	do		1884	...	312,458	11,483	323,941
do	1882	do		1883	...	245,631	14 422	260,053
do	1881	do		1882	...	522,949	41,897	564,846
do	1880	do		1881	...	415,456	38 302	453,758
do	1879	do		1880	...	622,306	47,308	669,614
do	1878	do		1879	...	767,293	57,216	824,509
do	1877	do		1878	...	551,046	69,246	620,292
do	1876	do		1877	...	851,201	91,846	943,047

It is satisfactory to know that tea is so fully taking the place of coffee, over, 130,000 acres being now planted with this product, which grows well, not only within the limits of climate suited to coffee, namely, from 1,500 to 5,000 feet above sea-level, but from a few score of feet above, or almost at sea-level, to our plateau, at nearly 7,000 feet altitude. The tea plant is, in fact, one of the hardiest on the long list of the sub-tropical planter, and nowhere has it found a more congenial home than in moist hot Ceylon. The cry of overproduction has, indeed, of late been raised in reference to tea, but if English-speaking folk in America take to drinking tea in place of their favourite coffee (now likely year by year to decrease in supply) there will be a wide demand added to the present one. Moreover, so far as Ceylon is concerned, it has been shown that through the great advantages possessed by the colony, tea of a superior quality can be produced more cheaply here than in its great rival India, so that the remote districts in the latter country must first suffer.

The exports in which the Ceylonese people are chiefly interested—*i.e.*, cinnamon, plumbago (our only commercial mineral), essential grass oils, and the products of the coconut palm, *i.e.*, oil, copra, and coir fibres, keep well up, although the crop of coconuts is liable to alternate, according to the season. In a favourable season, the number of nuts gathered in Ceylon is now estimated at a thousand millions, the greater portion, however, being utilised locally for the food of the people.

Briefly, the total value of our staple exports for the past season may be put at 2,400,000 lb. sterling, while for the current commercial year—October, 1886, to September 1887—the following estimate, framed for the *Ceylon Observer*, from district returns, indicates a very considerable advance:—

Season 1886-7.—Probable Shipment of Staple Exports:—

		Quantity	Value £
Coffee	...	185,000 *cwt. at 75s	693,750
Tea	...	14,000,000 lb. at 1s ½d	787,500
Cinchona Bark	...	12,000,000 lb. at 8d	400,000
Cocoa	...	22,000 cwt at 80s	88,000
Cardamoms	...	300,000 lb. at 2s	30,000
Coconut Oil	...	280,000 cwt at 27s 6d	385,000
Copra	...	150,000 cwt. at 14s	105,000
Coconut poonac	...	50,000 cwt. at 7s	17,500
Cinnamon	...	1,500,000 lb. at 1s 3d	93,750
Do Chips	...	500,000 lb. at 5d	10,416
Plumbago	...	200,000 cwt at 8s	80,000
Coir of all kinds	...	110,000 cwt. at 15s	84,000

* Rather too high we fear now, seeing that up to 20th January we have only sent away 32,294 cwt. against 78,545 cwt. at the same date last season.—ED.

	Quantity	Value £
Ebony	7,500 tons at 100s	37,500
Deer Horns	2,000 cwt. at 50s	5,000
Sapan wood	2,500 cwt. at 40s	5,000
Kitul fibre	1,800 cwt. at 50s	4,500
Essential Oils	6,500,000 oz. at 1d	27,000
Total		2,853,716

—I am, sir, yours faithfully,

J. FERGUSON

Of the *Ceylon Observer and Tropical Agriculturist.*
Colombo, 26th November, 1886.

EAST AFRICAN DRUGS.

Of curative drugs, the East African manifests but little knowledge. Near Lake Ugombo, a small wild aloe, when the green skin has been peeled off, forms an ice-cold and healing application to burns; and in the neighbourhood of Dar-es-Salaam, a highly aromatic plant, with hairy purple stalks, called *arcazamudi*, is reputed a good native cure for pains in the stomach. The Somalis occasionally eat the local variety of dragon's blood, a resin of acidulous flavour obtained from the *moli* tree (*Dracæna schizuntha*). Between Zanzibar and Dar-es-Salaam occurs a creeper with bean-like, hairy, S-shaped pods having severe stinging powers; it is about four inches long, of yellowish brown colour, and is called *upupu*. The pain yields to cowdung and wood ashes. In the same region, a broad-bladed grass, called *mwanga mwitu*, enjoys some fame as a styptic.

Arrow-poisons come much more prominently within the range of native study, and most tribes use some description of vegetable poison for anointing their spears and arrows. The most important is a species of *Strophanthus*, either *S. hispidus S. Kombé*, which will probably prove to be the sole source of this class of poison used on the eastern coast, from Zanzibar to Somali-land, and even far into the interior. The plant is a runner, bearing large, rough-ribbed leaves, arranged in clusters of three or four together Each shoot consists of three branches, of which one bears the seed and the other two the leaves. The flower is yellow, with curiously tailed petals. The seed has the form of a huge military frog-button, with lobes nine inches long, and is the direct source of the poison. This, according to St. Vincent Erskine, is called *umtsuli* in Gaza or Southern Mozambique, and is so energetic that men wounded by arrows in the fleshy part of the leg have been known to die within three hours, and with small bucks the poison takes effect before they can run out of sight. He likens the active principle to strychnine. These facts quite accord with the description given by R. W. Felkin and A. W. Gerrard (*Pharmaceutical Journal*, April 9, 1881, p. 833) of the poison used by the Wanika and Wakamba tribes, west of Mombasa, except that several roots are supposed to contribute to the deadly effect. These authors mention an antidote composed of sundry roots reduced to charcoal, which, however, proved a failure on trial. Careful investigation of the *umtsuli* reveals the fact that it is a powerful cardiac poison, as powerful as digitalin, and more powerful than veratria, when injected under the skin. But it causes only nausea, vomiting, and some weakness when taken by the mouth. The flesh of animals killed by this poison is eaten by the blacks without ill effects. Probably identical with this is the "poison tree," from the roots of which the natives of Somaliland extract a black and pithy substance for poisoning their arrows. Perhaps, also, the pitch-like poison obtained from the boiled-down bark of a tree used on the Rufiji river for application to arrows, lances, and even bullets; and the *muavi*, or poisonous decoction of the bark of a tree, employed in the trial by ordeal of the natives of the Nyassa and Zambesi valley, is the same article under another guise.

Indulgence in narcotics appears to be confined to tobacco, which is very commonly grown under cultivation. It is a special product of the Hendei district, whence considerable quantities of the sun-dried leaf beaten into little round flat cakes about two inches in diameter, are sent down to Pangani for export. The tobacco is coarse and strong, but of fairly good flavour. The Kiswahili use water-pipes (*kiko*), made of gourds of various shapes. They swallow the fumes in smoking, and seem to enjoy the paroxysm of coughing which results.—*Journal of the Society of Arts.*

THE LONGEVITY OF MATTER.

In your September number is a very interesting paper on the above caption—the leading idea being that the germs of plants are infinitesimally *small* and comparatively indestructible. I have given this subject more thought and experiment than any other in agriculture.

1st. My attention was first called to it by the fact that lands once in forest and cultivated, when fenced up and left fallow, produced the original growth of trees.

2d. When I was a boy, tobacco was cultivated by my father; this was put into a tall building to cure, and the basement was used to feed the work-horses, being far off from the home-stables. Probably twenty years afterwards, I pulled down the house, having no use for it so far off, and spread the manure, which was several feet deep, over the adjoining grass fields. The result was a luxurious growth of red clover on all the manured spots. This set me to speculate upon the vitality of seeds. I do not believe that the forest growth was an original growth and renewal of the old trees; still less could we believe that in a few days red clover was made anew by natural laws. Nor shall I discuss here the question whether God or long centuries of Nature's forces made all the Fauna and Flora.

3d. The vitality of seeds is proven beyond cavil. Now if the clover germ lasted, say twenty years, till favorable surroundings, sunlight, moisture and plant food burst it into the living plant, why not so lie dormant for centuries?

4th. The Irish potato, up to my times, was believed to be and called by scientists a *tuber*, like turnips or beets. But I proved by the microscope and logic, that it is in fact a bulb; that is like the onion or tulip, having *many* "germs" or "ova," instead of *one*. From Northern seedsmen, rare potatoes were cut very closely, the eyes of the seed end being so near each other that they had to be set into slips of carrots; but they, when planted, produced as large potatoes as any.

5th. I found out also that the old theory of the surroundings of seeds *nourishing* the *plants* is a fallacy. Like the germs of other plants, the "*eyes*" of the potato are a perfect "ovum" by which nature, forcing itself into the soil, and failing to reach it, dies, notwithstanding the starch, water, &c., which compose the edible part of the potato, are in reserve. This is proved by the experiment, when potatoes were laid upon the soil, they at once took root in the sod, the potato remaining comparatively whole and unchanged. When the potato was put in the same cold frame not touching the ground, the plant shoots put out feebly and then *perished*, the potato being a little *shrivelled* only. Now if the potato meat nourished the "ovum" shoots, it should have been used up before the plant perished. What, then, were the agents of the temporary plant growth? They were the water in the potato and the elements of the air—no more—which, being supplied elsewhere, do not need the food of the potato meat at all.

6th. Now, then, we are prepared to answer whence came the "germs" or "ova" of the second growth pines or oaks, or other trees? They came from their *invisible* germs, which, having the ordinary covering, decayed, yet remained vital in the soil, to spring anew into plants when the needed forces ensued. All of this is to my mind as logical as any demonstration in Euclid. I used the term "ova" as the most intelligible term for the Fauna and Flora.

7th. One more experimental proof: When the McAdam road was made from Richmond to Lexington,

at the "Walnut Hill" the grade was cut about twelve feet deep through a red clay. In the succeeding spring, mullein, poke and dock plants and others grew in great size and thickness. Now, whence came they but from ancient germs? The rag-weed only comes on my farm in very wet summers; now but *very sparsely*. On the neighboring farm an *immense crop*, because I cut them before the seed ripened, and they are nearly extinct near the surface. Hence comes the foolish idea that wheat grows from the seed, but "chess" from abortive wheat. The truth is, the season unfavorable to wheat just suits "chess," and nature is ready for all contingencies. So you see much nonsense is based on so-called "evolution." I have read all the modern scientists, and I see no reason to discard the Mosaic theory. For even, if the Fauna and Flora arose successively in different climes and long eras, the language of the Bible is generic enough to cover the facts.—C. M. CLAY.—*Southern Planter.*

COFFEE.

A breakfast should always consist of a good cup of coffee. The simple thing of making coffee has to be done three hundred and sixty-five times yearly in almost every family, yet how few know how to do it, and fewer still know how to order it done. Breakfast is a meal which should be lightly partaken of, its very name implying the breaking of the fast, so all such little things as coffee must be made nice and appetizing, so as to tempt the dainty appetite of the morning. Speaking of coffee reminds me of a story of a young married couple. During six weeks of matrimony did the young husband at breakfast table make up hard faces over his coffee. At last his patience gave out, and one morning after tasting what he denominated duck puddle coffee he relieved his overcharged mind by saying: "Well, Minnie, I don't know how it is that our coffee is always so bad? You know mother's never was so. There is not a bit of taste to this!" "Well, my dear, I don't know I am sure. I buy the best Government Java; at least it ought to be the best, for I pay the highest price for it." "That may be so, Minnie, and yet it tastes like anything else than that mother used to give us." "Well, Walter," replies the young wife who by the by was a graduate from some seminary, "I made that coffee myself, exactly as Mrs. Thomson told me, and you know she thinks nobody can equal her in cooking anything. I took two spoonsful of Java and poured a quart of hot water on it, and then let it boil for fifteen minutes as hard as it could. Mrs. Thompson says it is the simplest way. "O, yes," said Walter, "the way is simple enough. I dare say, but not half so simple as my dear little wife is to try it." So Walter told his wife he would not be home to tea, but would meet her at his mother's, and asked her to go over and spend the day, and learn from his mother the secret of making coffee. Minnie was well up in mathematics, but a beverage she had breakfasted on for twenty years she knew not how to brew. The fact is, like many of our young housekeepers, she needed a few lessons in a cooking school. Two human beings, chained by love and strong ties of matrimony, were both sickening for a comfortable meal, and so after Walter had gone Minnie got her work done, and went over to Mrs. Powers, and told her the whole story. Mrs. Powers laughed at the girl and and said: "Never mind, dear, it is never too late to learn," and so she told her her way of making coffee, and gave her the family cook book; and now Minne is a splendid cook, and they are a very happy couple. Minnie will give you her way of making coffee for breakfast, which I think is a good one: Take one-half cup Government Java, pour over enough cold water to cover it; let it stand over night covered with a damp cloth, stir in in the morning one egg and shell; put this in your coffee pot, in three pints of hot water; let it simmer a minute on the stove, but not come to a boil; then set on the back of the stove, and it is ready for use. The beautiful aroma which arises from boiling coffee is what you must save. When you hear your husband say in the morning, "How good the coffee smells!" you may know that the aroma which makes it delicious has gone out through the kitchen window.—*The Household.*

[As a matter of fact we believe excellent coffee can be made by pouring boiling water on well roasted and recently ground beans, the hot water being allowed to percolate through the coffee.—ED.]

PORTABLE FOREST TRAMWAYS.

By D. BRANDIS, *late Inspector-General of Forests and* MAJOR F. BAILEY, R.E., *Conservator of the School Forests.*

The Decauville portable tramway was invented in 1876 by a French gentleman of that name, for use in his business; but he very soon began to manufacture the rails and trucks for sale. He Exhibited his invention at various agricultural and other shows in France and also in Belgium and Norway, obtaining gold medals and other prizes. In 1877 the tramway was shown in England and Ireland and as orders began to come in rapidly he was obliged in January 1878 to increase the number of men employed upon its manufacture from 35 to 100. Since then the development of the use of the tramway has been extraordinarily rapid, and the number of workmen employed by M. Decauville had, by the middle of 1884 risen to the large number of 900, a railway station on the Paris-Lyons railway having been built near the works. Between 1878 and 1884 the invention was exhibited in Austria, Italy, Buenos Ayres, Calcutta and Japan, orders having been received from the Russian Government who required the tramway for use in Turkestan, from the French Government for use in Tunis, from England and Australia and many other countries. It is at the present time, almost without doubt, the largest establishment of the kind in the world. * * *

Two portable forest tramways have already, we understand, been laid down in the Nellore district of the Madras Presidency, and others have probably ere this been established at other places. We assume that the construction of such tramways is generally well understood in India, and that it will suffice to mention a few points relating to the one we have mentioned. The gauge is 0·60 metre, or about 2 feet. The ground is almost level, here and there with very slight undulations. The main line may for the present be regarded as permanent, the position of the branches being changed from time to time to follow the progress of the cuttings. The main line is laid in lengths or sections of 7 metres, on sleepers of wood or iron. The rails, both of the main line and the branches, are of steel, their weight is between 6 and 8 kilogrammes per running metre. The sleepers are at one metre apart, and the rails are rivetted into the iron or spiked down into the wood. The seventh sleeper supports the joint. The sleepers are laid in ballast at the side of the central metalled portion of the road. The joints are made with fish-plates.

The branch lines are laid upon the natural surface of the ground, which is not levelled in any way. They consist of sections, 2 meters long, supported at each end by a wooden sleeper. These sections weigh 38 kilogrammes (84 lb.), and are, therefore, easily carried by one man. In the system here used the sleepers of the branch lines are always made of wood, which from its greater rigidity is found to be more suitable than iron for laying upon an uneven surface. The sleepers being nearly 2 meters apart, the rails used are stouter, and they weigh about 8 kilogrammes per running metre. There is sufficient play in the joint to admit the line being curved to some extent, in order to avoid stumps of trees and other obstacles. For greater curves spinal sections with curved rails are used. The essence of this arrangement is, that the branch line is brought alongside of the logs as they lie, and that the logs are loaded upon the trucks without having to be previously moved from the place where they fell. This of course leads to the line being carried over broken ground, small ditches and pools of water In such cases the sleepers are supported by rough pieces of wood or turf, hastily laid. In this manner

2 kilometres of branch line were laid in two days by two men, and trains of heavily laden trucks pass over it without accident. One kind of truck serves for the carriage of material of all kinds.

When used for the carriage of logs a horizontal revolving plate is fixed on the top, furnished either with an iron crescent-shaped support or a horizontal bed on which the ends of the log rest between movable vertical arms. The revolving plates admit of a pair of trucks with the log loaded upon them being taken round curves.

For lifting the logs on to the trucks, numerous devices have been invented. The two in use in the Kottenforst, consist of a double crane, which raises up the log vertically, and an inclined plane, up which it is rolled.

The crane, which is capable of lifting 9,900 lb. is placed astride the log. It consists of two uprights joined at the top by a movable pin. The uprights are made of wood, strengthened with iron, and they are hinged into horizontal pieces, which rest upon the ground. The log which has been previously rolled on the rails, is gripped by a powerful iron pincers, and is then raised by chains and pulley worked by two hand levers. By this apparatus logs of considerable size are easily raised to the required height by two men, working at the two levers. The log having been raised high enough to clear the top of the truck (2½-3 feet) the two trucks are passed underneath, and the log is gently lowered upon them. It is then secured by chains terminating in conveniently shaped wedges which are driven into the log to make all fast. An oak log measuring about 36 cubic feet was raised upon the trucks and secured in four minutes. Each half of the apparatus is easily carried by one man.

The inclined plane is formed by two bars or beams built of iron and wood, resting partly on the ground and partly on the truck. To each beam is attached a chain which is passed round the log and over a wheel, and the chains are then hauled in by means f hand levers similar to those used with the crane previously described. The log is thus rolled up over the trucks, when the beams are removed and the log is allowed to lie between the rests on the revolving plates. This arrangement is regarded as safer for the workmen than the crane.

A third arrangement, which from its easy construction may perhaps be more suitable for work in India, but which is not in use in the Kottenforst, consists of a tripod. From the apex a set of pulleys is suspended, by means of which the log is raised.

When a sufficient number of logs have been loaded up, the trucks are coupled together, a coupling pole being put in when the logs project, so that the ordinary chains and hooks are too short. The horse is attached by a chain to the last truck, so that the driver is able to see the whole train before him. It is said that on level ground one horse will draw a train loaded with about five tons of timber. The short train on which we travelled, was formed of three pairs of trucks with logs aggregating about 110 cubic feet of oak timber, and it was dragged along on the main line at a sharp trot without slacking speed at the curves, not the slightest difficulty being experienced. The trucks are provided with brakes to be used in case of necessity.

In order to carry fuel, a platform about 12 feet long and 4 feet wide, is laid on a pair of trucks. When earth or gravel has to be carried, an ingeniously arranged tip cart is substituted for the platform.

The cost of the whole line laid down, including rolling stock and all apparatus, was 25,000 Marks paid to the manufacturer, plus 800 Marks expended on the earthwork for the main line. This corresponds to an average cost of £252 per running mile, and it is estimated that the plant will last 15 years.—*Indian Forester.*

[It is possible that a similar tramway might be profitably used in some of the forests in the North-east portions of Ceylon.—ED.]

DISPERSION OF PLANTS BY BIRDS.—In an interesting article in *Nature* (Dec. 16, p. 151) on the dispersion of plants by birds, Mr. D. Morris points out that the pimento industry in Jamaica depends entirely for its existence on the offices of frugivorus birds. It is thought by the planters in the island that the seeds in passing through the birds undergo some fermentation which fits them better for vegetation than those gathered immediately from the tree, and that no other plan is likely to produce good pimento walks, although it has been shown in the Botanical Garden there that young plants can be raised otherwise if carefully treated. —*Pharmaceutical Journal.*

FIRMING THE SOIL.—Considering that the best farmers so long knew the advantage of rolling their fields after seed sowing, it was always a matter of surprise that the practice had never become part of good gardening, and still more of a surprise when Mr. Henderson's paper on firming the soil appeared in our columns, at the objections some made against it. Yet the evidences of the value of such a practice could be stumbled against almost any day. The *American Agriculturist* recently gives an illustration of this, which is worth repeating here. "Peter Henderson, the author of 'Gardening for Profit,' in insisting upon the great importance of firming the soil over seeds and plants, writes us: 'It was rather an amusing incident that first brought to the attention of a truck farmer, of Charleston, S. C., the importance of firming the soil. It seems that a gentleman of color, having the constitutional weakness for chickens peculiar to some of his race, got into a hen-roost and helped himself bountifully. In evading a high-road, he struck a bee-line through a newly sown turnip field, where he left tracks that led to his detection. But these tracks did more. They showed to Squire Buncombe, whose chickens had suffered, that wherever the foot of the colored citizen had fallen, there he had a "stand" of turnips and nowhere else (for they had been loosely sown and the weather was dry). The lesson was heeded, and has been worth tens of thousands of dollars to the farmers of South Carolina, who, it seems, were never before sufficiently alive to the importance of firming the soil until the unfortunate negro showed them the way.'"—*Gardeners' Monthly.*

FIJI AND ITS INDUSTRIES: OPIUM, BANG, AND GUNJAH.—The Governor of Fiji gave his official consent on July 28 to two Ordiances affecting these drugs. Ordiance XI. 1886 is "To prohibit the growth and use of bang or gunjah. Bang consists of the dried leaf of the Indian hemp, and gunjah or gunja of the flowering tops of the female plant. They are favourite narcotics of the coolies from Hindustan. Indian hemp, *Cannabis Sativa* is the same species as that grown in Europe for fibre, but it does not excrete its narcotic resin in cold climates. A penalty is now imposed in Fiji on everyone proved to be growing bang or gunja for private use or otherwise, or found in possession of or selling or giving to any person either of these articles, £25 or imprisonment for three months for the first offence, and £60 or six months imprisonment for the second. Registered medical practitioners and registered licensed chemists and druggists may sell bang or gunjah for purely medical purposes, but the burden of proof rests on the vendor. Police officers may visit suspected places and seize all the prohibited articles found; owners or managers may destroy any found growing on their plantations; and part of the fine paid into court may be awarded to informers. Ordinance XIV. 1886, "to amend Ordinance VI. of 1878 with regard to Indian Immigrants," by section 6 imposes a penalty of £20 or three months imprisonment on any Indian immigrant found in possession of opium or any preparation containing opium or any of its ingredients, and the same punishment on any person selling or giving the same to an immigrant. Any opium or its preparations found in possession of an immigrant may be seized by plantation managers or the police. The manufacture of copra has been utterly abandoned in some quarters, by Europeans and natives alike, for more remunerative enterprises. —*Chemist and Druggist.*

VEGETABLE PRODUCTS IN CRETE.

In a report on the trade of Crete for the year 1885, dated Crete, October, 1886, referring to the Olive crop, it is stated as a rule, that a year of abundant Olives—which is the staple product of the island—alternates with one, very seldom with two, of failure. The value of the Olive oil manufactured therefrom varies in the former case from £600,000 to £800,000; in the second, from £60,000 to £80,000; but there are years when it does not reach to £40,000, and exceptionally bad seasons when it hardly attains half that sum. Allowing for all irregularities, the yearly average may be set down at £450,000. It being reckoned that the 86,000 families forming the population of the island consume yearly about 100,000 cwt., which represent £150,000, there remains a balance of £300,000 for exportation in kind or in manufactured soap. The vegetable products of Crete which find their way to the United Kingdom are Olive oil, Locust Beans or Carobs (Ceratonia siliqua), Valonia, and a few raisins. The quantity of Olive oil forwarded to Great Britain in 1886 was 800 tons, representing, at £31 10*s*, per ton, £25,200, against 1,159 tons, at £30 per ton--£34,770--in 1884. The exportation to other countries was 5,192 tons, of a value of £150,817. Only 1,000 tons of Carobs, of the value of £3,120, were forwarded to this country; the only other countries to which Locust Beans were shipped for much higher values were Italy and Russia, amounting together to £17,000. Valonia is only shipped at Rethymo, which is the central district where it is produced. Raisins have begun to be forwarded to Great Britain within the last two or three years, and represent as yet an insignificant value, but it is probable that as they become better known in the British markets the trade may attain a considerable importance. They are grown and prepared on an increased scale from year to year and represented, in 1885, 133,000 cwt., of the value of £22,365.—J. R. J.—*Gardeners' Chronicle.*

WHAT IS GINGER?

As usually seen ginger is in the form of a grayish-yellow powder, but if you go to a drug-store and ask for "race" ginger, you will be served with the article unground, and you will see that it is the dried root-stock (often called root) of some plant. Race—as applied to whole ginger in commerce—is from the Spanish *rais*, "a root." The botanical name of the ginger plant, Zingiber, is from a very similar old Sanskrit name. It was formerly placed in the same family with the banana, but botanists at present give it a family by itself. The fleshy root-stock throws up reed-like stems three or four feet high; these bear long and narrow leaves. The flowers are borne upon a separate, leafless stem. This bears a cone-like spike, between the scales of which the flowers appear. The flowers are yellowish-white in colour, with purple markings. Ginger is supposed to be a native of Asia, in the warmer parts of which it is generally cultivated, but it is not known in the wild state. It has been introduced and is now cultivated in nearly every warm country, especially in the West Indies, from which ginger was exported to Europe as early as 1547.

In cities there is sold, in autumn, at drug and grocery stores, fresh or green ginger root. This is the root-stock, just as it comes from the ground, and is used for flavouring preserves. The pieces have one or more green buds attached to them, and if planted in a pot and kept in a sufficiently warm place, will grow. But a very small share of the crop is sold in this state; the ginger, after it is dug, is washed and then exposed to the sun until perfectly dry. This is the ordinary "race ginger" of commerce, and is the kind ground for use. What is called Jamaica ginger is prepared by scraping the rhizome when fresh to remove the outer portion; these are then bleached by placing them in a solution of chloride of lime. Considerable lime adheres to the surface, and the pieces look as if they had been whitewashed. On account of its nicer appearance Jamaica ginger is preferred for medicinal uses, and is used by some families. There is still another form in which ginger is imported—preserved ginger—which comes from China in porcelain jars. The young and tender "roots" are preserved in sugar.—*American Agriculturist.*

VARIATION IN PLANTS.

In spite of the assertion, by De Candolle and other authors, that "a cultivated species varies chiefly in those parts for which it is cultivated," we find great degrees of variation affecting different organs, and often extending to other parts of the plant structure. This statement applies both to plants in a wild state and to those under the care of man, when in the latter case the conditions may be considered more or less artificial. The reasons for this similarity of variation, both in a wild and cultivated state, will be obvious when we consider that a plant must originally vary spontaneously, before man can in any way affect it, at least by selection. This is especially the case where we have obtained by selection in the course of many generations a number of distinct races, descendants of one species, as in the Apple, Pear, Chrysanthemum, and others. It simply comes to this, that man cannot so far alter the conditions, as to cause plants to abandon their natural tendencies, nor to vary except in accordance with natural laws. Therefore in spite of the fact that man desires to select seedlings presenting the requisite variation in one organ or set of organs only, it very frequently happens that there is a correlation between the homologous parts of plants causing them all to vary more or less evidently in a similar manner. Cases of albinism will serve to illustrate this point.

Plants producing red, pink, purple, yellow, or even blue flowers normally, often both in a wild or cultivated state, give birth to seedlings with pure white flowers. Some authors would describe this as a case of reversion. The converse more rarely happens, but Lychnis vespertina, sometimes producing red flowers, and Primulas belonging to different species, are cases in point, both in a state of Nature and under cultivation. In connection with albinos amongst plants, not only are the flowers white, but the foliage and the whole aspect of the plant bears an unmistakably pallid hue, and such plants can often be recognised in the absence of flowers. This paleness in the colour of the foliage does not owe its existence to man's selections, but is more often an undesirable feature than otherwise. This correlation of homologous parts is exemplified in white-flowered varieties of Lychnis chalcedonica, L. diurna, Silene armeria, Linaria cymbalaria, Campanula rotundifolia, Thymus Serpyllum and Dianthus deltoides. The same may be said of Impatiens flaccida, which has dark foliage and stems more or less striped with purple, but in the white-flowered variety has pale foliage and pale green unstriped stems. White-flowered varieties of Primula sinensis have pale foliage and dark-flowered forms are characterised by foliage of a similar tint, more especially evident in the petioles, the midrib, principal nerves, and the underside of the leaf generally. There is also a correlation between the colours of the underside of the leaf and that of the flowers in Senecio cruentus and other species.

The tuberous roots of the Dahlia afford another striking instance of the variability of plants even in the parts that are not specially selected either for the benefit or pleasure of man. Some have large, or even short, thick and very succulent tubers, while in other cases the individual tubers are elongated and spindle-shaped, or long, slender, gradually tapering to a point, and radiating or projecting in all directions. Nor is this variation confined to form, but in a collection of any extent, considerable variety of colouring is found to prevail, such as yellow, white and purple, or violet. This is frequently unnoticed because of no interest to the general cultivator, nor presenting anything valuable either for economical or ornamental purposes. There is also a more or less evident correlation between these colours and that of the flowers. Uncared or and generally unimportant though frequent and considerable variation extends to the foliage stems nd flowers of different individuals,

What applies to the Dahlia applies still more forcibly to the Potato, notwithstanding the fact that the tubers form the only part specially selected. This is the more remarkable, considering the number of varieties in cultivation at an early period of their history even in this country. In the northern parts of Britain, before the ravages of the Potato murrain became so severe, numerous favourite and valuable sorts enjoyed an extensive cultivation, ranging over wide districts. Now these sorts were so distinct both in the subterranean and aërial parts, that anyone possessed to an ordinary degree of the faculties of observation, could tell to a nicety by the stems and leaves alone what particular variety would be found on digging up the plant. Of the twelve to eighteen varieties coming under my observation, and mostly cultivated in the field, I could readily distinguish at sight all, except those which were mere sports from other varieties, differing in the stripes, flakes or markings of the tubers, but having stems and foliage perfectly similar. This fact amply testifies to the amount of variation in the aërial parts of Potatos, notwithstanding that they have not been selected on that account, nor particularly desired for such. Between the stems and tubers there was generally a more or less pronounced correlation in colour. This is the less remarkable when we consider that stems and tubers in this instance consist of homologous parts modified to perform each their own particular functions. Excepting chlorophyll, or the green colouring matter of plants, the other colours are much less affected by light or its absence, so that the relation between stems and tubers of Potatos becomes more apparent, rendering their correlative variation a matter of common and expected occurence. In striking contrast to the deep purple, almost black, tubers and purplish stems of some varieties may be mentioned their white flowers, while other sorts with white tubers have pink or purple flowers.—J. F.—*Gardeners' Chronicle.*

OFFICIAL REPORTS ON CEYLON TOBACCO AND OILS.

(*From the "Times of Ceylon."*)

No one can read the reports we publish to-day without being struck with the possibilities they open up for the future. We give them in detail *(See Supplement a-h)*, that our readers may note what is said of other products than those to which European planters have as yet given any attention. It is as well, however, not to be led away by the favorable nature of the report of the Committee on Ceylon tobacco, for no product is more fickle in its financial results, and none requires greater personal care and attention than this one. Speaking generally, nothing but loss has resulted from the many attempts made by European planters to cultivate tobacco in Jaffna, Tangalla, and other suitable localities, though it seems hard to believe that the care and foresight of intelligent Europeans are unable to compete with the haphazard and wasteful system of natives. But such is the verdict of the past. The Committee, which inspected the samples of tobacco sent from Ceylon, report, as will be seen, very favourably upon them, but, though many tropical countries in the eastern and western hemispheres are noted for the excellence of their tobacco, and though the industry in America and Java may be said to be exceedingly prosperous, yet, with all our natural advantages for the growth of such a product, Ceylon has not as yet been a competitor in the production of the fragrant weed. However this may be, we expect our readers will be surprized to hear that as much as 6,645,129 lb. of tobacco were raised in Ceylon during 1885. But so says the Government Blue Book for that year. We subjoin the acreage estimated to be under tobacco in 1885, the quantity raised, and the rate per acre in each province of the island, which we have compiled with some little trouble from the Government Blue Book, as follows:—

Province.	Acres.	Quantity. lb.	Average ℔ acre.
Northern	5,897	6,013,667	1,019
North-Western ..	1,677	283,600	169
Eastern	716	260,565	364
Western	456	67,670	148
Central	93	14,490	156
Southern	85	3,787	44
North-Central ..	7	1,350	194
	8,931	6,645,129	av. 744

The previous Blue Book gave 16,910 acres as under tobacco in Ceylon (1884), but it is quite evident from the above table that no reliance whatever is to be placed upon the Blue Book returns. We have the yield per acre in the Northern Province and Jaffna set down at 1,019 lb, whilst that of the Central Province it said to be 156 lb. per acre, and of the Southern Province 44 lb. per acre! Such returns show the carelessness with which Provincial Agents compile their returns, and reflect the greatest discredit upon the Government. We will, however, leave the inaccuracies of the Blue Book and its incompleteness to be dealt with on another occasion, for that is a subject to which we intend to invite the attention of the public and the Government as soon as possible. We think that it cannot be denied that the cultivation of tobacco, not merely amongst Europeans but amongst natives also, is declining in popularity in Ceylon. But a few years ago and Uva tobacco was well known as even more fragrant in the form of cigars than the Dumbera leaf, but who ever hears now of such a thing as Uva cigars? We imagine, with regard to the above figures, that the only items of any accuracy in them are the figures for the Central Province, the greater portion of which acreage lies in or near the Dumbera Valley. A practical planter, writing in the Handbook and Directory for 1877-78, said that "tobacco cultivation is not suited to European colonists. The necessary skill can only be acquired through a series of blunders, and, when it is acquired, it can only be applied as far as one pair of eyes can reach." But surely this dictum is capable of modification. What is possible of accomplishment by Dutch planters in Java and by American landowners in Virginia is surely not beyond the abilities of Ceylon men, given a climate suitable to the plant—a climate which is to be found in the Northern, North-Western and parts of the Eastern Provinces. It seems strange, therefore, not only that failure should hitherto have attended all the efforts of Europeans to cultivate the leaf in those localities, but stranger still that these few failures should have prevented many other attempts being made by enterprizing planters, who could easily acquaint themselves with the most profitable methods of cultivation and curing. If the question had been put to a representative coffee planter ten or fifteen years ago—"Why do you not grow tea instead of coffee?"—his only answer would have been that nothing could possibly pay better than coffee, and that he knew nothing of tea which was very difficult to manipulate. In fact, it was generally thought that the manufacture of tea was a secret art of the Chinese, unknown to Europeans, so complicated and intricate as to necessitate the employment of a large number of skilled hands. As these did not exist in Ceylon, it was thought quite impossible to introduce the cultivation of tea as a European enterprize, though the fact that the shrub would *grow*, and that tea could be made in Ceylon, had been demonstrated many years before that. Is it not probable, we would ask, that a similar result may await us in the matter of tobacco cultivation? That it will *grow*, and that it is even possible to cure it, and smoke it, is known to all of us, but because the process of manipulation and curing is said to be difficult, the cultivation is neglected by Europeans. In such cases as this the Government should give every possible encouragement to planters, both here and elsewhere, by the free grant of land to commence operations. If Deli planters and others with a full knowledge of tobacco cultivation were induced to make a commencement in suitable localities in Ceylon, the result might be satisfactory.

SPIDER SILK.—Mr. Duthie, Superintendant of the Saharunpur Botanic Garden, reports that he caused to be collected spider's web to be used for weaving purposes. The total weight collected in the season was only 10 lb., and the cost of collection will probably prove too great to render the material of any commercial importance.—*Gardeners' Chronicle.*

THE GERMAN POTASH TRADE.—The production of chloride of potash for 1886 is announced at 1,923,994 centners, to which stocks at the beginning of the year must be added, viz., 103,737 centners, in order to get at the quantity open for sale, viz., 2,027,731 centners. The sales amounted to 2,041,849 centners up to November 30 (though, of course all had not been delivered) so that the sales of 1885 will be considerably exceeded this year. The improved condition of the river Elbe has been of great service to the chloride of potash trade lately. Orders for about 300,000 centners of goods of high percentage have arrived from America this month, and a large spring demand may be counted on from that country. The industry is at present in a very gratifying position.—*Chemist & Druggist.*

THE NILGIRI NETTLE.—From recent advices from Madras we learn that there has been formed at Ootacamund a society for furthering the acquirement of more intimate knowledge of the botany, geology, and ornithology of the district. The society has been named the Nilgiri Natural History Society. Mr. Lawson is the first president, and Mr. David Hooper, the Government quinologist, acts as Secretary. At present, meetings are held fortnightly and excursions are also made. It is contemplated to form a museum of the specimens which are collected on these excursions. At the last meetings of the society Mr. Hooper read a note on the sting of the Nilgiri nettle (*Girardinia Palmata*). This nettle yields a useful fibre, but from the number of stings that clothe all parts it is very difficult to collect it. The stings, or glandular hairs, resemble in shape those of the common nettle *(Urtica dioica)*. They leave no abrasure of the skin or dangerous symptoms the next day. The result of Mr. Hooper's examination of the secreting fluid of the sting is that he has found it to contain formic acid, the body to which is due the irritating effects of the sting of such insects as red ants, bees, and mosquitoes As the nature of the sting of nettles has been a point of uncertainty, Mr. Hooper's observation is of considerable interest.—*Chemist and Druggist.*

SOUR POMELLOE.—A notice appeared in a recent number of the Society's Proceedings under the above heading and in reference to it, Mr. Bartlett writes as follows:—"I observe in your published Report of Proceedings for the month of October, that mention is made of a *Sour Pomelloe.* Dr. Bonavia writing about this lime expresses a wish to know the history of its introduction into Calcutta, and you add that no information is traceable in the records of the Society on the subject. I am glad to be able to throw some light on the matter. Some 40 years ago a relative of mine, who was then residing at Augurtollah, in Independent Tipperah, found the lime in question growing wild at that place, and he sent me a plant, which he designated, in default of a better name as the "Family Lime," probably in allusion to the circumstance of the fruit yielding an abnormal quantity of juice; but unfortunately he did not give me the native name of the plant. On its fruiting in my garden, several of my friends asked me for grafts, and I obtained a large number and distributed them to the extent I was able; at the same time I sent one to the late Secretary for the Society's garden, which no doubt is the identical lime you speak of. It is a free cropper, bearing from 50 to 60 fruit every season. From each of the larger fruits I have obtained a quart of juice. I always found seeds in the fruit. No ill effects were produced from the use of the juice, though intensely acid, and more sharp than that found in any of the others of the family that I know. I also found the rind, with the thick coating of pith attached, excellent candied. No doubt Dr. Bonavia must have seen the fruit in the Lucknow gardens, to which place I sent a plant some years back, as a Member of the Eurasian Association of Mysore met with it at that garden, and, learning from whence it was obtained, wrote to me for seeds, with a view to the introduction of the plant in the farms they were then establishing, accordingly I forwarded about one hundred seeds. —*From the Proceedings of the Agricultural and Horticultural Society of India.*

COCONUTS.—Veyangodu, 21st January.—Yesterday's fall gauged 25 of an inch, and more seems in store for us. The result of the rain is that coconuts are dropping freely. This, I suppose, is owing to a process of fermentation or heating of the sap being induced by its being partially cooled by a small shower of rain. Observation shows that a good heavy plump of rain after a rainless period is not followed by such disastrous effects as a slight shower is, when the effect is almost immediate. *Re* coconut Oil, what if analysis should prove that our Oil is poorer than Cochin oil in stearine, and a chemist suggest remedies? How many proprietors will adopt improved or rational cultivation? Unlike Coffee, Tea, and other products in the hands of Europeans, the bulk of our Copperah is produced by small peasant-properietors. If improved methods of cultivation be adopted by enlightened Proprietors resulting in an increase of stearine in the Copperah and therefore oil—apart from its whiteness, the value of each lot of Copperah will have to be tested by analysis, as in the case of Cinchona. This will hardly pay unless the test be easy and inexpensive.—"Examiner".

PUDDLING CLAY.—It is stated in the *Aberdeen Free Press* that Mr. Thomas Fraser of King Street, Aberdeen, has discovered a new method of preparing clay for preventing leakage in reservoirs, water tanks, &c. and has taken the necessary steps to have his invention patented. Hitherto it has been the general practice, when clay has been used in connection with the construction of waterworks, and for other similar purposes, to apply it in a thoroughly wet and plastic condition. From a series of scientifically-conducted experiments, Mr. Fraser has come to the conclusion that far better results can be obtained by drying the clay, and reducing it to a fine powder, before applying it to the bed of a reservoir or to anything which it is desired to render watertight. A long connection with the brick and tile business led him to study closely the properties of clay, especially when used as a preparation, out of which a variety of articles had to be manufactured. He learned from observation that in a wet state, clay had reached its extreme point of expansion, and that water would then filter through it. Having ascertained this fact, he concluded that if clay were used for puddling in a dry compressed state, it would absorb a certain percentage of water, expansion naturally following and rendering the layer water tight. The greater the pressure of water, the more satisfactory the results are said to be. Mr. Fraser began his experiments by selecting his clay from a special bed, out of which he cut a square. The specimen was carefully measured and weighed. After it was thoroughly dried, its dimensions and weight were again taken, when it was found that the clay had lost 25 per cent in weight, while the shrinkage was 10 per cent. Clay in this dry state is extremely hard and compact, and if put into water and not allowed to expand, it would require a long time before water would penetrate to the centre of a 3-in. tube. Another specimen of clay, from the same bed as the former one, was dried, and reduced to a fine powder. In this loose condition it absorbed about 75 per cent of the water, which filtered through it. When the clay was prevented from expanding, it was found to absorb 50 per cent of water, which filtered a little. Powdered clay to the depth of 6 in. was pressed into a tube 8 ft. long by 3 in. in diameter, and having 2 in. of perforated zinc at the bottom. The tube was then filled with water, with the result that the clay absorbed 35 per cent., but there were no traces of filtration. Mr. Fraser is confident that the method he has hit upon, besides being more efficient is also more economical in every way than the manner of using puddled clay now in vogue. He is sanguine that it could be beneficially applied in covering arches, in preparing a perfect bed for street cause-waying, or, in fact, for the prevention of leakage in any description of work that has to be made waterproof from internal or external pressure. —*Indian Engineer.*

Inclined Railroad for China.—At Hong Kong a cable tramway is constructed from the town to the Peak a range of very steep hills, on which are fine villa residences, and where the climate is more salubrious, than near the harbour. The incline where they have to work is 4,800 feet long, and the line, which is partly single and partly double, is laid with 35-pound steel rails on steel sleepers. The gradients vary between 1 in 2 and 1 in 10, closely following the natural contour of the ground. The total height to which the carriages have to be raised is 1,300 feet, and the ropes, of which one is the working rope and the other the safety rope, run on separate sets of friction-rollers. The carriages are attached to each end of the ropes, and as one pair of carriages ascends the incline, the other pair descends. Each car is to contain 60 passengers, the maximum load being 7½ tons at each end of the ropes. The working rope is passed over a pair of drums 8 feet in diameter, and the safety rope over one drum, the drums being fixed at the top of the incline and driven by two compound steam-engines, 40 nominal horse-power each. The speed of the cars is to be six miles an hour.—*Indian Engineer.*

Tropical Dew.—Having had occasion to lay out a large quantity of iron hoes and picks without handles, on the hard ground of an open inclosure in one of the driest districts in India (Bellary), where in fact these implements had been collected in the face of a scarcity, it was found, after they had lain a couple of months, that a thick, weedy, but luxuriant vegetation had sprung up, enough, though there had been no rain, to almost hide the tools. The effect depositing tools on grass has had in stimulating its growing the writer has observed in the tropics before, but was at a loss to account for it, except upon some irresolvable theory of radiation or magnetism. The whole phenomenon is cleared up by Mr. Aitken's paper on "Dew" in "Nature" of January 14 (page 256), dew being proved deposited, not as generally, thought, from the air above, but rising and condensing from the soil below; and the ground in India is always hygroscopic. The outer surfaces of the iron tools radiate of course quickly at night, and the stratum of air inclosed between the metal under surfaces and the earth is, therefore, saturated with condensing moisture. That iron gratings laid on bare ground will raise a rank vegetation in places with only 10 or 15 inches of annual rainfall, and exposed to tropical heat, is a not unimportant fact, as being a readily available substitute for irrigation water, worth further investigation.—*Nature.*

Double Manure Salt.—The market for double manure salt or sulphate of potash, is now lower than ever before known, and as recent heavy arrivals have unsettled values, a lower range of prices may prevail. The easy position of the article is not owing to decreased consumption, but to over production, and consequent larger shipments, and unless some arrangement is made at the source of supply whereby exports are curtailed, the future will be anything but promising. We hear rumors of a probable combination abroad, but there is no reliable information upon which to base an opinion as to what action if any will be taken to remedy the present depressed feeling in the market. For five or six years, double manure salt remained on a steady basis at one and a quarter cents per pound; then the price broke to one dollar and seven cents per one hundred pounds, and the feeling gradually weakened until ninety cents was reached, which is the present nominal value for lots on dock, with some parcels in store limited to one dollar and ten cents. Low prices have stimulated trade to some extent and we understand that the salt has been substituted for muriate of potash, but not in important quantities.

[The above from the *Drug Reporter* would seem to shew that now is the time for purchasing potash salts to mix with cattle manure as an appliation to tea.—Ed.]

Queensland (*Calophyllum Inophyllum*).—During the debate on the Pearl Fisheries' Bill in the Assembly on July 23, a clause was specially inserted to protect trees of the species *Calophyllum inophyllum* on Thursday Island, on the motion of Mr. Palmer. A fine of £10 is inflicted on any person who cuts down or injures either one of these species, or a coconut tree, or any other tree bearing edible fruit. Mr. Palmer said that the oil was valuable, worth £90 a ton, the wood useful, and the bark a good tanning material. Mr. S. W. Brooks and Mr. Sheridan both supported the motion, the former gentleman remarking that the tree was known in Tahiti as *tamano* or *delo*, and the oil was a specific for rheumatism. The Bill was passed by the Legislative Council on August 19, and now awaits royal consent. [Baron Ferdinand von Mueller writes to us on this subject as follows:—Concerning the *Calophyllum inophyllum*, as early as 1855, I found the tree on one of the islands of Hawick's group, on the north-eastern coast of Queensland. Other localities of this species as recorded in my *Fragmenta phytolog-Austral.* ix., 185, are Adam's Bay, Cape York, Rockingham's Bay, Edgecomb's Bay, Fitzroy's Island, and Goode Island; but I have no specimen from Thursday Island. Still I should think it most likely to exist there, as the tree has a wide range along the coasts of tropical Asia, extending to eastern Africa and to Polynesia. My collection of Thursday Island plants is not complete, so the mere absence of the plant from there is no proof of the tree not occuring in the locality. I may incidentally remark that a second species of *Calophyllum* occurs in north-eastern Australia, namely, *C. tomentosum*, but it is as yet only known from near Rockingham's Bay and Johnstone's River; its fruits are considerably smaller than those of *C. inophyllum.*" —*Chemist and Druggist.*

Sweet Girl Graduates in Prussia.—The *Journal de Pharmacie d' Anvers* states that the Prussian Minister of Education has prohibited the admission of ladies to the Prussian universities, either as students or to lectures.—*Chemist and Druggist.*

The Museum of the Pharmaceutical Society has been greatly enriched during the past year by many large and valuable donations. Some of these have been received from well-known wholesale firms, or from private individuals, but the most extensive additions have been made through the liberality of the Commissioners of the Colonial and Indian Exhibition, and of several of the exhibitors, some of the latter having handed over their entire exhibits to the Society. Among the last-named are the valuable exhibits of Dr. Ho Kai and Messrs. A. S. Watson and Co. in the Hong Kong Court, the former including over four hundered specimens of Chinese drugs, and the latter, several valuable models. Not less important are the exhibits of Dr. Brooks, including vanilla and valuable specimens of essential oil, from the Seychelles, and that of Mr. Fersson, of Demerara. The Indian Court contributed a most useful series of sections of the trunks of the cinchona trees cultivated in that country, which show the mode of renewing the bark. The whole of the collection of Ceylon drugs (three hundred and fifty specimens) has been acquired by the Society, as well as the collection of Chinese drugs in the Straits Settlements Court, the latter having been presented by the Executive Commissioner. Valuable contributions to the Museum have also been received from the Executive Commisioners of the British Guiana, West Indian, Victoria and Fiji Courts. The materia medica of the Cape of Good Hope is now represented in the Museum by an entire series of the drugs exhibited in that Court, presented by Mr. Sidney Cowper. In addition to these, a very extensive and valuable collection of essential oils, many of them of great rarity, has been presented by Messrs. Schimmel and Co., of Liepzig. Dr. Aitchison has handed to the Society a collection of the drugs obtained by him in Afghanistan, and specimens of considerable interest have been received from the Director of the Kew Gardens, from Dr. Dymock of Bombay, Dr. Ondaatje, of Ceylon, Mr. Murai, of Japan, and many others. The large contributions to the Museum during the last few years have raised it to the first rank as a Museum of Materia Medica; so that it has lately been classed in a well-known periodical (*Nineteenth Century*) with the National Musem of Natural History at Kew and the British Museum.—*Pharmaceutical Journal.*

CEYLON UPCOUNTRY PLANTING REPORT.

ADVERTISING TEA AT HOME—ABSURDITY OF DELAYING THE SALE OF GOVERNMENT FOREST LAND AT KALUTARA —SMALL BREAKS OF TEA—CULTIVATION OF COCA IN CEYLON—COFFEE AND CACAO CROP PROSPECTS

31st Jan. 1887.

Judging from the tea advertisements which have appeared at home, by parties desirous of pushing the Ceylon tea trade, and which have from time to time been copied into the *Observer* columns that portion of the public which receive their knowledge of Ceylon and its teas from such sources, have had for mental food rather "confused feeding." It is a pity that this educational agency cannot be rendered more effective, and that when knowledge is being imparted it should not be more exact. The article which calls it forth is good, and it were well that the information were also as good. Still as long as the teas sell, and get into general use we need not perhaps be too particular on this score. Besides, there seems to be a demand on the part of the public for information regarding Ceylon and its teas, which is spreading even to the provincial towns and those who supply it evidently do the best they can, dr wing pretty much on their imagiuation for their facts. A friend of mine writing from one of the towns in Scotland says that a grocer there has a bill in his window stating "that the finest tea that comes to Europe is grown in Ceylon on mount ains 7,000 feet high!" This high class article was sold at the moderate price of 2s 6d a pound. "We got some of it," says my correspondent, "and found it good."

Regarding the forest land at Kalutara—the 5,000 acres which you referred to the other day—it does seem absurd that the Government should delay the selling of it, or indeed that they should not put it up in smaller blocks. If it be the case as is generally supposed, that all this land is to be put up at once, the result will be an unfortunate one for the Government. Why should not, say the half of it have been sold before now, instead of delaying? Better prices would certainly have been got for this than can possibly be secured if the limited demand for land is to be glutted by this extensive area thrown in the market all at once. I suppose that it is hopeless to expect that the principles which regulate ordinary business, can be found operating in such things as the sale of Crown lands. Even yet, although the surveys have been for some time completed, no plans can be got, whereas if the Government had gone in for a 2,000 acre lot, the work might have been all finished, plans issued, land sold, and in all likelihood at better rates than will be got later on if the whole be put up at once. I suppose it must be known to some of the officials that the S.-W. monsoon is generally considered to be the best for planting; but the knowledge of this fact does not seem to stir them any in regard to the Kalutara lands, indeed one might question whether they were aware of it.

The combination among tea buyers to neglect the small breaks is not likely to lead to much good. Indeed, I suppose, it has even now come to nothing. I already know of some who say that if they are forced to store their teas until they have what may be termed a good break, that they will ship it, rather than offer it locally. If they cannot get fair value in the local market for such breaks as they can send, they will adopt the other course. One of the chief advantages of the weekly sales in Colombo has been that the planter has been able to turn his produce into money at once, and get a fair value even although the breaks were small, but if he is to be kept out of this advantage, by any kind of combination, he may as well have a trial of the London market at first hand. A parcel of tea was reported on lately by some Colombo authorities, and the result was a very poor report. It was a pleasant surprise to the shipper when the break was sold in London to find that it realized 1s 4d a lb.!

The cultivation of coca in Ceylon is not extending very rapidly, nor likely to. And yet you do hear of it growing here and there, and the plants which were for sale at the Peradeniya Gardens, at 12½ cents each, all found buyers. I understand that its use as a local anæsthetic, is bringing it more and more under the attention of scientists, who are studying its nature and will in all probability extend its use. It is quite within the range of possibility that this concentrated attention, may lead to some important discovery regarding it, which will induce a demand for the coca leaf such as does not exist at present. Even as it is, I have heard of one who has been promised a shilling a pound for all he can send home, a price, I understand, which will pay well enough.

Last week's rain did a lot of good, and brought out a scattered blossom on what coffee was in heart. There remains a promise for something better later on.

The cacao crop is winding up, and it has been a very good one. The new blossom for the next crop is somewhat tardy in parts, but there is plenty of time yet. The trees are particularly healthy, most of the pests which plague and worry are in abeyance, and long may they so continue.

PEPPERCORN.

TEA.

The following is the annual report of the tea trade by Messrs. W. J. and H. Thompson.

The past year has again been unsatisfactory to the importer, while statistically for the first time for many years the total deliveries show only a fractional increase, the most serious feature being the falling off in home consumption, a decrease of 1¾ million compared with last year.

This possibly may be accounted for by some disarrangement with regard to the deliveries in 1885, consequent upon the expectation of an increased duty or to the largely increased use of Indian and Ceylon teas, which possess much more strength than those from China, and at the present moment contribute to the extent of one-half of the total consumption. The export is satisfactory, being two millions in excess of last year. China: Prices early in the year were well maintained in prospect of reduced stocks, and the commoner grades advanced in value. On the receipt of news of hurried and heavy shipments, combined with the large increase from India and Ceylon, a general decline took place. The new crop met with little attention, and the finer qualities showed a reduction of 4d to 8d per lb as compared with the current prices of former years. The medium grades were not equally affected, and the common kinds maintained comparatively a high range, owing to a moderate supply. The lowest point reached was in October, but since that period there has been some slight rally. The total export from China is expected to be about the same as last year. Indian tea: the year opened with stocks of high average value and only a small supply of low-priced Tea, the effect of which was to restrict business and cause a decided decline. When the new crop arrived in the autumn, the market being in a sound position, a good business at steady prices resulted, until it became apparent that the crop would be a heavy one and consist largely of low grades, when rates began to fall for all but the best qualities, and at last reached a lower range than has ever been known. This fall

has greatly stimulated consumption, which for the past three months has risen to the rate of 80 millions per annum, while in December Indian and Ceylon deliveries together for the first time amounted to one-half the entire home consumption. The season's supply of Indian is estimated at 75 millions, eight millions more than the previous crop. At the present rate of delivery the consumption would be equal to 75 millions, showing an increase of 13 millions. To the growers the result may prove better than present prices indicate, as the reduced cost accompanying a large yield forms some compensation for the lessened values of inferior grades, while for those who made fine teas the market has been favourable throughout. Ceylon Tea: This branch of the trade is beginning to assume large proportions, the imports and deliveries being double those of 1885, while the demand has been sufficient to maintain an average for some time past of 1s 2d per lb. due to the success of planters in keeping up a high standard of quality, for in the spring when the average value of other teas was higher than now, Ceylon fell as low as 10½d per lb., the portion of the crop then arriving being of inferior quality. Java Tea: The quality has been of an average class, and the deliveries have been about the same as last year.

Messrs. Layton and Co.'s Circular says:—Looking back upon the last year two unfavourable features are noticeable, viz., (1) the continued fall in the value of fine Tea, and (2) the increasing tendency of Indian to drive China Tea out of consumption in this country. As to the first of these, it is probable that we have now arrived at a pitch when some reaction must take place and indeed prices of really good Kaisow or Moning are decidedly firmer already than a month since, although no great advance can as yet be quoted. As regards the second of these facts, we believe that it must continue for some time to come, and until the low prices current for Indian descriptions stop the production of increased supplies year by year. This is hardly likely to occur at present, because the extensive use of improved machinery in India has more and more reduced the cost of manufacture until an average price of only 8d per lb., which a few years ago would have been considered quite an absurd quotation, is found to leave growers a margin of profit. It seems probable, therefore, that unless China can send an improved article to compete on better terms with the more pungent liquor and more even leaf of India, no permanent change can be hoped from the present very unfortunate state of things, and the downward course of the China Tea trade for so many years can hardly be arrested. During the past year the total deliveries of China Tea for home trade showed a falling off of 5,881,000 lb. compared with 1884, while the consumption of Indian showed an increase of 5,770,000 lb.; it is startling to find that whereas the deliveries of China Congou are less than in 1871, those of Indian Tea have risen from 13,500,000 lb. to over 70,000,000 lb. in the same period. The landings of Indian Tea in December were on a larger scale than ever previously, amounting to 14,113,590 lb. against 9,227,394 lb. in 1885, and though the deliveries were exceedingly heavy for the time of year, being 6,594,546 lb. against 5,241,228, the stock on the 31st ult. was further increased to 32,887,308 lb. as compared with 24,751,920 lb. in the previous year. The general favour in which Ceylon Tea has gradually risen continues and all grades have brought comparatively high rates the style and liquor of several invoices being highly approved.

The market for Indian Tea which closed on the 22nd ultimo was reopened on the 3rd instant with a small sale, and during the week 18,000 packages have been offered. Prices at first were irregular, but since then there has been more competition for Pekoe Souchongs at from 7d. to 10d., and Pekoes from 9d. to 1s 1d. per lb., quotations for which show a advance, especially for the latter. Common Broken Pekoes under 1s are lower, but medium and goond medium have sold briskly at many previous rates. The demand for finest descriptions keeps limited The deliveries for December were 6¼ millions, which is satisfactory, and for the past six months they show an increase of fully six millions as compared with last year. Owing to the excessive arrivals in December the stock appears unusually heavy. Ceylon: The sales comprising 1,700 packages passed with a little more animation as compared with the closing sales of 1886. Java: Partly due to the limited quantity brought forward lately, the 460 packages offered this week met with attention, and for the useful parcels there was fair competition. The figures for the past six months, as compared with previous years, are as follows:—

	1886 Imports.	1885
Indian ...	52,038,000 lb. ...	42,681,0 0 lb.
Ceylon ...	3,834,000 lb. ...	2,320 000 lb.
Java ...	1,788,000 lb. ...	1,605,000 lb.
	Deliveries.	
Indian ...	35,670,000 lb. ...	29,472.000 lb.
Ceylon ...	4,092,000 lb. ...	2,110,000 lb.
Java ...	1,860.000 lb. ...	1,841,000 lb.
	Stocks Dec. 31.	
Indian ...	32,887,000 lb. ...	24,752,000 lb.
Ceylon ...	1,660,000 lb. . .	1,028.000 lb.
Java ...	944.000 lb. ...	675,000 lb.

Messrs. Beebe's New York Circular of Dec. 23rd says:—A large business has been done in most descriptions of Tea at improving prices. The speculative feeling indicated by the transactions referred to in our last became more pronounced early in December, and large sales and resales of Formosa and Amoy Oolongs here and to arrive, followed, leading to an advance in values of about two cents per lb. all around. But little of either class remain in first hands, dealers and speculators holding at the close most of the stock. Considerable sales of Foochows have also been made, mainly of cargo grades, and the advance on them is fully equal to that on Formosas and Amoys. Greens have been in more demand, Country packed as well as Pingsueys, and chop values for them may be quoted one to two cents higher than when we wrote last. Japans, other than Common to Good Medium, are comparatively unchanged. These grades close at an advance of one to two cents. Sales and resales reported at private and made under the hammer foot 200,700 packages, including 20,200 Country Greens, 17,000 Pingsueys, 18,800 Japans, 62,300 Formosas, 54,000 Amoys and 25,000 Foochow Oolongs, and 3,400 Congou. 29,700 of these were made in the auction room. Green Teas have met with more inquiry during the past three weeks, and values at the close show an advance of about two cents average on the better chops of Moyune and Teenki, and one or two on Pingsueys and the lower grades of Country packed. Holders are less inclined to press sales either at public or private, and a further improvement in value seems probable in the near future. Japans find some increase in the demand, but mainly for Common to Good Medium. These grades are realising one to two cents more in the auction room, while Fine to Choice show little or no improvement over last month's values. Oolongs have been very freely taken both in the regular way and on speculation, with sales and resales aggregating about 140,000 packages. Of these Formosa kinds cover 62,000; Amoys, 54,000 and Foochows, 25,000. An average advance of fully two cents is established on all grades other than Finest to Choice, and the market closes firm at the improvement. Congous are practically unchanged, with but little inquiry for other than Common Cargo.—*L. & C. Express.*

CINCHONA IN BENGAL.

The report on the working of the Cinchona Plantations in Bengal during 1885-86 shows that there were upwards of five million trees in various stages of growth on these plantation. The major portions of these trees comprise the red and yellow species (*succirubra* and *calisaya ledgeriana*). The most important feature of the year's operations was that the planting out was exclusively confined to yellow bark trees, of which 187,000 were of the hybrid variety, and 239,000 of *ledgeriana*. The crop was not a large one, and amounted to 205,410 lb. of dry bark, most of

which was red. The bulk of the crop was as usual made over to the febrifuge factory.

The demand for the febrifuge was not as great as in previous years, and this is ascribed to the presence at the three presidency depôts of a large quantity (7,000 lb.) of London-made febrifuge, sent for sale under instructions from the Secretary of State. Until, therefore, this large supply has been absorbed, the demand for the Bengal febrifuge must necessarily be limited. Why the Secretary of State should send out London-made febrifuge for sale to India,* when it can be as well manufactured here, is not quite clear. It cannot have any other than a deterring effect on the Indian industry, which at present is very largely in the hands of the Government of India, not to speak of private enterprise. The outturn of febrifuge from the factory is regulated by the demand, which fell from 6,464 lb. in 1884-85 to 4,743 lb. during 1885-86. This "demand" was limited owing to the 7000 lb. of febrifuge having been sent out by the Secretary of State, and thus the connection between the two is established. The Indian revenue from this source has, therefore, suffered. The cost of manufacture was also more than in preceding years, owing to the introduction of an improved method of working the factory. So that although the cost of manufacture increased by five annas per lb. in the case of ordinary, and eight annas per lb. in the case of crystalline febrifuge, the percentage of febrifuge, obtained from the bark was raised by three per cent by the new method. The increase in cost of manufacture is also ascribed to the smaller quantity manufactured. It will thus be seen that the Secretary of State's venture has not proved a very paying one. The issues during the year decreased by 1,653 lb. as compared with the preceding year, having been respectively 5,499 lb. and 7,152 lb.

During the past year there was a heavy fall in the market price of quinine; the ruling price having been only R2-1 0 per ounce. To this cause is attributed the decrease in the sale of the febrifuge to the public. It is, however, anticipated by the Government that the depression in the price of quinine, which is ascribed to special causes, will not last. In this connection it may be as well to state that there has recently been an enquiry into the prevailing *high* retail prices of quinine, and that there is every likelihood of the present low prices being maintained. So that unless the Government see their way to reducing the prices charged for their febrifuge very much *below* that prevailing in the market for quinine prepared by London manufacturers, the falling off in the sales to the public may be expected to continue. The total expenditure on the Bengal plantations amounted to R79,728, which is R18,077 below the budget allotment. Of this the sum of R12,052 represents the capital expenditure on the young trans-Teesta plantation at Rungjung, which has not yet come into bearing; and the balance, R67,675, the working expenses of the old plantations at Mungpoo, including Rungbee and Sittong. Thus the capital account is now brought up to R1,096,255. It is, however, explained that this has been recouped by the saving effected by the substitution of cinchona febrifuge for quinine in Government medical institutions. The gross revenue derived from the sale of febrifuge, seed, plants and bark amounted to R93,476, against R124 225 in the previous year. The actual profit on the year's working is stated to have amounted to R30,221; but with the expenditure at R79,728, and the revenue at R93,476, the net profit would amount to R13,648. It is, therefore, not clear how the above figures are arrived at. In addition to the "actual profit," Dr. King points out that 2,054 lb. of febrifuge, supplied to Government medical institutions, and valued at R33,000, should be taken into account. The thanks of the Lieutenant-Governor of Bengal are very properly accorded to Dr. King for his continued efficient management of the department, and to Mr. Gammie, who held executive charge of the plantations and factory.—*Indian Agriculturist.*

* He sent out febrifuge manufactured in London from Government bark, as an experiment.—ED.

ASH OF CINCHONA BARK.

BY DAVID HOOPER, GOVERNMENT QUINOLOGIST.[1]

I have recently been engaged in examining the inorganic constituents of cinchona bark, and the analysis has been communicated to the Government of Madras for information of the cinchona planters of the Presidency. As the chemistry of this drug will always be of interest to pharmacists, I send some notes relating to the amount of ash and the quality of the ash occurring in barks cultivated in India.

In Flückiger and Hanbury's 'Pharmacographia' the following statement is made:—"The cinchona barks yield but a scanty percentage of ash, not exceeding 3 per cent, a fact well according with the small amount they contain of oxalate and kinate of calcium."

With regard to the quantity of ash, my experience is that cultivated barks yield over 3 per cent; the average of three hundred estimations made on samples from this country was calculated at 3·42 per cent. Renewed and old natural barks are the poorer in mineral constituents, but they never fall below 2 per cent. On the other hand, young and branch bark gives as much as 4 per cent, and it is interesting to notice that the leaves afford as much as 5, and sometimes 6 per cent. With regard to the species of cinchona, there is a marked difference in the amount of ash yielded by each, provided that natural bark is operated upon. The crown bark is richer in ash than that of the red, and the red richer than that of the Ledger; and knowing that crown bark grows at an elevation of 7000 to 8000 ft. the red at 5000 to 6000 ft., and the Ledger at 3000 to 5000 ft., the altitude may have something to do with this gradation of ash in the different species.

When gently incinerated at a low red heat, cinchona bark should always leave a greyish-white ash. If it is at all reddish, it points to the presence of dust or dirt adhering mechanically to the sample, if weighed, it will be found much in excess of that obtained from clean bark. The two most dirty samples of bark I have met with came from Ceylon, leaving when burnt a reddish residue of 18·8 and 19·5 per cent respectively, but as they were both labelled "dust," neither the vendor would be blamed for the impurity, nor could the purchaser rave on account of its poverty in alkaloids.

A complete analysis was made of the ashes of the two species of cinchona grown on the Nilgiris, the *C. officinalis* growing in the Dodabetta plantation, and the *C. succirubra* from the lower elevation at Naduvatam. Notwithstanding the barks were from different species and localities, the result of the examination shows that there is a great similarity in the composition of the ash.

	C. officinalis.	*C. succirubra*
Soluble in water ...	27·33	24·46
Soluble in acid ...	66·92	69·94
Residue	5 75	5·60
	100·00	100·00
Insoluble silica ...	5·75	5·60
Soluble silica	1·42	4·40
Alumina	2 70	4·24
Iron oxide	2·85	3·21
Manganese	trace	
Lime...	32·70	32·80
Magnesia...	2·07	2·52
Potash	16 35	12·49
Soda	3·40	2·28
Carbonic acid	27·22	27·77
Sulphuric acid... ...	1·16	1·08
Phosphoric acid ...	3·93	3·19
Chlorine	·45	·42
	100·00	100·00

The chief constituent is the lime which forms nearly one third of the whole, and exists in the ash in the form of carbonate. The next element of im-

portance is the potash, which amounts to one-sixth and one-eighth of the whole ash respectively.

About fourteen years ago P. Carles wrote a paper on the "Complete Analysis of Cinchona Barks," in the *Repertoire de Pharmacie* (new series), vol. i., p. 60 (which appeared in the *Pharm. Journ.*, March 15, 1873), and a complete analysis is given of the ash of Ilnanuco, calisaya and succirubra barks from South America. His examinations agree on the whole with the above, but he finds traces of copper and appreciable quantities of manganese present. Although there was quartz present in most of my samples, weighed as insoluble silica, yet there was no trace of copper; and the absence of more than traces of manganese is in accordance with the nature of the Nilgiri soils. I can confirm Carles in showing what a small quantity of chlorine is present. As to barks rich in quinine associated with abundance of lime salts, I cannot agree that there is any relation between the alkaloids and the mineral elements. The cinchonas of South America were poorer in quinine then than the India barks are now, and they yielded about half the amount of ash. On the other hand the Ledger barks, which are richer in quinine than succirubras, always contain less ash, and consequently a less amount of lime. There is not much lime in the Nilgiri soil, yet it seems an essential ingredient in cinchona bark, and is taken up in large quantities whether the cinchona is grown in India or America. However different the soils of these two countries may be, a comparison of the analyses of Mr. Carles and myself will show that cinchona bark appropriated to itself a peculiar arrangement of chemical elements. If the arrangement of the inorganic constituents of plants were at all constant, it would be a means whereby the chemist could assist the botanist in discriminating between different natural orders, genera, if not species of plants. —*Pharmaceutical Journal.*

THE BEVERAGES IN COMMON USE.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

Under the head of aromatic beverages I propose to speak exclusively of such as contain a certain alkaloid, with the formula $C_8H_{10}N_4O_2$, which Runge, in 1820, found in coffee, and to which he gave the name *caffeine*, which Oudry, in 1827, found in tea, and which he called *theine* which Martius discovered in the *Paullinia sorbilis*, and which finally Hæckel and Schlagdenhauffen have isolated, along with theobromine, from kola nuts.

In order to simplify the exposition into which I am about to enter, I will admit that all these alkaloids are identical, although I know very well that it is by no means demonstrable that isomeric bodies have absolutely the same physiological action. I shall not touch upon the different hypotheses which have been put forth relative to the atomic composition of this body. I have already called attention to this point in a recent study on the derivatives of caffeine.† I have shown that if, according to Strecker, caffeine is only the methyltheobromine, according to Fischer, on the other hand, caffeine and theobromine are derivatives of xanthine; theobromine is the bimethylxanthine, while caffeine is the trimethylxanthine. But I cannot now take up your time with these chemical researches.

All the aromatic beverages containing caffeine (or the isomeric alkaloids above mentioned) for their bases are used in immense quantities all over our globe, and their employment is much more extensive than that of alcoholic beverages.

Many opinions have been put forth as to the physiological and hygienic action of coffee. These may be reduced to three hypotheses. Coffee diminishes the excretion of urea and is a waste-restrainer; it does not modify the urea excretion, and is a force-producer; or lastly, it acts as a food, supplying elements of nutrition.

The first view is supported by Schultz, Gasparin, Broker, Lehman, Frolish, Trousseau and Pidoux, Rabuteau, Marvaux, etc., who claim that coffee diminishes the quantity of urea excreted; that it does not nourish, but that it prevents denutrition. This is the waste-restraining-aliment theory.

But to facts advanced by these physiologists other facts are opposed, and we see Roux and Giraud in France, Binz in Germany, Brackenridge in England, maintain that coffee, as well as caffeine, in no respects modifies the figure of urea. Hence Gubler, basing himself on the researches of these authorities, affirms that coffee has no action on nutrition, but that it is a tonic, or, rather, a force producer.

Lastly, Payen has shown that coffee contains nitrogen, and this in quite notable proportion, since in green coffee this essential element exists in the proportion of 4·48 per cent, and in roasted coffee in the proportion of 1·75 per cent. He shows, moreover, that the admixture of coffee with milk, in ordinary usage in many parts of the world as a breakfast beverage, is one of the most nutritious of all drinks, a mixture of 500 grams of infusion of coffee, 500 grams of milk, and 75 grams of of sugar containing, according to his estimate, 49 grams of nitrogenous substance and 100 grams of hydrocarbon and salts.

This view has been adopted by Fleury, Bouchardat and Jomand, and is supported by facts being in accordance with the experience of entire populations (in England, Germany, Switzerland and the United States), who find sustenance in their breakfast dish of coffee.

Coffee is, then, by virtue of the nitrogen which it contains, a food, and you remember that in the primordial alimentary principles I included caffeine among the azotized substances. Moreover, recent experiments of Guimaraës show positively that augmentation of urea follows the administration of coffee.*

But is coffee anything but an aliment? It possesses special tonic properties on the circulation and nervous system. All experimenters are agreed in the fact that under the influence of coffee the beatings of the heart become more rapid and more energetic, the circulation more active, and the urine more abundant. Leblond's study has given us in this regard tracings of high importance. Moreover, whether by the activity which it impresses on the circulation, or by a direct action on the nervous elements, coffee directly affects the brain, and may be called "a cheering and thought-inspiring beverage."

This threefold action, on nutrition, on the circulation, and on the nervous system, makes coffee an admirable tonic, and we are justified in saying that it is largely by reason of the strong coffee, which habitually forms a part of their diet, that our troops have been enabled in the burning of climate of Algiers to endure the most exhausting campaigns.

It is also owing largely to the coffee, which is becoming more and more an article of daily consumption among the farmers in the country, that we see this class of people able to endure the great increase of toil to which they are subjected in haying and harvesting seasons.

Coffee, in order to be fit for nutrition, must first be torrefied. Payen has made a special study on the modifications which coffee undergoes by roasting, and has shown that during the process there is a breaking up of the chlorogenate of potassium and caffeine, and a setting free of a part of the caffeine held in combination.

I cannot here touch upon the different modes of preparing coffee, modes by which the properties of roasted coffee are doubtless more or less modified. While in Europe it is the infusion which is drunk almost exclusively, the inhabitants of the East prefer the decoction, and, if we may believe their statement, the decoction, while preserving the tonic and alimentary properties of the coffee, is quite devoid of the exciting properties which characterize the infusion.

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette.*

† Dujardin-Beaumetz, "On the Physiological and Therapeutic Properties of the Derivatives of Caffeine." (*Bull. de Ther.*, 1886, t. cx., *p.* 241).

* Guimaraës, "On the Physiological and Hygienic Action of Coffee" (*Arch. de Phys.*, 1884, t. iv., p. 253).

The different physiological properties of coffee have caused this food medicine, and its congeners, tea, Paraguayan maté, guarana and kola, to be applied to the treatment of a great number of affections. Its tonic action on the circulation has led to its use in the treatment of diseases of the heart, and Gubler, Lépine and Huchard have shown us all the advantages derivable therefrom. Its diuretic properties have led to its being recommended in dropsies, urinary gravel and gout; its cerebral tonic action has rendered it useful in the treatment of migraine and cephalalgia. Lastly, we see its utility recognized in intestinal strangulations and opium poisoning.

I have finished what I wished to say concerning coffee, leaving aside what appertains to infusions made from roasted acorns and chicory, which contain nitrogen, and probably have some food value, but are devoid of caffeine, and therefore of the tonic and excitant properties of coffee.—*Pharmaceutical Journal.*

REPORTS ON INSECTS INJURIOUS TO FRUIT CROPS

(Prepared for the Agricultural Department, Privy Council Office.)

We have already noticed two previous issues of these Government Reports, relating respectively to the insects affecting the hop and corn crops. The new publication is likely to be the one most generally popular, as private persons all over the country as well as fruit farmers are concerned about the insects which ravage fruit-trees. The Privy Council have done useful service in having this work prepared. In it Mr. Whitehead has compiled in a fairly popular style as much as has been ascertained concerning the nature and life histories of the weevils moths, bugs, and flies which are so ruinous to our various fruit-trees. The pamphlet is obtainable for so little cost that it is not necessary to analyse its contents at great length. We may, however, state that about thirty of the most familiar garden insects are figured and discussed. These include the chief devastators of the apple, pear, cherry, currant, raspberry, strawberry, and gooseberry leaves and blossoms. The details given under the heads, Prevention and Remedies, show that no royal means have yet been discovered for battling with these foes without a great deal of trouble. Some different details of treatment are suggested for each insect, but generally it is recommended that the trees or bushes infected should be well syringed with a mixture of soft soap (7 lb.) and quassia (6 lb.) to 100 gallons of water. After an attack the ground round the roots is generally to be well hoed, quicklimed, or sawdust with paraffine, or soot, or ashes well mixed in with the earth, and all cuttings from the tree to be perfectly cleared away. Hellebore is said to be an effectual dressing in some cases, but its poisonous nature forbids its use when any fruit, however small, is forming. It is much the fashion to attribute the attacks of insects to the east wind, as if it in some mysterious manner were the actual generator of sundry of the species which spoil the crops and destroy vegetation, or as if they literally came on the wings of the wind. Mr. Whitehead notices this old-fashioned theory, and attributes it to the fact that after a cold and variable spring, during which there has been an unusual amount of east wind, all plants, trees, and herbs appear to be more liable to attacks from insects, in consequence of certain chemical changes and the disorganisation of tissues rendering them more grateful to the tastes of their ordinary parasites.—*Chemist and Druggist.*

THE BHEL FRUIT, OR BENGAL QUINCE.

MR. E. JAMES, Ipswich, writes as follows:—"Reading in your valuable paper an account of the Exhibition, my attention was attracted to the Bael fruit (misspelt Bahl), which does not seem to have any attraction for your correspondent. It gives me great pleasure to draw the attention of Queenslanders to this valuable fruit, from an edible and medicinal point of view. The fruit is obtained from the *Ægle marmelos*, and belongs to the most valuable natural order, Leguminosæ. The fruit is about the size of a large orange, with a hard woody rind. The fruit is highly valued by the natives of India, which is its natural habitat, as an astringent in severe cases of dysentery, diarrhœa, &c. I have always taken it during my five years' residence in Ceylon, where it grows abundantly, and is considered by medical men in India, to be a most valuable medicine, a preparation of which is official both in the British and Indian Pharmacopœia. The preparation as in the B. P., is known as fluid extract of Bael fruit, but it is not equal to the fresh fruit. For further information see Fluckegar and Hanbury's Pharmœographia, which ought to be in the hands of every one who takes an interest in fruit growing."

Lindley gives a different spelling to either of the two above referred to—namely, "Bhel." The "Dictionary of Gardening" calls this fruit the *Ægle marmelos*. Order Rutaceæ (not Leguminosæ). It is described as "an evergreen tree producing very large fruit, which much resembles an orange in general appearance, very delicious to the taste and exquisitely fragrant. This genus differs from Citrus principally by its numerous disunited stamens. The pulp of the fruit is an aperient, and a valuable remedy in dysentery; the thick rind and dried unripe fruit are astringent. It thrives best in a rich loamy soil, and is propagated by ripe cuttings, which, if not deprived of any of their leaves, will root in sand under a hand glass, in heat. It grows to a height of 10 ft." We have to thank Mr. James for calling attention to a fruit likely to suit the climate of this colony, and also to be an addition to our horticultural resources. We shall also be glad to publish particulars of its growth and cultivation in this colony. Mr. Bernays, in his "Cultural Industries," says that a specimen at Bowen Park has flowered profusely, but not yet fruited, but that he has seen good fruiting specimens in the gardens on the coast from Bowen northwards.—*Queenslander.*

TRADE AND COMMERCE OF SANTOS.

(From the Report by Consul Cowper for the Year 1885.)

There is no new feature in the production of this province. Coffee still continues to be its staple and only article of export. Former reports have treated exhaustively this subject, and there is nothing to add to it, except the fact that the production of coffee shows a tendency to increase, notwithstanding the very great depreciation in its value during the last few years—a depreciation which barely leaves a margin for profits, and has reduced the revenue derived from it by several millions of pounds.

Coffee, as already stated, is the only article of export, and the shipments during the past year were larger than those of any of the previous ones, in consequence of the extension of the crops. Great Britain consumes but little of the San Paulo, or "Santos" coffee, as it is commonly called, hence the shipments thither are small and of no great consequence. New York, Havre, and Hamburg are the principal markets of the staple produce of this province.

The import trade of this province, carried on through the port of Santos, still continues to be of growing importance, and as long as the province develops its resources at the rate of past years, the import trade will increase in direct ratio to the same. There has been no diversion or new feature in the import branch of trade here. Great Britain, as heretofore, supplies the greater portion, both in bulk and value, of the imported goods, and entirely monopolises the trade in railroad and tram plant, and rolling stock, gas and waterwork materials, agricultural implements, hardware and machinery of every description, and coal. Although Germany endeavours to compete in cotton goods, British makes are preferred and command the market. Unfortunately no statistical information as to the volume and value of the importation from different countries can be given, inasmuch as the custom-house has never yet published statistical matter on the subject. There was a great falling off in number o

British ships entering the port of Santos in 1885, as compared with other years. Two years back British shipping, whether sailors or steamers, far exceeded that of any one nation, but last year steamers under the German flag, and sailing vessels under the Norwegian flag, considerably exceeded those under the British flag. The cause of this appears to be the much lower rates at which the Germans and Norwegians can equip and sail their vessels. The low freight, which now rules through excessive competition, apparently leaves no margin for profits, and the general cry of the shipmaster is that their vessels are sailing at a loss. This, in regard to British vessels, appears to be actually the fact in most cases, inasmuch as the sailing expenses of a British vessel are about twice as great as that, say, of a Norwegian vessel. For instance, in the first place, the Norwegian mercantile marine consists of principally English vessels bought up cheaply; second, the Norwegians victual their vessels at a much lower rate than the English; and lastly, the wages paid to Norwegian crews, whether master, mate or seamen, average half the wages paid to British seamen of the same class. British shipping cannot compete under such advantages, and if the Norwegian mercantile marine was sufficiently large they would, under circumstances noted, do the entire carrying trade.

Under the heading of exports it was stated that Great Britain consumed but little of the coffee exported from Santos; hence this branch of the trade, commercially speaking, does not interest the industries or trade of Great Britain. It is otherwise however with the import trade, inasmuch as with the exception of farm house and market garden produce, every commodity used by a civilised community, possessed of no productive industries of its own, is imported from such countries as can supply the demand for them to best advantage. The demand for foreign commodities and industrial production increases every year in this province with the expansion of its population and the development of its vast territories. The demand comprises household furniture, utensils and commodities, hosiery, ready-made male and female attire, boots and shoes, cotton, woolen, and linen materials, jewellery, wines, beers, groceries, flour, oil, kerosene, preserved meats and fruits, stationery, medicines, china and porcelain, hardware, cutlery, glassware, earthenware, agricultural implements, railroad stock and plant, waterwork plant, tram car stock and plant, and every description of machinery and iron work.

Great Britain, by reason of her practically inexhaustible stock of industrial products, unlimited productive power, and possessed of the facilities of capital, material, enterprise, sea transport, &c., ought to supply the non-industrial countries with her productions without fear of competition from countries less favourably situated. Such is, in point of fact, the case in this province. The importations from Great Britain alone amount to nearly half the value of the total import trade. Other countries, notably France, Germany, and America, are attempting competition, but with no marked success at present; the long-standing specialities of British industries always obtain preference.

In those cases where the productions of foreign industries compete successfully with, or are superseding those of Great Britain, the cause or fault is generally traceable to the British manufacturers themselves, who, often too conservative in style and design, obstinately ignore the tastes, wishes, and requirements of consuming markets; whereas, on the other hand, competitors in Germany, France, and America, with a keener eye to business and more mobile in disposition, spare no pains to adapt and supply goods in accordance with the wants and peculiarities of each country.

To exemplify this assertion, mention may be made of the earthenware and glass trade of this province to within very recently supplied from British industrial sources alone, but now almost entirely superseded by the introduction of German earthen and glassware. The diversion of this trade is solely due to the persistence with which the British workers, in the face of warnings from their correspondents here, supplied obsolete ware, heavy in weight and ungainly to the sight; whereas the Germans introduced an article of less weight, and always of the latest modern design, this at once competing advantageously with the British wares in several essentials, viz., modern forms and patterns to meet the generally diffused desire for "novelty" and lightness of weight, to harmonise cost of production, transport freight, and custom duties, paid by weight. By not giving thought to these simple matters a lucrative trade has been lost to British industries in this province; and what has happened to the earthenware trade may also happen to other branches of trade if British manufacturers through remissness allow their foreign competitors to steal a march on them.—*South American Journal.*

SILK COTTON.

Kapok, an article which at present does not figure largely among exports of Straits produce is now drawing great attention in Australia. Notwithstanding the steady inquiry for it there, this product is so little known that, doubtless, fuller particulars regarding the article will not be without interest. Kapok is the Malay and Javanese name for the *Eriodendron Anfractuosum* and the *Gossampinus Alba*. It belongs to the Bombaceæ family which comprises the Baobab the largest tree yet known, the trunk being sometimes 90 feet in girth, and the Durian tree. Kapok also known by the name of silk cotton, was imported for the first time into Europe in 1851 for the Exhibition held in London, that year, where, however, little notice was taken of it. In Holland more notice was taken and that country continue to be the only market for the article, until its value began to be better known in the Australian colonies. At the Amsterdam Exhibition held a few years ago, greater interest was taken in it than in 1851, but yet the results so far as its importation into Europe was concerned, Holland excepted, proved discouraging. This is the more extraordinary now that the article has with a wonderful success secured a commanding position in the Australian market. The first consignment of Java Kapok arrived in Australia, fifteen years ago. Owing to the trade being then in the hands of Hollanders and natives, supplies were irregular, and insignificant, the results being that sales were confined to small quantities only. In 1881 on occasion of the Exhibition at Melbourne, there came thither the first shipments of Kapok from British India and Ceylon. The article met with a ready sale from its fitness for bedding and upholstery purposes. Since then it has been imported into that port increasingly, but a lively demand did not spring up until the firm of Catherwood Welby & Co. of that city with praiseworthy perseverance and remarkable good fortune, imported and disposed of the article in large quantities. This took place in 1884, owing to Mr. Catherwood, when passing through Ceylon, becoming attracted by the Kapok he saw. He at once perceived its economic uses and the future there must be in store for it. This improvement with respect to Kapok, was not without influence on the market in Holland where, in December 1884, not less than 12,000 bales of it were stored up in warehouses at the prompting of a ring to keep up prices, while dealers on their part were firmly determined to stand out against them in the hope that further shipments would compel merchants to ease down stocks. They reckoned without their host, for unexpectedly the said firm secured two-thirds of the whole crop. These circumstances will have a material effect in raising the price of kapok in this part of the world by the operation of the well known economic rule that whenever the demand becomes greater, prices are bound to rise. The rapid increase of importations of kapok into Melbourne may be judged of from the fact that they rose from barley 1,000 bales in 1881 to upwards of 8,600 in 1886, of which 7,995 were from Java valued at £22,600. These figures show the leading position of Java among kapok-exporting countries. From Ceylon so little of it is exported as to be almost inappreciable. Comparison between Indian and Java kapok brings out the fact that

the former stands immeasurably inferior. In bales imported from British India, good and bad kapok is intermixed, and as if this is not enough, all sorts of foreign substances, such as sand and other heavy materials, are added to increase the weight, so that the bales require to be opened as a security against fraud. Moreover the packing leaves much to be desired. The kapok packed by means of hydraulic presses loses that peculiar elasticity which renders it so valuable. Moreover, by hard packing uncleaned stuff, a dark coloured oil is expressed from the seeds which is suffused over the kapok and consequently stains it. From these disadvantages, Java kapok is free, it is always well packed, brilliantly white in colour, and springy. Judging from the particulars available so far, there is every prospect of kapok having a bright future before it, and there is little doubt that, with the invention of proper carding and spinning machinery, it will be used in the fabrication of articles of clothing, and prove a formidable rival to its allied substances. It has already been used for making gun-cotton, a substitute for beaver fur, converted into half-stuff for paper-making, making silk buttons and fringes, and by the Indians, who make beautiful fabrics of it. In Bombay, the fibre of the bark is used as a substitute for flax, and in Bengal the natives collect the milky juice as a substitute for shellac and gutta-percha. The seeds have almost the same value as cotton seeds, being exported to Europe to extract the oil and fetch from £3 to £5 per ton.

Such is the opinion of experts Should their anticipations be soon realised, a new and remunerative industry will be called into being which cannot but be welcome in these hard times. Kapok being an indigenous article, plantation enterprise may be better directed to its cultivation than to that of foreign products requiring acclimatisation before they can thrive. —*Straits Times.*

PAPER.

The following interesting article has been forwarded to us by a correspondent:—We live in an age of paper. There is not perhaps any manufactured article that is in more universal use; trade, finance, arts, literature, science—everywhere paper occupies the first rank. For us, journalists, it is a most valuable servant; we confide to it our impressions, which then pass, in the form of newspaper, reviews, pamphlets, books, etc., from the hands of the printer into that of the public. Never has the paper trade received such an impetus, and made such progress, as in the last few years. It is a common thing now to speak of paper bottles, paper collars, cuffs and shirt fronts, paper napkins and towels; paper wheels, rails, carriages, roofs; paper soles, hats; paper chimney stacks, and innumerable other objects and commodities made of paper. Have we not seen, within the last few years a paper-boat gaily cruising over the waters of many European countries? Have we not now luminous wall papers? The United States are now organizing festive celebrations in remembrance of the introduction of printing in America; this seems to us a fit opportunity to glance at the manufacture of paper—this all important factor in printing—and at some of the most important features in connection therewith. Leaving aside the continents of Asia, Africa and Oceanica, in regard of which our information is extremely imperfect, we shall cursorily look at the importance of the paper trade in Europe and the United States. Europe produces a million tons of paper per annum. In France alone, the annual production is 178,885 tons, representing a value of £4,832,400 and employing in her 516 factories no less 33,371 hands, of which 17,816 are men, 11,596 women, and 3,580 children. Great Britain, which in 1588 only manufactured a coarse wrapping paper, and purchased all her better papers in France, produces more than 200,000 tons of paper per annum. The first American paper mill was established in 1690 in Philadelphia, and the United States, which at the beginning of this century scarcely produced any paper at all, now makes over 500,000 tons per annum. The paper trade consumes 800,000 tons of rags per annum. Water paper, straw, wood, old rope, etc., are employed for making paper to at least the same extent. The money value of these ingredients may be estimated as follows:—

	£
Rags	15,200,000
Straw and Wood ...	800,000
Waste Paper, Esparto, etc.,	4,000,000
Total ...	20,000,000 per annum.

These materials produce about 1,500,000 tons of paper, costing forty millions sterling, or about the same figure as the amount of capital invested in paper making plant, machinery and works in Europe and the United States. Of these one-and-a-half millions of tons of paper, 120,000 tons are used as writings, valued about six-and-a-half millions sterling; 300,000 tons serve for news, periodicals, etc., 80,000 tons for books 120 000 tons for administrative, official and trade purposes. Including ink and labour, three above categories of printing reach a total value of sixty-nine-a-and-a-half millions sterling. Card and millboard reaches approximately 600,000 tons per annum, wall papers 60,000 tons, and another 60,000 tons for other descriptions, such as blottings, silk paper, filtering paper, etc., of a total value of twenty-four millions sterling. To blacken so much paper we use annually £800,000 worth of steel pens, costing on an average at the works about sixpence per gross, about the same value in printing type; 8,000,000 lead pencils, costing at the works about three shillings and four pence per gross. For every hundredweight of paper it takes one pound of printing ink: and more than 3,000,000 blocks and engraved plates are used annually for illustrations. If we take into consideration all the various branches of commerce depending from and consequent upon the paper trade we arrive at an amazing number of people to whom it affords a means of livelihood and entitles paper to the rank of a "universal provider." Nor is it only for the requirements of trade, writing, printing, packing, wall covering, tobacco, etc., that paper is employed for, we have now paper chimneys which we were wont to build of bricks and of a height of as much as thrity yards and upwards. We here refer to such a chimney erected at Breslau and made from paper blocks compressed under high pressure and intercemented by means of a silicious mortar. It has been observed that paper pulp compressed resists fire, and as a result we find paper doors recommended where there is danger of fire. The tests made at Breslau on the above named paper chimney have given highly satisfactory results in respect of solidity, elasticity and incombustibility, while in point of cost it compares most favorably with brick constructions. Even gas retorts are being made of paper, but gas itself may some day find itself encroached upon by paper. We will in conclusion and *apropos* of gas, say a few words on the subject of *luminous paper*, which is, unquestionably one of the most striking inventions of the age. There is no particular novelty in its manufacture; it is made in the usual manner, and no mystery whatever exists in the after process. It is composed of.—

Water	10 parts.
Pulp	40 „
Phosphorescent powder ...	10 „
Gelatine	1 „
Bichromate of potash... ...	1 „

Thanks to this bichromate of potash it becomes waterproof; the phosphorescent powder, consisting of sulphates of lime, baryum and strontium furnishes luminous properties lasting for months in succession, and we have only to hang our walls with this luminous paper to strike a severe blow at gas, candles, lamps, etc.—*Paper Makers' Circular.*

BOMBAY MANGOS AND OTHERS.

BY DR. E. BONAVIA.

A short time ago I was given some real Bombay mangos which had just come from that place. I was asked whether I had ever tasted a *real* Bombay mango. They were yellow with a red cheek. Of course I do not know whether they were the best, or

only inferior Bombays. The presumption is they were the former, as no one in his senses would think of sending inferior Bombay mangos all the way from that capital. I confess I was disappointed. They were not bad, but stringy, and inferior in flavour to scores of varieties we have in Upper India. One has heard so much of Mazagons and Alphonses, that one may perhaps have learnt to look upon them with a sort of awe. The notion that Bombay's surpassed all the mangos of the rest of India may have been true in the days of Clive, when communication between the coast and the interior may have been difficult, owing to want of roads, and the presence of thugs, dacoits, tigers, &c. And it is not impossible that by repetition over a hundred years that they *were* the best, this notion may have stuck to them, and that everything else out of Bombay was *jungle-mango*. If our up-country Bombays were really orginally brought from that place, it would appear that the flavour and texture of the children have far surpassed those of their parents. Anyhow there are so many choice varieties now in cultivation up-country that they can hardly all have owed their origin to the Western Presidency. If the people of Bombay were made aware of the wealth of varieties which are to be had in the Upper Provinces, and of the superiority of many of them, it is almost certain that a brisk mango trade would result between Upper India and Bombay.

When pears are being sent to Covent Garden from the Cape in capital condition, and when both pears and apples are being sent to the Colonial Exhibition from Australia over 14,000 miles of sea it is a great pity that no one has thought of making some arrangement to send over to the Exhibition samples of the choicest mangos of India—fruits, which, in the estimation of many, are far superior to the pears and apples of any part of the world. The mango bears being plucked under-ripe, and by refrigeration, could easily be sent to England *tale quale*, and there ripened to perfection, within a week. Nay more, it could be sent to New York, a sea voyage of only six days further. The voyage from Melbourne to Colombo takes now about 19 days, and from Colombo to London the voyage is longer than from Bombay to London. So that mangos could be carried from Bombay to New York in a shorter time than apples and pears can be carried from Melbourne to London. Of course at these places, an Indian, up in the art of mango ripening, which is simple enough, might be employed to bring them to maturity after arrival. If England and America were made acquainted with the choice varieties of this unique fruit, there is no knowing what stimulus a trade in mangos between Bombay and those countries would give to their cultivationall over India. There are positively scores of superb varieties.

Leaving, however, foreign trade out of the question, there seems room for an extensive trade between Upper India and Bombay. Someone recently returned from Bombay, told me that mangos there were selling at R6 a dozen. It is true the octroi duties may be high in Bombay, and it may be true that high rent is paid for fruit stalls in the Crawford Market: still R6 a dozen for mangos in Bombay is an enormous price, when up-country the choicest, in favourable seasons, sell for 20 or 25 for *one rupee*. It would be interesting to have it settled once for all whether the "Lingra" of Benares, or the "Tikari" of Farukhabad, or a dozen of so-called Bombay mango varieties grown in these Provinces, are not infinitely superior both in flavour and texture to any *native* Bombay or Alphonse mangos. If not, those grown in Bombay must be simply *angelic* as many varieties grown in these Provinces are *simply perfect*. Alphonse De Candolle, in his *Origin of Cultivated Plants*, says that "in the new world the mango was first introduced into Brazil, for the seeds were brought thence to Barbadoes in the middle of the last century. In Jamaica it was introduced about the year 1782. It is cultivated at the present day in tropical Africa, and even in Mauritius and the Seychelles, where it has become to some extent naturalized in the woods..... It was not cultivated in Cayenne in the time of Aublet at the end of the 18th century, but now there are mangos of the finest kind in this colony. They are grafted, and it is observed that *their stones produce better fruit than that of the original stock.*"

If the latter statement be true, it should be written in *large letters* in every village and town in India, where mango *baghs* of the fine kinds exist. I have preached for many that it is a grave mistake to throw away the thousands of stones of superb mangos that are consumed every year. Natives still believe that there is no other way of obtaining good mango trees excepting by taking *grafts*. This is so, if the *identical* sort of mango fruit is wanted, but it does not at all follow that a stone of a good mango will not give a *better* fruit than that of its parent. A little reflection must teach them that all the choice varieties they now possess could not have come about except through the seed of interior sorts, and these again from sorts interior to them and so on until we reach the wild mango of the jungles. Very rarely new varieties of *any* sort of fruit can be raised in any part of the world, excepting by means of the seeds which may give an inferior, an equal, or a *better* variety. Anybody who came across a fine mango would do a good service if he either planted the stone himself, or gave it to some one who would plant it. The Canal Department and public gardens, and jail gardens might do a great deal in this way by letting it be known that they would be glad to collect seeds of fine mangos for sowing. If some of the trees turned out inferior kinds and not worth keeping, very little would be lost, as such trees might be sold for firewood, while the good ones might be propagated by grafting.

Although India has missed the opportunity this year of showing the world at the Colonial Exhibition what sort of a thing a good mango is, and how many scores of choice varieties she might send to London and new York, there will be yet another opportunity of doing so shortly. It is proposed to hold either next year, or the one after, an International Horticultural Exhibition in London, and under any circumstances *that* opportunity should not be again missed. The Maharaja of Durbhunga and the Maharaja of Benares, who are great collectors of choice mango trees from all parts of India, and many other Rajas, Nawabs, and native gentlemen could easily send a representative collection of one of the finest fruits in the world. And if the supply could be kept up, as is being now done with apples and pears from Australia, so much better. Already Jamaica sends mangos to New York, but an American in India who knows them, told me they are not good. No country for many years could compete with India for the supply of choice fruit. She has had centuries in which to perfect her mangos, and if they took the fancy of the English and American people, a good business might be made of it.

It is stated that "in London there are *restaurants* to-day, where over a thousand dinners daily are served, wholly of cereals, vegetables, and fruits:" the vegetarian mania is still on the increase. What would not a vegetarian give for a breakfast of iced mangos and toast? Those who have not tried it had better do so, and see how delicious and satisfactory it is. —*Pioneer.*—[In Ceylon, where grafting is practically unknown, a good proportion of the mangos, are excellent.—Ed.]

A CONTEMPORARY notices that in the agricultural class book for use in schools about to be revised by Mr. Robertson, there is a chapter on insectivorous birds which that able ornithologist, Mr. W. Davison, of Shoreham, has contributed. The birds described in the work are figured in colors on separate charts to be used to illustrate the book. The ignorance of natural history among school-going children of the present day is profound, and some satisfaction is felt in learning that at last the Educational Department is alive to the importance of the subject. It is not only those who are trained to agriculture who should distinguish one bird from another, and be able to tell the proclivities of each, but young children generally should acquire early a taste for such knowledge, which is both elevating and moralizing.—*Indian Agriculturist.*

Correspondence.

To the Editor of the "Ceylon Observer."

NEW TEA ROLLERS.

Maskeliya, 22nd Jan.

"Mercy o'me what a multitude are here—
They grow still too, from all parts they are coming."
Shakspeare, Henry viii.

DEAR SIR,—The divine William is ever equal to the occasion, and on reading recently "Notes and Comments" the quotation heading this rushed through my brain.

But I do not think B——'s roller has continuity of roll, as however good it is, I don't think the inventor even claims that as one of its merits, as a certain break most occur between discharging and filling. Another new roller does its work continuously without the smallest iota of a break until all available leaf is finished. B——'s does not do so, the seller's to the contrary notwithstanding.—Yours,

THE MORE THE MERRIER.

TEA IN HAPUTALE: WELL DONE.

DEAR SIR,—I have no permission to use names, but I think an extract from a report of a well-known Colombo tea-taster and broker will show that the Kandapola side will prove second to no district in the quality of its tea, which may be of interest to some of your readers:—"I must congratulate you on the stride made in the manufacture. No. 1 is really a handsome tea, full of golden tips, very brght, good aroma &c. &c., may safely value it at 2s per lb. and No. 2, pekoe souchong leaf, bright flavory clean brisk liquor, value 1s 2d to 1s 3d per lb."

This is promising. I may add the break was a small one, but No. 1 was 4-5ths of the whole, and the plucking was an usual one. The proprietor will soon have near a hundred acres of the same jât to pluck from.—Yours, PLANTER.

THE DHOLL PLANT.

The Colombo School of Agriculture, 1st Feb. 1887.

DEAR SIR,—I have learnt with great pleasure that some of our goyas have made arrangements for cultivating dholl extensively and with a view to giving them an idea of how the cultivation can be best carried on, I send you for publication the following particulars about the plant. I may also mention here that this letter has already appeared in Sinhalese in the "Dinakaraprakashaya," a leading native newspaper:—

The dholl plant or rata-tora of the Sinhalese is not very uncommon in some parts of the island, although it is very seldom cultivated by our goyas. The botanical name of the plant is *Cajanus Indicus* and the common English name is Indian peas or dholl. The following account of this plant appears in the "Catalogue of the most interesting forest trees" &c. prepared by Mr. D. Morris, M.A., Assistant Director of the Royal Botanic Gardens, Ceylon:—"There are two varieties of this species. Both are cultivated in various parts of the tropics for the sake of their seed or pulse. In India the pulse is called dhal or dhol and forms a large part of the food of all classes of natives. In the West Indies the seeds are called Pigeon Peas and are highly esteemed as food. Horses and cattle are very fond of the young branches and leaves, either in a fresh or dried state. There are few tropical plants so valuable. It grows luxuriantly in the parched Savannah and mountain declivity, as well as in the more fertile and seasonable districts."

Dholl is a most nutritious and agreeable food and the seeds are said to contain more nutritious matter, bulk for bulk than meat. The seeds are also said to possess the property of counteracting fever and I have the authority of the Chairman of the Agricultural Association of Ceylon for this statement. In one of his letters addressed to the Colombo School of Agriculture, he had stated this fact and asked for a supply of dholl seeds so that he may distribute them among the inhabitants of those districts of the island which are subject to frequent attacks of fever. A large quantity of dholl has been grown in the Agricultural School compound. It takes about six months for the plant to grow and flower. The cultivation of dholl is carried on to such a large extent in India that a large quantity of the decorticated seed is also exported annually. The decorticated seeds which are sold in our boutiques under the name of "parippu" are generally dholl. The "parippu" is a Tamil name for any kind of decorticated grain, such as dholl, gram, &c. The roots and the seeds of dholl are used medicinally by the Sinhalese and it appears that the few plants which are to be found in some parts of the island are also chiefly grown for this purpose. It can be readily seen that dholl is a most suitable food for those who never take any kind of meat either by habit or by principle.

On the occasion of the prize distribution at the School of Agriculture by H. E. the Governor, I heard Mr. A. M. Ferguson, C. M. G., speaking about dholl cultivation and alluding to the "grand physique of the men of Northern India as a result of living on dholl porridge, dholl being largely cultivated in that part of India." Dholl will grow in almost any soil, cowdung is a good manure for the plant. A top dressing of lime will be found most beneficial for obtaining a heavy crop. I here describe for the information of our goyas the method in which this plant is cultivated in India and the seeds prepared for the market. First of all, the land is prepared just as our goyas prepare their lands for sowing gingelly, kurakkan &c., and the seeds are sown broadcast—about five seers of seeds are required for an acre. If the land is hard and unfertile it should be loosened either by ploughing or by digging and manured. In about three days the seeds will germinate. The plants are very tender when young. After the plants have grown for about six months, they blossom and when the pods get quite dry the trees are cut down to within a foot of the ground and carried to a suitable place where the grain is thrashed out with the aid of cattle. The seeds are afterwards soaked in cold water for a whole night and dried in the hot sun, which cause the testa or the husk to split and the cotyledons to separate. The husks are very easily separated by means of winnows. Dholl can be cooked just as the natives cook green gram or mun-eta. A little ghee added when cooked will make it an excellent curry. Excellent soup can also be prepared from the seeds.

The stumps which are left shoot up again and give a second crop. After the second crop is gathered the plants are pulled up by the roots and some other kind of vegetable is grown on the land, or it is allowed to lie fallow for a few months and dholl seeds sown again.

As dholl is such a nutritious article of food and is so easily grown as the above account shows, I hope that our goyas would be induced to take up the cultivation of this valuable food-plant in every part of the island.—I remain, yours faithfully,

H. D. LEWIS.

[The writer of this interesting and useful communication is Assistant Master of the Agricultural School, Colombo.—ED.]

COCONUTS.—A Coconut plantation in the West Indies, well established and in full bearing (say at the end of eight years), with sixty trees to the acre, may, says Mr. Morris, in his annual report on the public gardens of Jamaica, be safely assumed to be of the annual value of £10 per acre. The expense of maintaining a Coconut plantation, when once established, is practically nothing; hence the thousands of acres of land bordering the sea-coast of our West India possessions are capable of immense development.—*Gardeners' Chronicle.*

TEA AVERAGES.

The following are some of the averages realised during the month, according to the circular of Messrs. Walker, Lambe & Co., our list for December, 1885, ranged from 1s ½d to 2s per lb.

Garden	Broken Pekoe	Pekoe	Souchong and Pekoe Souchong	Broken Tea	Average Price
Budderpore, Cachar ...	...	10½d	7¼d to 8d	...	8½d
Chatali, Sylhet	...	9¾d	7¾d	9½d	9d
Dejoo, Assam	1s 2d	10½d	8d	6¾d	9¼d
Washabarrie, Doors ...	1s 3½d	8¾d	7¾d	6¾d	9¾d
Pashok, Darjeeling	1s 2¼d to 1s 3¾d	9½ to 10¾d	7¾d	6½d to 6¾d	10¾d
Assam Co.....	1s 11d to 1s 11¾d	11¾d to 1s 4d	8d to 8¾d	6d to 1s 2¾d	10¾d
Kaline, Cachar	1s 2¼d to 1s 3½d	11¾d to 11¾d	...	7d to 9½d	1s 1d
Lavant, Ceylon	1s 7½d	1s 2d to 1s 2¾d	11¼d to 11¾d	9¼d	1s 1¼d
Sinnapittia, Ceylon	1s 4d	1s 0½d to 1s 1d	11d to 11¼d	9¼d	1s 1¼d
Darjeeling Co. G	1s 10½d	1s 1½d to 1s 1¾d	9¾d	7½d	1s 1¼d
Do A	1s 6¾d to 2s 1½d	1s 3d	10½ to 11½d	6¾d to 7½d	1s 2d
Do F	1s 11½d	1s 0¾d	9d	...	1s 2¼d
Hope Ceylon	1s 7½d	1s 1½d	11¼d	...	1s 2¾d
Kookwood Ceylon	...	1s 7½d	11½d to 1s 3¼d	...	1s 5½d
Tiphook Assam	2s 3¾d	1s 10½d	1s 1¾d to 1s 3d	...	1s 5½d
Calsay, Ceylon	1s 9½d	1s 5d to 1s 8d	1s 0¾d	...	1s 5¼d
Turyum, Darjeeling.....	2s 1½d	1s 10½d	...	8d	1s 7½d

SIR M. E. GRANT DUFF'S REVIEW MINUTE.*

In a Minute written on the principle of the paper before us there was sure to be plenty of reference to Sir M. Grant Duff's favourite tastes and studies, and readers of his former publications would expect a great deal in it on the subject of botany. This part of the "Review Minute" is exceedingly interesting. The hilly country surrounding Ootacamund, the Simla of Madras, its alternative capital, is especially favourable to the cultivation of the new and now very numerous plants introduced of late years into India. South America sends most of them, and, as is beginning to be known in this country, almost all the recent additions to the pharmacopœia come from South America. It is now long since the cinchona began to be cultivated on the Neilgherries, and Sir M. Grant Duff speaks strongly of the success of the Government officials both in raising the tree and extracting the healing alkaloids from the bark. There is, however, some mystery about the matter. The price of quinine has not fallen in Europe nearly to the extent which might be expected from the great quantity of bark added by Ceylon, India, and the Dutch colonies to the old supplies from South America. There is probably some commercial reason for this unsatisfactory phenomenon.* It appears, however, from this Minute that the Madras official quinologists have been highly successful in producing a preparation of the inferior alkaloids of cinchona which is an energetic febrifuge and extremely cheap. It may be suspected of not being very palatable, but the extraordinary numbers of the vast Indian populations who suffer from ague would not reject even the most nauseous medicine if the reward of swallowing it were a cure. Another South American plant, producing a medicine of which the extreme value is beginning to be recognized in England, the coca, grows readily on the Madras hills, and so do various new food plants, also of South American origin. Among industrial importations, there are the two species of rhus which produce the Japan lacquer and the Japan wax, and the quillaia, or vegetable soap, from Chili. It would appear, moreover, that some curious experiments are being tried on the Neilgherry Hills not only in respect of new trees and plants and new modes of cultivation but in regard to new methods of making hitherto useless vegetable productions available for food. The silo appears to have a considerable future before it in India. A mischievous weed, the *bidens glabra*, which overruns the slopes of the Neilgherries, is found, after being treated in a silo, to be devoured greedily by cattle; and Sir M. Grant Duff tells us that the Madras Commander-in-Chief (presumably Sir Frederick Roberts) was of opinion that the prickly pear, the most intractable of vegetables to all outward appearance, can by treatment in the silo be made most acceptable to animals.—*London Times.*

* "Review Minute." By his Excellency the Right Hon. the Governor. Madras, Printed by R. Hill, at the Government Press, 1886.

* The phenomenon exists only in the imagination of the writer. Quinine has gone down about two-thirds in price, since Ceylon flooded the bark market.—Ed.

Tobacco Culture.—We are reminded by Mr. Worthington Smith (prophet of evil!) that it is quite within the bounds of possibility that living Tobacco plants may, in this country, fall a prey to the Potato fungus—Peronospora infestans. It has been recorded in England amongst the Nicotianeæ. A New Palm.—Professor Sargent has recently detected a new Palm in Florida, not only new as a species, but sufficiently distinct to constitute a new genus. Dr. Wendland proposing to call the plant provisionally Pseudo-Phœnix Sargentii. The trunk is 10-12 inches in diameter [near the base ?], and 20-25 feet in height. The leaves are 4-5 feet long, pinnately divided; pinnæ lanceolate, 12-16 inches long. No flowers, and only immature fruit was found, so that the plant cannot be fully described. At present only six individuals have been found. We extract these particulars from the *Botanical Gazette*, vol. xi., No. 11.—*Gardeners' Chronicle.*

"Bouquets under water" reads a little far-fetched, but the following description of the process from *Vick's Magazine*, by which a boquet of flowers can be preserved fresh for a long time may prove interesting to our readers:—"A vessel of water is required, the vessel should be large enough to allow the submersion in it of a plate or dish holding the bouquet to be preserved, and a bell glass, to cover the bouquet. The dish or plate should contain no moss or other material; the water should be limpid and quite pure. Place the plate at the bottom of the water, and on the plate, submerging it, place the bouquet, which is maintained in an up-right position by a weighed base previously attached to it. This being done, the bouquet is covered with the bell-glass, the rim of which ought to fit exactly to the flat part of the plate; the bell-glass should be entirely filled with water,

and without the least air-bubble. Then all are raised together, plate, bouquet, and bell-glass filled with water, and placed on a table, carefully wiping the exterior, but leaving on the plate, around the base of the bell-glass, a little provision of water which prevents the entrance of air. The flowers in this condition will be preserved in all their freshness for several weeks, and their beauty is increased by a great number of bubbles of gas produced by the respiration of the leaves, and which attach themselves to the petals appearing like pearls. The edge of the plate and the water that it contains should be concealed by a light bed of moss in which are set some other flowers. In the evening by artificial light, a bouquet thus arranged produces a charming effect."—*Indian Agriculturist.*

FAIR PAY FOR OCEAN MAIL SERVICE.—Although Congress failed to make fair provision for American vessels carrying freight mails, it is interesting to know that the business men of this city are in favour of fair play for ocean mail service. The following is a memorial sent to Congress on the question:—"It is applying the same principle to carrying the mails between the United States and neighbouring countries that is applied to our coastwise steamship lines and to our entire postal system, and which has given other nations the world's trade. Steamships build up their respective countries just as trunk lines of rail road do their respective termini. We have only about 6 per cent of the Spanish-American trade, which for contiguity and natural laws of trade would, with proper steam communication, naturally come to us. We are now carrying only 14 61-100 per cent of our own products, against 75 per cent in 1859. Our country needs an outlet for her products. The last steamer in the South American line took out merchandise manufactured in twenty-six different States. This is no party question. It is business common sense that if we would obtain our share of the world's trade, we must do as our competitors, do to obtain it. A cry of 'anti-subsidy' cannot fairly be applied to a proposition to pay American steamers a fair price for a necessary service. The same cry, if heeded, would stop three-quarters of the mail routes in the United States." This memorial was signed by the leading business men of New York, and particularly by houses interested in foreign trade. The number included eight bank presidents and 189 prominent importing and manufacturing firms.—*American Exporter.*

THE WORLD'S SUGAR PRODUCTION.—The statistics of the world's production of sugar show that there is a steady and large annual increase. The amount of cane sugar produced in the season of 1885-6 was 2,905,000 tons, an increase of 733,000 tons over that of 1884-5 and 1,078,583 tons over that of 1875-6. Cuba led the list with 600,000 tons this season, which was a falling off of 27,000 tons from the year before and 61,058 tons less than in 1875-6. There was also a decrease in the product of Java, the next greatest source of supply, of 60,000 tons from the yield of 1884-5. But in the production of almost all other cane growing countries there has been, as shown by the totals, a marked advance. The yield of beet-root sugar (2,014,000 this season) has fallen off 501,000 tons from the last annual report, but comparison with the statistics of 1875-6 show a growth of 702,689 tons in ten years. These reports do not recognize glucose and grape sugar, or sorghum sugar or maple sugar, and, are evidently made up from the basis of of commercial statistics concerning the sugar that has entered the market. Beyond this there are vast quantities of cane sugar produced for domestic use in all tropical countries and consumed by the producers and their immediate neighbours, which do not enter into the computation. The most notable increase in any country is in the beet root sugar yield of Russia, which has grown from 222,000 tons in the season of 1875-6 and 386,000 tons in 1884-5 up to 525,000 tons in 1885-6.—*American Exporter.*

FORESTRY AND BOTANY IN CEYLON, are thus noticed in an article on *Indian Forestry* by Surgeon-General Elward Balfour:—Ceylon has been equally progressive and though not politically forming part of British India, it may be mentioned, as it has a Forest Department of its own, and its Flora and Timber trees have been well described by Dr. Thwaites and Mr. W. Ferguson. In climate and flora it assimilates with the Peninsula. Dr. Balfour adds:—It is 50 years since Indian Forestry had a beginning, in the nomination of Dr. Gibson to the superintendence of the Bombay forests, and there is now needed from them one book bringing their knowledge of the forests and their trees up to the present time, and another as a handbook of Indian Forestry, arranged in parts, to admit of the region of British India being worthily described. The information in Drs. Stewart and Cleghorn's works on the trees of the Punjab Himalaya; in Stewart and Brandis' *Forest Flora of N.-W. and Central India*; in Mr. Kurz's volumes on the trees of Burma; in Mr. Gamble's *Trees of India;* in the third edition of Surgeon-General Balfour's *Timber Trees of India and of Eastern and Southern Asia;* and in Colonel Beddome's *Flora Sylvatica*, need all to be brought together in compact volumes. The financial results from establishing a Forest Department in India justify liberality in making its trees and forests better known. Its revenue has been continuously on the increase. Twenty years ago, in 1867-68, the gross receipts were stated at £334,000, but in 1883-84 they amounted to £1,052,190, and the clear profit in that year was £403,815.

The SWALLOW'S nest has always been a delicacy highly prized by the Chinese; but from an interesting report recently submitted by Mr. Portman, in charge of the Andamanese it appears that the high estimation in which these nests are held is not confined to the Celestials. It is not generally known that the Government derive a revenue from this source, of which they have a monopoly, as we learn that Mr. Portman was directed to "take charge of the monopoly of edible birds-nests and trepang," and he now furnishes some interesting particulars on the subject not generally known. The nests are as a rule found in caves, and as many as four crops may be gathered in a year, although three only were gathered by Mr. Portman. The birds begin to build in February, and the nests can be collected up to June, after which the birds are allowed to build for breeding. Each collection takes about a month's time, and the swallows rebuild in six weeks or so. The collections averaged about 52 lb of nests each. It is a regular industry in the Andamans, and many caves are known to the people of the islands. The Chinese obtain the most highly-prized nests, however, from Borneo, where they are also found in caves in the interior of the island in crystalline limestone rocks. Mr. Portman thinks that when the interior of the Andamans is explored, similar caves will be found, as this crystalline formation is common throughout these islands. There are many theories as to the composition of the nests, one being that the glutinous matter is extracted by the swallows from a species of sea weed somewhat similar to Iceland moss; another, that it is secreted from the throat of the bird; but Mr. Portman is unable to give any opinion in the matter. There are three kinds of nests found in the markets. The most highly prized are pure white, and fetch from R110 to 150 per viss of 3½ lb; another is slightly discoloured, and fetches from R100 to 140 per viss; the third is more discoloured and dirty, fetching from R75 to 115 per viss. The refuse also sells at from R5 to 15 per seer. The financial result of the edible birds-nest industry for the past season, shows a net profit of R4,000 paid into the treasury; the total expenditure having been R791. The manner of cooking these nests is thus described by Mr. Portman:—"They are first soaked in cold water for two hours, when they swell up and become soft. They are then easily picked to pieces and cleaned. After this they are boiled in clear chicken broth until dissolved, a process occupying about two hours longer. The usual allowance is one nest (value one rupee) to a tea-cupful of soup. Any clear soup may be used." Mr. Portman adds that the nest is absolutely tasteless and flavourless, and he has not found that it is particularly strengthening or useful in any way. We therefore conclude that it is not at all likely to become a favourite dish with Europeans.—*Indian Agriculturist.*

COLLYER, DAVIES & CO.'S REPORT ON FIBRES, FOR 1ST JANUARY, 1887.

The introduction of new or little known fibres has made but small progress during the past year; causes, however, are at work which will probably lead to an important increase in this department within a comparatively short period. Further improvements have been made in machinery for extracting, which can now be had to suit the requirements of any locality at very moderate prices. The greatest practical difficulty seems to be the necessity in most cases of cultivating the plants required for treatment; generally speaking, the plants are too widely separated when growing wild for economical extraction on a large scale. As the average yield of fibre is only about three to five per cent of the weight of the green material when cut, the carriage of the latter to the machines is in many cases too costly, and therefore the concentration becomes a necessity. The most promising varieties of plants for cultivation are as follows:—

Rhea or Ramie (*Urtica Nivea, Tenacissima &c.*)—The China Grass of commerce, for textile uses, grows, or can be grown in most subtropical and warm temperate climates where there is sufficient rainfall. Value of China Grass £36 to £38 per ton.

Moorva (*Sansaviera Zeylanica, &c.*)—For fine twines for netting and cordage. This plant is also very widely distributed in Asia, Africa and West Indies, of several varieties. Value £25 to £35 per ton.

Wild Pine Apple (*Bromelia Silvestris, &c.*)—The varieties growing in West Indies and Central America yield a remarkably good fibre for cordage, and some of the edible kinds yield a fibre adapted for textiles. Sooner or later pine apple fibre will become an article of considerable importance. Good samples have also been received from Southern India. Value £20 per ton and upwards.

Calotropis Gigantea (or *Mudar*) yields a fine fibre, but it is very difficult of extraction. The flocs (or seed covering in the pod) when gathered at maturity is in good demand. Value, when free from seed, about 6d per lb.

Manila Hemp.—This improtant staple has been in steady demand throughout the year. Opening prices in January were—for good roping £31 10s to £32, fair £29 10s. Market opened dull, and values declined during February and March to £28 to £29 for good and £25 10s to £26 for fair. In April and till about the middle of May prices advanced to £31 10s to £32 for good and £30 to £31 for fair, but fell away again towards end of the month, and in June quotations fell to £29 10s to £30 10s for good and £28 to £28 10s for fair. The world's consumption January to June was fully equal to the production, say about 200,000 bales, London stocks falling in the same period from 18,686 bales on 1st January to 15,285 bales on 1st July. From July to December inclusive fluctuations have been small, rarely exceeding 10s to 20s per ton, and close at £32 10s for good and £30 10s to £31 for fair, with a firmer tendency.

The fluctuations in arrival values have been much more important, this hemp being a favourite medium for speculative operations. Shipments to United Kingdom to 13th December, 162,000 bales, against 177,000 last year; to United States to 13th December, 161,000 bales, against 190,000 last year.

Consumption for 12 months 174,000 bales.

Sisal Hemp (Mexico). This hemp has shown a greater change in value than any other fibre during 1886. Prices were unduly depressed for a considerable time, and continued to decline until the middle of March, when London value was £17 5s. to £17 10s. per ton; from this date prices gradually advanced till end of June, being then £18 10s to £19.

In July, owing to the largely increased consumption in America, where, by improved processes of manufacture, this fibre is now used instead of the finer and more expensive kinds of Manila hemp, prices rapidly advanced £3 to £4 per ton, and this advance, with a few unimportant fluctuations, has been maintained and increased, the price in December, £27 to £27 10s being the highest of the year.

Stock on 1st June, 1886, were 5,300 bales.
" 1st Dec., " " 1,470 "

New Zealand Hemp.—There has been much less variation in the price of this hemp than might have been expected from the advance in Sisal. Import restricted by the high cost production—the year opened with small stocks, 142 tons against 583 tons in previous year, following a reduced consumption in 1885 of 700 tons against 1000 tons in 1884. Value in January of fair to good £20 to £24, and common £18 10s. to £19 10s., prices fluctuated very slightly during the year, closing about £1 higher, consumption for 11 months estimated at about 545 tons. Stock on 1st December about 44 tons against 157 tons last year. Consumption in 1886, 565 tons.

Mauritius Hemp.—The supply during the year has been fairly regular without any great fluctation in prices closing with a firmer tendency. Stocks small good white about £28, fair £26 17s., common £21.

East India Hemp.—Calcutta Sunn.—Supplies have been very small, and prices high all through the year until December, when the new crop arrived in bulk. Shipments being ample, and quality unsatisfactory, prices have receded to about £17 15s, and still lower prices are probable.

Godavery Hemp of good quality has been in steady demand at full prices, closing at £25 to £27 per ton.

Gopaulpore Hemp.—Supplies have been fair, and prices well maintained. New crop offering at £19 to arrive.

Coconada Hemp.—Very little change during the year Prices about £17 to £18 per ton.

Consumption of all kinds of east India hemp in 1886, 1,826 tons.

Jute.—The year opened with stocks on spot and afloat to the United Kingdom of 92,000 tons against 119,300 in 1884, and with a dull and drooping tendency, prices ranging from £11 to £12 15s for medium to £13 10s to £15 10s for fine; but shortly after market improved, owing to greater firmness in Calcutta, fully 10s per ton, and remained fairly steady with slight fluctuations till May, when unremunerative trade led to the closing of several factories—and with increasing stocks prices fell fully 10s per ton, and continued weak during July and until the latter end of August, when a slight improvement took place, which was maintainsd during September and October. Prices were rather easier in November; but during first half of December, market became firmer, and closes with a better prospect. Stocks here and afloat on 1st December, 78,880 tons of jute and 2,110 tons of cuttings.—Collyer, Davies & Co., Fibre and Colonial Brokers, 141, Fenchurch Street, London.

CORAL FISHING.

Though Naples, or at least Torre del Greco, is one of the great centres of the coral trade, the material found in the gulf is both small in quantity and poor in quality. They are submarine rocks, well known to the fishermen, though they are laid down on no chart, where a peace or two may almost always be found; but they are so few, and their yield is so precarious and meagre, that by a private agreement among the boat-owners each of them is only fished once in every three years. There can be little doubt that other and more fruitful fishing-grounds are still undiscovered. In the opinion of many who ought to be well informed, wherever a rock rises above the sediment which forms the ground of a great part of the bay at a depth of about three hudred feet or more from the surface, the chances are that coral will be found upon it. The discovery of such banks has hitherto been almost entirely the work of chance. When a deep-sea fisher found a branch among the refuse of his nets, he gave information to the proper authorities, and received a reward proportionate to the value of his find. It was thus that the great bank of Sciacca, on the coast of Sicily, was discovered, of which we shall have to speak further on. But, though new fishing-grounds may be found in the Bay of Naples

itself, it is not likely that they will have any great importance.

The value of coral depends on its colour and its size. The white or rose-tinted variety stands highest in popular esteem, perhaps chiefly because it is the rarest. It is mostly found in the Straits of Messina, and on some parts of the African and Sardinian coasts. The bright red coral, in which the polyps are still living when it is fished up, stands next in value. Dead coral has a duller tint, and is consequently sold at a lower price. Two entirely different substances bear the name of black coral. One of them is not, properly speaking, coral at all, and it is commercially worthless, as it breaks into flakes instead of yielding to the knife, though it is often sold as a costly curiosity to foreigners. The other is the common red coral which has undergone a sea change, probably through the decomposition of the living beings that once built and inhabited it. It is not much admired in Europe, but in India it commands high prices, so that large quantities of it are exported every year. These are the four important distinctions of colour, though they of course include intermediate tints which rank according to their clearness and brilliancy.

The size is a still more important matter. The thickness of the stem of the coral plant—we use the commercial and entirely unscientific expression—determines its price, and many a branch of red coral is valued more highly on account of its thickness than a smaller piece of the choicer rose colour. The reason for this is clear. A large straight piece of material affords an opportunity to the artificer; a crooked one, if it is only bulky enough, can at least be turned into large beads; mere points and fragments can only be used for smaller ones, or made into those horns which are said to be invaluable against the evil eye, but which do not command a high price in the market, perhaps because it is overstocked.

The coral fishery of Naples has now for the most part, fallen into the hands of a few wealthy firms. Formerly fishermen would club together and try their fortune on co-operative principles, but this system has almost entirely died out. A few single *padroni* still remain, but their exertions are entirely confined to the gulf. They are usually men of experience who can decide how the net is to be laid and drawn, and who hold the guiding rope in their own hands. The boat and the nets are theirs, and they pay their subordinates a fixed sum to serve under them for one or two days. The whole yield, under these circumstances, of course belongs to the padrone. The larger firms could make an end of these boatmen easily enough, but it is not worth their while to do so. The yield of the gulf is comparatively small, and houses that possess from ten to thirty large boats of their own find it more advantageous to purchase the rough material from the local fishermen than to crush them by a cruel and irresistible competition, as they train the men, who are afterwards employed in expeditions to a distance.

The instrument with which the coral is taken consists of two strong beams of hard wood, which are fastened together in the form of a cross by metal claspings, to which a weight is added. Strong hempen nets are fastened to the arms. When a bank is reached this primitive instrument is lowered, and moved up and down against the submarine rocks by means of a capstan turned by the whole of the boat's crew, except the padrone, who directs the movement of the apparatus by means of a second rope which is attached to the chief one some feet above the point where the latter is secured to the centre of the cross. The coral branches are caught in the meshes of the nets, and remain hanging in them. Those that are broken off by the wood work and are usually lost. In some places, especially on the cost of Sardinia, the end of the arms is surmounted by a circle of curved iron teeth, like those of a garden rake, but larger and stronger, below which open nets are suspended. In this case the beams are nearly double the length of those generally used by the largest boats, as they often measure six or seven meters—that is, nearly eight yards from end to end. It is only by this means that coral can be obtained from the lower surfaces of shelving rocks; but the teeth are apt to fracture the stems in such a way as to render them almost worthless; and so this form of the instrument is rarely used where the other can be employed.

The banks, or rather rocks, that are most frequently visited lie at a depth of from 250 to 450 feet below the surface of the water; it is very rarely that an attempt is made to reach those which are lower than 600 feet. Indeed, it lies in the very nature of the case that, even if they exist, they should remain unknown, and that, if they were known, they would hardly repay the cost of fishing while it is conducted on the present system. They are scattered all along the coasts of the Mediterranean, sometimes close to the shore, and sometimes at twenty-four, or even thirty hours' hard rowing from it. At many stations there is a small local fishery; but the bulk of the trade, at least in Italy, is in the hands of large firms, which, for the most part, have their centres in Genoa, Leghorn, or the Bay of Naples. These firms both supply and equip the boats, which, according to their size, are manned by five or ten fishermen. In addition to these a padrone is alloted to each, who exercises large disciplinary powers. He is a man of knowledge and experience, and usually receives a a percentage on the value of the season's take, as well as his regular pay. The selection of the crew of his boat is often left entirely to him; he is always consulted with respect to it, and enjoys a right of veto. The men are hired for the season, by agreement, for from sixty to seventy francs a month, a large part of which is usually paid beforehand, and their food, which is of the coarsest kind. As a rule, the season lasts from April to the end of September, but it depends greatly on the weather, as fishing is impossible in mist or when the sea is high.

The labour is exceedingly hard. At dawn the padrone calls his men and, after a short prayer, the net is lowered; from then till sunset the work continues almost without interruption. The exertion required to let down and wind up the net under a blazing summer sun is extreme, and it has to be done on ship-biscuit of the coarsest kind, and water that on the more distant stations has often become foul by long keeping. In the evening a sort of soup is made. Garlic and peperoni, the pungent fruit of a southern plant, are boiled in water; olive-oil is added, and this is poured over biscuits which have been broken and placed in the dish. For months this diet is hardly varied, and yet the men retain their good spirits. After the evening meal has been taken, they indulge in guitar-playing and singing, and on the more frequented banks the boats answer and vie with each other.

In 1878 the discovery of the Sciacca bank, which lies at a considerable distance off the southern coast of Sicily, roughly speaking between Girgenti and the island of Pantellaria, caused a crisis in the coral trade. At one time nearly a thousand boats might be found fishing there, and seeming to form a city in the midst of the sea. Each of these is said to have taken between one and two hundredweight of coral a day. It is certain that within three years 88,000 German centners were taken from this bank alone. A great part of this coral was dead, and much of it was of the black colour that only finds purchasers in the East. The large firms did everything in their power to prevent the market being overflooded. Many of them still retain hundreds and some thousands of cases which have never been placed in the hands of the artificers. Still the price fell, and it is only at a considerable sacrifice that the greater houses still keep their boats at sea and the workshops open; but they know that, if they let them fall, the fate of their old competitors in Marseilles awaits them, for both the fishing for coral and its treatment by the artificers depend upon traditious which, when they have once been lost, it is difficult to revive. One of the matters of general interest which the bank of Sciacca placed clearly before those who were interested in it from other than a mercantile point of view was the fact that not only were dead and live coral there found side by side, but that in many cases the latter was growl

ing on the former. Signor Lo Bianco spent several days on one of the boats for the purpose of inquiring into this and other scientific matters. Few men possess a keener eye for such sides of nature, or have enjoyed so good an opportunity of training and regulating it as his connexion with the Zoological station at Naples has afforded him. In his opinion the original bank was submerged by volcanic action, and the mud killed the mature polyps. The germs and larval forms, which still existed in the water, settled upon such branches of dead coral as still rose above the sediment, and so began life anew. If he is right, the Sciacca is a kind of submarine Herculaneum. There is not likely to be any immediate improvement in the coral trade. As soon as prices rise, the large firms will be tempted to sell a part at least of the stock they have hitherto reserved in the hope of better times. If he depression lasts, they may be compelled to do so, which would lead to a further fall. This can have but a small interest for the general public, but the sight of the boats whose crews sail or row for long distances without the aid of a compass, guided only by the stars or the glimpse of some distant headland, and in their fishing employ instruments which are said to have been hardly modified since the days of the first Roman Emperors, may suggest a summer afternoon reverie.—*Saturday Review.*

ANOTHER INSECT SCOURGE.

The following has been addressed to the editor of *The Argus*:—

Sir,—I desire to call attention to a species of coccus known as dorthesia. This destructive pest was first observed in the island of Bourbon. Thence it spread to Mauritius, about 25 years since. In Mauritius it destroyed the orange and lemon trees, many of the ornamental shrubs and acacias, and wrecked most of the beautiful plantations and shrubberies. At Port Louis it still exists in loathsome masses on the handsome Talipot palms.

About 12 years ago in was noticed for the first time in the Botanical-gardens, Cape Town, and most probably arrived there from Mauritius with plants sent to the Botanical-gardens. During the first summer it spread about three miles into the suburbs along the railway. Its fearfully destructive character now became evident, for the orange trees, the Australian wattles, the pittosporums, and the blackwoods became loaded with this disgusting parasite, and the trees slowly but surely succumbed to its attacks.

Its vast powers of increase and its peculiar structure rendered all attempts to check its progress unavailing. The adult female dorthesia is about one-third of an inch long, and is furnished with a pair of white fluted wings, similar in form to those of the cicada. Underneath these wings the body appears to be one mass of ova, comprising hundreds of individuals. Syringing, &c., failed to reach this ova, and although the adult dorthesia was sometimes reached and killed, the young escaped, and they are so light that a breeze scatters them far and wide.

All trees of the orange kind, such as lemon, citron, shaddock, &c., proved especially suitable food for the dorthesia, and once a tree became infested no amount of syringing or washing prevented its destruction. The disastrous results of its arrival at the Cape are all too evident.

Formerly in Cape Town itself, and throughout the suburbs, the orange tree lent a charm to the gardens that no other tree could give, and in the Western Province orange-growing form a most important source of wealth, many farmers netting several hundreds a year from their orange groves. Some of these groves, planted by the Huguenots and their descendants, were of great age, and besides being profitable, were objects of great beauty. Those of the Pearl, French Hock, and Wagenmaker's Valley were especially famous.

To-day this is all changed, and except for a few dead stumps these fragrant groves and this valuable asset in the country's wealth have disappeared.

Not so the dorthesia; it is still advancing steadily, and leaving destruction in its wake, and will continue to do so as long as suitable food is within reach. This plague appears to enjoy a wide range of food, for I have seen medlars, pear trees, oaks, quinces, and many other trees smothered with it. It crowds the stems and leaf-ribs of the pittosporum, the wattles, the Cape plumbago, and the pomegranate. Strawberry plants become so covered that the fruit cannot be eaten. French beans and many vegetables also suffer from its ravages, besides roses and many garden flowers. Vines are slightly affected.

Now, sir, this dorthesia has appeared in Melbourne. Yesterday, at Mr. Guilfoyle's request, I accompanied him to the Customhouse, and indentified the coccus covering the two pittosporums at the entrance as dorthesia. I wrote some weeks ago to the Agricultural department, urging that every precaution should be taken to prevent its introduction, as there was great risk of its being brought from Mauritius.

As it is already here, and it has proved so destructive elsewhere, I think it the duty of the authorities and of the public to use the most strenuous efforts to cope with it before the advent of warm weather. Every particle of vegetation affected by this scourge should be destroyed by burning. It is also desirable that a short bill should be introduced to deal with this and similar noxious insects that may reach these shores.

The shrubs of Melbourne are beautified by trees and shrubs that are particularly liable to attack, and the total extermination of the orange, pittosporum, wattle, and other trees is certain to ensue in a very short period, unless the dorthesia is stamped out.

—I am, &c. E. J. DUNN.

Referring to Mr. Dunn's letter Mr. A. N. Pearson, the Government agricultural chemist, who has had much experience as an entomologist, writes:—

"Some cuttings of the pittosporum trees in front of the Custom-house were shown to me about a month ago by a gentleman who was experimenting with some fluid which he hoped would kill certain insects that were found on the plant, and I was asked by the secretary of agriculture to state whether or not the insects were dead. I had not previously seen these insects. They were, however, of the coccus family and from the description given in Mr. Dunn's letter I should say they were the dorthesia he speaks of. There seems to be some mistake, however, in Mr. Dunn's description. The mature females of all the coccidæ, so far as I know, are wingless; the males have wings similar to those of the cicadas (the insects commonly called locusts); but in Victoria the body of the female becomes a mass of eggs in nearly all cases, little remaining of the original insect beyond a mere shell or skin covering the eggs beneath. In the dorthesia known in England, however, the mother does not become so completely absorbed into her offspring as is case with most of the other members of the family. All members of the family of the coccidæ which are likely to visit the shores of Australia may, with very little risk of error, be set down as noxious and warranting immediate destruction, even at the cost of some-what drastic measures. All who have anything to do with orchards know what a pest the scale insect is; and many insects commonly called "blights" are members of the coccus family. I have not heard of this particular dorthesia before; but species of dorthesia are known in England, and one member of the coccidæ family, if I remember rightly, was the cause of the destruction some years ago of all the orange trees in one of the Azores, where the growth of oranges was the main occupation of the inhabitants. The surest way of destroying these insects is to burn the branches on which they are found, and I learnt this evening that the two pitto-sporum trees in front of the custom-house, on which these insects had been found, were saturated with kerosene and completely burnt, so that unless the dorthesia has spread from those two trees it no longer exists in Melbourne. The insect which was shown to me was boat-shaped, varying in size from a microscopic object to one-third of an inch in length, dirty grey on the back, red under

neath, with little nearly black legs, almost hidden under the body. The whole insect is covered over with a thick cottony excretion. It adheres to the younger branches and twigs, from which it sucks the juice. I think that from this rough description anyone else who should happen to meet with the pest may be able to recognise it. With regard to Mr. Dunn's suggestion that a short bill should be introduced for dealing with the introduction of noxious insects, were a Government entomologist appointed, as suggested in the articles on "Economic Entomology" which you published, it could be his duty to attend to the inspection of all plants and seeds passed through the Custom-house. But any action in this direction on the part of Victoria would be of little use unless there were united action by all the colonies. The matter is undoubtedly one of great importance.

A TRIP TO CHILAW.

The bank *pongol* holidays with two other additional days, enabled me last month to visit Chilaw where I have some precious possessions. We left by the morning coach to Negombo, a road in which there is nothing particular to note, save a coconut tree in bearing, the trunk of which has grown in the shape of the letter O, and a double-headed arecanut tree, both on the roadside near about the town. An engraving of this extraordinary coconut tree appeared in the "Ceylon Miscellany," which has ceased to exist, not for want of supporters but for want of contributors. Such has been the fate of every ephemeral production in Ceylon that depended upon unpaid help from the public.*

The road to Chilaw is lined by teak and Banyan trees, and is kept in good order; we skirted the canal as far as Madampe.

All round the town of Chilaw, tobacco was being transplanted from nurseries into gardens. This plant is cultivated, first by heavily manuring the ground, and then watering it twice a day during the dry months of the year. It is harvested about April and when cured becomes a valuable commodity, 50 leaves of the first quality being worth from R4 to R5. The leaf is exceedingly brittle when green and cracks on a slight touch, which is, therefore, carefully guarded against and the roots are so sensitive that if they encounter a stone or a stump, the whole tree withers and die.

The cattle here are miserably lean, there being no pasturage; but the coconut trees in this district are *par excellence* the best in the island, both from their size as well as their fertility, although I was told that some years ago *thousands* of trees were killed by drought.

The friend who accompanied me is a coconut planter of the Colombo district, who grew quite enthusiastic on the subject, comparing the worst Chilaw tree with the best in his plantation.

There is plenty of water communication inland, and splendid opportunities for boating and sailing &c. An adventurous proctor was about to order an English boat from Colombo for his own use.

NEPHTHYTIS LIBERICA.—At present this rare Aroid is somewhat attractive in the Aroid-house at Kew. The heads of bright yellow fruits—each of which is about the size and shape of a small Coffee berry—are borne on erect scapes nearly as long as the petioles of the triangularly sagittate green leaves. The species was introduced from Liberia half-a-dozen years ago.—*Gardeners' Chronicle.*

THE "PIONEER" ON THE CEYLON TEA INDUSTRY.—Returns for 1886 published in last mail's *Economist* show that tea is rapidly taking the place of coffee as the main export staple of Ceylon. Since the appearance of the leaf fungus the cultivation of coffee has steadily declined, and last year the exports fell by over 90,000 cwts. On the other hand the exports of tea rose last year by over three million pounds, or more than 50 per cent., and an equal proportionate increase is estimated for the current commercial year. These facts are of considerable interest to Indian teagrowers. The Ceylon exports are, of course, at present a mere fraction of the amount shipped annually from Calcutta; but when we remember that the Ceylon trade is in its infancy compared with the Indian, that the former's annual advance is at the rate of 50 per cent while for years the latter has been creeping on with 7 or 8 per cent, and that the natural advantages of Ceylon enable it to produce tea of a stated quality more cheaply than can be done on the Indian plantations, there is abundant reason for believing that in ten years or so Ceylon will prove a serious competitor to India in the European market.

WATTLE AND TANNIN.—Some few months ago we mentioned the discovery, by Messrs. Borrow and Haycraft, of South Australia, of a method of extracting the tannin principle not alone from the wattle-tree bark, but also from the leaves, twigs, and small branches of 2 in. diameter. The cultivation of the wattle is now a recognised industry in that colony, and also in Victoria, fully 10,000 tons of the dried bark being annually exported from Adelaide to Europe. In another column we give an account of the process of manufacture, as reported in the *Register*. It is interesting for the success of the process is so complete that there is no doubt it will ultimately develop an extensive export trade of a purely Australian product. Of the two sorts of wattle commonly used for tanning purposes, the *Acacia pycnantha* will grow on the poorest soil, sandy or stony land, that is fit for nothing else, but the black wattle (*A. decurrens*) requires a deep rich soil. This latter species contains 30 per cent to 40 per cent of tanage in the dried bark, and 1½lb. of this bark is equal to tanning 1 lb. of leather, whilst it requires but 1 lb. pound of bark oak for the same purpose. One ton of black wattle bark will tan from twenty-five to thirty hides, and it has been found best suited for tanning sole leather and other heavy goods. The disadvantage of this bark is that it gives a red colour to the leather, which is not the case with leather made by the use of oak bark' myrabolans, valonia, and sumach, &c. The leather is quite as good and durable as when oak bark is used. The mature bark of our golden wattle yields about 30 per cent of catechu (tannic principal), about one-half of which is mimosa-tannic acid. The fresh leaves contain only 5 per cent of tanage, and when well dried give from 10 per cent to fifteen per cent. It has been estimated that the waste in stripping a wattle forest amounts to four times the quantity obtained, for in stripping as now practised the bark is only taken from the trunk and a few of the main branches. The *Register* calculates that at this rate this waste if converted into "tanage" would represent some 5000 to 6000 tons, worth five or six times the same weight of wattle-bark. "Tanage" is the name given by the manufacturers to their new product, so as to distinguish it from similar products known to tanners as "cutch" catechu, &c. Being a new industry, it is necessary first of all to find an outlet for the product, and the makers have discovered that in the tanners' business there is as much conservatism as in other trades. In the colonies the tanners are used to wattle-bark, and it is within the mark to say that it will be exceedingly difficult to induce them to give up their prejudices and adopt the extract. In Europe, however, the tanners are acquainted with a hundred or so of materials for tanning leather, and there will be no difficulty in inducing them to adopt another—especially since the imports of oakbark, hemlock-spruce, &c., are decreasing, and those of gambir, terra japonica, sumach, cutch, &c., do not increase, whilst the demand has more than doubled with the past few years. In 1823 a fluid extract of black wattle (Acacia decurrens) was sent to England, and was sold at £50 per ton.—*Queenslander.*

ALCOHOL FROM SWEET POTATOES.—French chemists have been at work in the French Antilles making a series of successful experiments, showing that the sweet potato can be made to yield nearly four gallons of alcohol to 225 pounds of sweet potatoes.—*Oil, Paint and Drug Reporter.*

* Yes, but where were our correspondent's eyes when he failed to admire the many beautiful reaches on the road to Negombo, with coconut palms and other trees meeting overhead. There are also cinnamon gardens, rivers, pretty native cottages, &c.—ED.

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, January 20th, 1887.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright	£6 a £7 5s
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
Red	Renewed	3d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s 1d
per lb. and Ceylon	Middling, stalky & lean	3d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 4d
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill	7½d a 1s 8d
2nds	,, ,, ,, ,,	7d a 1s 5d
3rds	,, ,, ,, ,,	5½d a 1s 1d
4ths	Woody and hard	5½d a 11d
Chips	Fair to fine plant	2d a 7d
COCOA, Ceylon, per cwt.	Bold to good bold	80s a 83s 6d
	Medium	74s a 78s
	Triage to ordinary	40s a 65s
COFFEE Ceylon Plantation per cwt.	Bold to fine bold colory	95s a 105s
	Middling to fine mid.	83s a 90s
	Low mid. and Low grown	78s a 82s
	Smalls	74s a 77s 6d
,, Native	Good ordinary	65s a 72s
Liberian	Small to bold	58s a 64s
East Indian	Bold to fine bold	95s a 110s
	Medium to fine	80s a 90s
	Small	73s
Native [per ton	Good to fine ordinary	65s a 72s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straigh	£5 a £17
FIBRE, Brush, per ton	Ord. to fine long straight	£10 a £35
Stuffing	Coarse to fine	£8 a £17
YARN, Ceylon, per ton	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £32
Do [cwt	Roping fair to good	£13 a £15
COLOMBO ROOT, sifted ℔	Middling wormy to fine	10s a 28s
CROTON SEEDS, sifted	Fair to fine fresh	10s a 25s
GINGER, Cochin, Cut	Good to fine bold	33s a 80s
per cwt. ,,	Small and medium	32s 6d a 55s
Rough	Fair to good bold	30s a 45s
,,	Small	22s 6d a 25s
GUM ARABIC, Madras	Dark to good pale	20s a 90s
NUX VOMICA, per cwt.	Fair to fine bold fresh	7s a 11s
	Small ordinary and fair	3s a 6s
MYRABOLANES, pale, per cwt.	Good to fine picked	7s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	5s 6d a 6s
Pickings	Burnt and defective	3s 3d a 4s
OIL, CINNAMON, per oz.	Good to fine heavy	1s a 3s
CITRONELLE ,,	Bright & good flavour	¾d a 1d
LEMON GRASS ,,	,, ,, ,, ,,	1½d a 1⅝d
ORCHELLA WEED [℔ lb.	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	8d a 8½d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold	9s a 14s
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	3s 9d a 10s
Dust	Ordinary to fine bright	3s a 9s
RED WOOD, per ton.	Fair and fine bold	£5
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor	£20 a £41
Do. chips	Inferior to fine	£5 10s a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green	8d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2½d a 4½d
TURMERIC, Madras, ℔ cwt.	Finger fair to fine bold	9s 6d a 10s
Do.	Mixed middling [bright	8s 6d a 9s
Do.	Bulbs whole	7s 6d a 8s 6d
Coebin	Do split	6s 3d a 7s
VANILLOES, Mauritius & per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 29s
2nds	Foxy & reddish 5 a 8 ,,	10s a 16s
3rds	Lean & dry to middling under 6 inches	7s a 12s
4th	Low, foxy, inferior and [pickings	4s a 8d

FROM BOMBAY AND ZANZIBAR.		
ALOES, Soccotrine and	Good and fine dry	£8 10s a £8 10s
per cwt. Hepatic	Common and good	£4 a £7 10s
CHILLIES, Zanzibar	Good to fine bright	34s a 35s
per cwt.	Ordinary and middling	32s a 33s

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTTIAONS.
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	12½d a 13d
	Common dull to fair	8½d a 12d
Stems	,, fresh	2½d a 3d
COCULUS INDICUS	Fair	12s a 6d
GALLS, Bussorah blue & Turkey ℔ cwt.	Fair to fine dark blue	59s a 65s
[cwt.	Good white and green	48s a 51s 6d
GUM AMMONIACUM per	Blocky to fine clean	15s a 34s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts, part yellow and mixed	£13 10/a £14 10/ £10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden	Sorts	65s a £5 12s 6d
per cwt. Ghatti	Fair to fine pale	38s a 85s
Amrad cha	Good and fine pale	80s a £6
	Reddish clean	34s a 68s
ASSAFŒTIDA, per cwt.	Clean fair to fine	35s a 40s
	Slightly stony and foul	25s a 30s
KINO, per cwt.	Fair to fine bright	35s a 40s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 97s 6d
OLIBANUM, drop per cwt. ,,	Fair to fine white	45s a 55s
pickings	Reddish to middling	32s a 44s
siftings	Middling to good pale	8s 6d a 11s
	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, red hard		2s 4½d a 2s 6½d
per lb. Ball & sausage, white softish		2s a 2s 3d
	unripe root	10d a 1s 2½d
	liver	1s 10½d a 2s 0½d

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz	Nearly water white	3½ a 4¼d
2nds ,,	Fair and good pale	2¾d a 3d
3rds ,,	Brown and brownish	2¾d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 6½d
	Fair to good black	1s 11d a 2s 2d
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt.	Fair dry to fine bright	23s a 28s
,,	Common & middling soft	8s a 22s
Natal	Fair to fine	25s a 30s
ARROWROOT Natal per lb	Middling to fine	3d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	63s a 64s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	32s a 32s 6d
	Pressed	29s a 30s
Block [per lb.	Good	21s 3d a 21s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 7d a 3s 10d
Medium	83's a 95's	2s 4d a 2s 6½d
Small	100's a 160's	1s 5d a 2s 3d
MACE, per lb.	Pale reddish to pale	2s 3d a 3s
	Ordinary to red	1s 9d a 2s
	Chips	1s 5d a 1s 6d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, ℔ cwt.	Fair to fine	11s a 14s 6d
medium	,, ,, ,,	11s 6d a 12s 6d
small	,, ,, ,,	10s a 12
Flour [per lb.	Good pinky to white	8s a 9s
TAPIOCA, Penang Flake	Fair to fine	2¼d a 2⅜d
Singapore	,, ,,	2⅛d a 2½d
Flour	,, ,,	10s a 17s 6d
Pearl	Bullets, per cwt.	25s a 26s
	Medium ,,	20s a 21s
	Seed ,,	20s a21s

THE TEA MARKET FOR 1886.

We devote large space in our present issue to the elaborate review of the course of the British market for teas during the past year. The year was notable for the collapse of fine China teas, notwithstanding an improvement on the past season which is described as "vast." This seems to establish the fact that, even with the most careful preparation possible, China teas cannot compete in intrinsic value with those from India and especially those the produce of Ceylon. The figures for consumption now that, they are brought up to the end of 1886, prove more strongly than ever the large and increasing extent to which Indian teas are superseding those from China in public favour and in the markets, while Ceylon teas, so far as the comparatively small quantity yet produced shews, are ahead of all in the market. Looking, however, at the figures for total consumption in Britain, they are not so encouraging as could be wished. From 139½ millions of pounds in 1874, there was an advance to 174 millions in 1883, but the average for the succeeding three years has but slightly advanced. The highest figure ever attained was 175,203,000 in 1885, but the quantity recorded against 1886, shews only 174,665,000. Owing no doubt to the prevailing depression, the consumption of tea in Britain has been nearly stationary for four years. If war can be averted and trade improves, we may expect to see an increased demand. The great facts for planters in India and Ceylon are that whereas the percentage which their teas bore to the whole consumption in 1874 was only 12¾ it rose to 42¾ in 1886, and that in the 5 years between 1882 and 1886, while China shewed a decrease of 11 per cent, Indian and Ceylon increased by 48 per cent. The actual figures will give a more vivid idea of the great and rapid increase the consumption of Indian kinds, viz. from 17¾ millions of pounds in 1874 to 74,665,000 in 1886. This process seems likely to proceed at an increased ratio, so that before a total consumption of 200,000,000 lb. is attained one-half will be Indian and Ceylon. The deliveries of Indian teas (excluding Ceylon) are now up to an average of 7 millions per mensem. The average for Ceylon was a little over half-a-million for 1886, but the actual deliveries had increased from 285,000 in January, to 471,000 in December, the highest figure yet, 818,000 having been attained in August. There can be little doubt, we think, that for 1887 the average monthly deliveries of Ceylon tea will rise to 750,000 lb. The prices for our teas have, we regret to notice, decreased from 1s 2¾d and 1s 3¼d to 1s 1d; but the latter figure will pay well and with increasing care in preparation here and increasing prosperity at home we may hope for keener competition and higher prices for our teas, which now take the highest position in Britain and are finding favour on the Continent of Europe. They will ultimately make their way in America.

STENNING INSIKPP & CO.'S INDIAN & CEYLON TEA MARKET REVIEW FOR 1886.

LONDON:—29, MINCING LANE, Jan. 1887.

THE COURSE OF THE MARKET.—The steady tone that prevailed at the closing sales of 1885 soon gave place to dulness and lower values. Common kinds attracted some attention for a time, but prices fell again in April and medium sorts likewise showed a decline. Broken Pekoes had been difficult to sell even at very low prices since the beginning of the year, but in May their position improved. Just prior to the arrival of the New Crop, fine Teas, being scarce, commanded more money, whilst low and common grades went weaker. New Darjeelings proved of poor quality and obtained low prices; a parcel here and there having flavour sold well, but Ceylon Teas again affected the value of Indian growths. Late in August, owing to some improvement in quality, more attention was given to New Indians, and also to Teas for price at a slight advance, which was maintained for a short time, but on heavy arrivals of poor quality taking place at end of September, a decided fall occurred, and only very low prices for all but fine and finest could be obtained. October opened with a steadier feeling, but inferior Teas being offered, the month closed with a further fall, whilst good liquoring Tea from Assam sold at high rates. Heavy auctions then occurred, and values, chiefly for Broken kinds, again fell, whilst former prices were with some difficulty obtained for the finer grades. Afterwards, for a time, less pressure to sell was shown, but towards the close of business for the year considerable sales took place, and with the exception of common to medium whole leaf, which sold firmly, all Teas marked a giving way, Broken Pekoes being quoted at a decided fall from the highest point.

Present Prices are much below those ruling at end of 1885: common to the extent of about 3d per lb.; medium, about 4d; fine and finest, a little below to par.

The season has been generally unfavourable for the grower, except in the case of some Assam Gardens, which were able to produce a fair quantity of desirable liquoring tea, but in other gardens in this district, as well as in Cachar and Sylhet, the mistake has, apparently, been made of aiming too much at quantity, notwithstanding the repeated warnings from this side. In our Annual Review of 1885, and again in our Circular of 25th March, 1886, we particularly drew attention to this point, viz.: "Season 1886 87. A word of caution to planters at this time may not be out of place, and we would urge, as we have often done before, the advisability of adhering to *a moderately fine system of plucking*. The comparatively high prices that have ruled for the commoner classes throughout the past season (*i. e.* 1885-86) have been mainly due to better quality, the result of a careful method of plucking, and not so much to short supply. Moreover, it is probable that the improved position of common China Congou will lead to a large export from that quarter next season, in which case common grades of Indian "if of poor quality resulting from coarse plucking, will only realize low prices." Not only as production increases will it be more than ever necessary to avoid coarse plucking, that is, producing inferior Teas, as buyers here find much difficulty in disposing of them, but Ceylon as a competitor can no longer be ignored.

FIGURES.—In no previous season has the consumption responded so slowly to the fall in values; the low prices ruling in September failed to influence the Deliveries in October, and it was not until the following month that any expansion could be said to have taken place. Current low values should cause a great increase in consumption, and Indian Teas being now so much cheaper than China, the latter should be largely supplanted, unless it be possible to sell them at still lower than present prices. So largely has the use of Teas other than China increased that their consumption in November amounted to 7,965,000 lb., against 12,035,000 lb. (including 4,250,000 lb. taken for export) of China.

The quantity shipped on Garden Account shows a slight increase over that of last year. The same causes as last season have again been in operation, namely, the low exchange, the low average selling price in Calcutta, and the increasing attention paid by buyers in London to successive complete Garden Invoices.

The quantities compare as follows :—

	July to December.			
	1886.	1885.	1884.	1883.
	Packages.	Packages.	Packages.	Packages.
On Garden Account..	271,374	226,972	192,183	160,394
On Purchase Account..	198,983 or 57½ per cent on Garden Account.	170,260 or 57 per cent.	212,566 or 47½ per cent.	233,525 or 40¾ per cent.

QUALITY FROM THE DIFFERENT DISTRICTS.

ASSAM.—The improved standard of quality noted last seasou has been fully sustained, and the high averages, together with a fairly good, and in some instances, large yield must have amply repaid managers for their skill and labour.

CACHAR.—The quality has not been good, and has shown a falling off from the moderate standard of last sea on, and some of the well known marks have not attained such a high standard. The inducement held out by the market for common grades in 1885-86 has in many quarters been too strong to be resisted. Where teas have had quality, good prices were readily obtainable.

SYLHET.—The slight improvement noted a year ago has not been maintained; it is to be hoped that the rapidly increasing supplies from this district will soon show good quality, when a ready sale may be looked for.

DARJEELING AND TERAI.—We have again to record a disappointing season, so far, for these growths; very few invoices have afforded any real quality, and the good prices realized ought to stimulate growers to do their utmost to produce teas with flavour. Dull or thin flavourless Darjeeling teas invariably meet with very poor support.

DOOARS.—With the largely increasing yield in this district, it is surprising that excepting on one or two gardens, that so few good liquoring teas are manufactured: the promise of a few years ago of fine quality has not been borne out.

CHITTAGONG has produced some excellent teas, and the very satisfactory prices obtained should be an encouragement to persevere in keeping up a good standard.

KANGRA VALLEY AND KUMAON.—Almost all the tea from these districts has been of indifferent character, owing, we believe, to an unfavourable manufacturing season.

DEHRA DOON.—Very few teas have come forward, and these were perhaps as good as are possible to be made in this district.

NEILGHERRY.—Fewer flavoury Teas have been received this season, and prices, consequently, have not been so good.

TRAVANCORE.—Judging from a few small invoices. there seems no reason why this district should not turn out very good Tea. A few such have sold well at very satisfactory prices; the character of the Teas much resembles Ceylon makes.

JAVA.—In the early part of the year arrivals were large, and the quality being quite up to the average, the Teas found ready buyers, Lately, the low prices of Indian have checked Imports. 57,423 packages have been offered during the 12 months.

SORTING.—As a rule four, or at most five, breaks in an invoice are all that are really needed, viz.: Orange Pekoe or Broken Orange Pekoe, Pekoe, Broken Pekoe, Broken Tea, and Pekoe Souchong, with an occasional lot of Fannings and Dust. Such an assortment should be practicable if the leaf be plucked moderately fine. When a garden is producing but a small quantity,, there should be as few different kinds as possible, with a view to avoiding small or non-sampling breaks.

With the yearly increasing quantities at auction the necessity of making larger breaks becomes greater, in order to diminish the number of samples, often more than 300, to be tasted each sale day before 12 o'clock, and so enable buyers to give proper attention to the Teas, and thus ensure a full competition for them. This cannot be the case when Teas go to auction hastily valued or perhaps untasted, and to obviate this, in several instances lately, invoices arriving by the same ship from the same garden have been bulked together here, thereby reducing the number of breaks, and also effecting a saving in time, trouble and to some extent in expense, to all concerned. As time goes on this course will no doubt be more generally adopted, and buyers will be enabled to pay fuller attention to the Teas when offered in large and attractive breaks.

BULKING IN INDIA.—Whilst this operation has on the whole been well carried out with an equal quantity of Tea packed in each chest, cases have occurred in which these all-important conditions have not been fulfilled, thus causing much dissatisfaction to the buyers. Owing to this the Wholesale Tea Dealers' Association have threatened after the present season only to buy teas weighed gross and tare as formerly. This will not only cause delay in selling, but expense to growers, besides necessitating the additional cost of, and risk of damage by, bulking here. It is to be hoped that the Association may be induced to reconsider and modify their intention, as much disappointment will otherwise be caused to those growers who are successfully carrying out the conditions by which separate weights and bulking here are avoided.

Unless the teas are *thoroughly bulked* and an *equal quantity packed in each chest of the break*, an extra expense of *not less than 1s 4d per chest* will be incurred, which has to come out of the Planter's pocket.

WEIGHING NET.—This system has made fair progress, but there is still a want of accuracy in some quarters, the variation often much exceeding the limit of 2 lb. either way, *i. e.* above or below.

WEIGHING INDIAN TEA.—The following are the amended regulations which came into force November, 1885.

The weight of Indian Tea for duty may, if desired by the Importers, be ascertained under the following regulations :—

1.—The packages on arrival to be weighed to ascertain the gross weight of each package.

2.—The importers to give with each entry a statement that the Teas in each break have been bulked in India, and that the chests of each break contain even net weights.

3.—In order to test the accuracy of this statement, 10 per cent. of each break to be turned out and weighed net, but in no case are less than 3 chests to be turned out.

4.—If the variation in weight of the test packages, from each other, be found to exceed 2 lb., the whole parcel is to be tared. For instance, if the test packages weigh net 79, 80 and 81 lb. respectively, the variations would not exceed two pounds, but if one package be found to weigh 79 lb., and any other 82 lb. or more, then the whole break to be tared; unless the importer and surveyor consider that an everage tare can equitably be given, in which case the tarers must not vary more than two pounds, as in the case of net weights.

5.—Duty is to be charged on the average weight of the packages weighed net, provided that, when the average of the packages weighed net amounts to so many pounds and a half or more, the half or more will be charged as a full pound; when the fraction is less than a half, it may be disregarded.

6.—All Indian Teas bulked in this country are to be weighed gross, and each chest tared.

MARKS ON CHESTS.—Nothing is wanted, or is of any service here beyond (1st) garden mark, (2nd) description of Tea, (3rd) garden numbers, and (4th) bulked (if such be the case). Gross, tare or net, are not of the least use, and should be discontinued.

SMALL BREAKS.—Under eight chests or eight half-chests, or twenty boxes, are called "small breaks," and in order to save the time of the majority of buyers such breaks, although catalogued, are passed over until the conclusion of the day's auctions.

SIZE OF BREAKS.—Progress can be reported on this head; but as quantities increase the number of chests should be larger, buyers here paying greater attention to large breaks.

WEIGHT OF PACKAGES.—When a gross weight of 129 lb. is exceeded there is an additional charge of 5d per chest up to 159 lb.; the following scale of charges fully explains this and deserves attention.

Management rate, per package, subject to 5 per cent discount at Warehouses other than those at the Docks:—

Gross 160 to 199 lb. 2s 9d; 130 to 159 lb. 2s 3d; 90 to 129 lb. 1s 10d; 80 to 89 lb. 1s 8d; 60 to 79 lb 1s 5d; 45 to 59 lb. 1s 2d; 35 to 44 lb. 1s; 17 to 34 lb. 7d; under 16 lb. 4d.

HOME CONSUMPTION OF INDIAN, CEYLON AND CHINA.

	Indian and Ceylon.	China.	Total.	Percentage of Indian and Ceylon.
1886..	74,665,000	100,000,000	174,665,000	42¾
1885..	68,894,000	106,309,000	175,203,000	39⅓
1884..	63,038,000	106,918,000	169,956,000	37
1883..	59,097,000	114,953,000	174,050,000	34
1882..	50,497,000	115,569,000	166,066,000	30½
1881..	48,836,000	112,156,000	160,992,000	30⅓
1880..	43,807,000	111,307,000	155,114,000	28¼
1879..	35,243,000	125,576,000	160,819,000	22
1878..	36,776,000	120,192,000	156,968,000	23½
1877..	28,013,000	123,012,000	151,025,000	18⅔
1876..	26,735,000	126,004,000	152,739,000	17½
1875..	23,275,000	126,508,000	149,783,000	15½
1874..	17,756,000	121,622,000	139,378,000	12¾

Compared with 1882 (4 years ago), the consumption of China Tea has *decreased* fully 11 per cent whereas that of Indian and Ceylon has *increased* close upon 48 per cent

The total quantity of tea, Indian and Ceylon, offered at Auction, was during :—

	1886. Chests.	1885. Chests.	1884. Chests.
January to March... ...	245,441	261,645	221,010
April to June	156,447	99,558	142,583
July to September... ...	220,919	179,860	162,947
October to December ...	325,513	282,785	242,802
	948,320	823,848	769,342

The total quantity of tea, Indian and Ceylon, offered at Auction was, during :—

	1883. Chests.	1882. Chests.	1881. Chests.
January to March	199,671	151,347	127,532
April to June	136,984	112,356	80,052
July to September... ...	148,160	149,948	125,187
October to December ...	245,759	205,828	160,710
	730,574	619,479	538,481

CEYLON.

The year commenced with good quality on offer, bringing high rates; afterwards, arrivals being poor, the enquiry fell off and prices showed in favour of buyers, and it was not until the middle of the year that any decided improvement in quality took place when values soon became better and the Tea continued in demand to the close of business for the year. It is satisfactory to note that growers in Ceylon have not, as a rule, been led away to go in for quantity we think a steady adherence to the principle of moderately fine plucking throughout the Season, with the Tea packed in not more than four or five breaks or less if the out-turn is small, will prove the most profitable course for growers. The quality, owing we believe to unavoidable circumstances, has not been so uniformly good as during 1885. The Teas find favour amongst buyers and a large and increasing quantity is consumed without any mixture of other growths. For some time past Ceylon Teas have been taken or the Continent, a very satisfactory feature in the development of the Trade. The quantities offered and the average price throughout the year have been as follows—

1886 ... 101,145 Pkgs. Avr. 1s 1d. per lb.
1885 ... 58,921 „ „ 1s 3¼d „
1884 ... 15,701 „ „ 1s 2¾d. „ (1st August to 31st December only).

We would direct attention to the remarks on the 1st and 2nd pages under the heads of Sorting, Bulking, Weighing, Marks, and Size of Breaks, &c.

JANUARY.—The quality was good and in some cases very fine; prices for all makes were maintained at a high level until the end of the month, when, the selection being poor, Teas were less inquired for.

Public Sales contained 4,472 packages, against 2,364 in 1885.

FEBRUARY.—Commenced with a better inquiry, as the quality showed better, although poor invoices continued to be represented. Desirable Teas were supported at previous prices.

Public Sales contained 5,361 packages, against 2,456 in 1885.

MARCH.—The quality throughout was disappointing and except for common grades, values, in sympathy with Indian makes, were not so firm.

Public Sales contained 7,789 packages, against 3,114 in 1885.

APRIL.—The quality continued unattractive, and prices, especially for the higher grades, went decidedly in favour of buyers, Broken Pekoe being especially depressed.

Public Sales contained 4,677 packages, against 3,865 in 1885.

MAY.—Arrivals were heavy and a few invoices of attractive quality commanded attention at an advance, but inferior Teas were irregular at lower prices.

Public Sales contained 12,329 packages, against 3,871 in 1885.

JUNE.—The large offerings contained but a small proportion of desirable Teas, and consequently the averages obtained were low.

Public Sales contained 11,264 packages, against 5,901 in 1885.

JULY.—Towards the end of the month better liquoring Teas appeared, which attracted attention at firmer rates, especially for the higher grades.

Public Sales contained 11,743 packages, against 7,673 in 1885.

AUGUST.—The improvement in quality continued, and prices further hardened all round, Broken Pekoes commanding a decided advance. Inferior Teas were difficult to sell at low and irregular quotations.

Public Sales contained 15,884 packages, against 7,642 in 1885.

SEPTEMBER.—The position as regards both quality and demand remained unchanged throughout the month.

Public Sales contained 10,529 packages, against 7,522 in 1885.

OCTOBER.—Imports showed a falling off, but the offerings contained some choice liquoring Teas, which commanded very full rates. Teas without point were slow of sale.

Public Sales contained 6,616 packages, against 4,134 in 1885.

NOVEMBER.—The selection was satisfactory, and Teas found a ready sale at prices which compared favourably with Indian growths; common kinds, however, were a little affected by cheapness of Indian.

Public Sales contained 6,689 packages gainst 5,511 in 1885.

DECEMBER.—The quality continued to show improvement and high prices were obtained. The figures to end of November excited attention by reason of the great advance in consumption.

Public Sales contained 6,077 packages, against 4,868 in 1885.

CEYLON TEA.

	1886 Import	1886 Delivery	1886 Stock	1885 Import	1885 Delivery
January.....	226,000	285,000	980,000	144,000	139,000
February	394,000	235,000	1,130,000	146,000	122,000
March	399,000	317,000	1,213,000	156,000	168,000
April	705,000	316,000	1,602,000	364,000	194,000
May	693,000	429,000	1,865,000	251,000	246,000
June	624,000	570,000	1,919,000	323,000	239,000
July	881,000	766,000	2,033,000	628,000	324,000
August	814,000	818,000	2,030,000	362,000	493,000
September . ..	681,000	787,000	1,924,000	402,000	416,000
October	427,000	684,000	1,668,000	368,000	345,000
November.....	500,000	566,000	1,601,000	260,000	286,000
December.....	530,000	471,000	1,660,000	300,000	266,000
	6,874,000	6,244,000		3,704,000	3,128,000

CEYLON TEA.

	1885 Stock	Import	1884 Delivery	Stock
		Before this date Ceylon statistics were included with Indian		
January.....	550,000			
February	574,000			
March.....	562,000			
April	738,000			
May.....	738,000			
June	820,000	177,000	66,000	414,000
July.....	1,124,000	257,000	183,000	489,000
August	993,000	393,000	210,000	582,000
September.....	978,000	193,000	251,000	523,000
October	1,001,000	167,000	190,000	500,000
November	994,000	180,000	146,000	535,000
December	1,028,000	143,000	133,000	545,000
		1,420,000	1,179,000	

	Import lb.	Delivery lb.
1st June to 31st May 1884—85	2,482,000	2,047,000
Do do 1885—86	5,060,000	3,933,000
1st June to 31st Dec. only, 1884	1,421,000	1,179,000
Do do do 1885	2,642,000	2,350,000
Do do do 1886	4,457,000	4,662,000

JAVA TEA.

	Import lb.	Delivery lb.
1st June to 31st May 1883—84	3,501,000	3,452,000
Do do 1884—85	3,256,000	3,545,000
Do do 1885—86	3,849,000	3,565,000
1st June to 31st Dec only, 1884	1,800,000	2,168,000
Do do do 1885	1,888,000	2,159.000
Do do do 1186	1,985,000	2,271,000

PLANTING IN FIJI.

LEVUKA, Dec. 10th.—The weather of this year has been very remarkable. The first three months furnished three hurricanes. The next six threatened the islands with all the evils of a severe drought, and the last quarter promises to be unpleasantly remarkable for its rainfall. Over all the group heavy rains have been general, and the prospect is still very watery. In some parts more than enough has already fallen, and evil effects are following. Especially has this been felt at Taviuni. While from other parts of the group complaints were heard of the long spell of too fine weather which followed the hurricane, Taviuni continued to receive more than its average rainfall. Latterly, to this had been added an equal share of the copious general downpour, and the island has been deluged. The growth of jungle and weeds has been something extraordinary, but the root crops, yams, kumalas, &c., have rotted in the ground, and there is a scarcity of these kinds of food which will yet be more severely felt before it is relieved. From the above and other causes the cane on the Holmhurst estate has suffered severely, and the yield of sugar will be very poor. The mill commenced working late, and it is now continuing in a spasmodic fashion, crushing a few hours a day, as the labourers engaged are not sufficient to get cane to the rollers in quantity sufficient to keep them in full work. A considerable acreage has been planted up. It is reported that when crushing is over all but very few of the European *employés* will be discharged until next season for the purpose of reducing working expenses. At Selia Levu there is a large acreage of splendid cane to be crushed; but here, also, they are very backward, through the delay caused by substituting water for steam power. At Mango the rainfall has been heavy, but it has done only good. It has given a wonderful impetus to the growing crops and coconuts but as a matter of course the sudden excess of moisture reduced the density of the cane ready for the rollers, and after a few weeks's crushing it was considered advisable to stop the mill for a while. From the other parts of the Lau province the reports are to the effect that the country is looking splendid, and there is the promise of a heavy coconut crop for next season. At Ba and Ra, which are two of the driest districts in the colony, the heavy rains did not set in until the crushing was nearly over. The yield rom the New Zealand Association Company's Raiawai Estate in the first-named district has largely exceeded all expectations. This was set at 1,200 tons. Already 600 tons have been shipped away. A fortnight ago 1,200 tons were ready for shipment, and it was expected that the general yield would not be far short of 2,000 tons. The average of the cane crop has been light, not more than 38 tons to the acre; but it is the splendid density which has given the high return, and it is said that the average output has been at the rate of one ton of sugar to eight tons of cane. On this point millers are always very reticent, but the statement will bear a liberal discount, and then be a good one. At any rate there is no doubt that the returns are very satisfactory and prospects most encouraging.

Another step is to be taken which will have the effect of putting labour matters on a better footing. Legislation on this general subject ranged under three heads—Fijian, Indian, and Polynesian. The Ordinances have to a large extent been of a tentative character, and have been so multiplied by amending Ordinance and Ordinances to amend the amending Ordinances, that their name is legion. There are between 15 and 20 different laws in force affecting the relations of master and indentured servant, and it was found that to keep the run of them it would be necessary to retain standing counsel, not for, but on each estate. With a view to remedy this, the Hon. John Hill gave notice of his intention, at the last meeting of the Legislative Council, to move for the codifying of these numerous enactments, but withdrew the notice on being informed that the Attorney-General was already half way through the work.—*Argus.*

THE TEA MARKET: POSITION OF CEYLON ESTATES AND DISTRICTS.

We do not know why the returns should differ go greatly, but appended to the interesting annual review by Messrs. Wilson, Smithett & Co., we find the Board of Trade figures for Home consumption of tea, and we are glad to notice that they are far more encouraging than those we quoted from Messrs. Stenning, Inskipp & Co.'s Report. The quantities now given are:—

1884 .. 176,000,000 lb.
1885 .. 182,456,000 ,,
1886 .. 178,894,000 ,,

The average for the three years is thus 179,000,000 lb. These are the deliveries for Home consumption. For export they have been:—

1884 .. 44,611,000 lb.
1885 .. 42,036,000 ,,
1886 .. 44,413,000 ,,

The average export has, therefore, been almost exactly 44 millions of pounds, which added to the average for Home consumption give an average of total deliveries equal to 223 millions of pounds. The stock of all kinds at the end of 1886 was 109,727,000 pounds, of which 1,660,460 were Ceyon teas.

Messrs. Wilson, Smithett append to their review details, (which we shall reprint tomorrow,) in which Ceylon estates are ranged according to the average prices of their teas in 1886. Blackstone, owing to Mr. Barber's fine plucking, hard-rolling and generally careful manufacture, stands first with an average of 1s 9¼d for 20,000 lb. Agarsland, where also much importance is attached to hard-rolling, comes close behind with 12,000 lb. at 1s 9d. Loolcondura, many will be surprised to hear, who know how fine the plucking is, stands only third, with 34,000 lb. at 1s 6½d. The vast majority of the estates range over 1s and prices between that sum and 1s 2¾d, "sundry marks" realizing an average of 1s 0½d for 650,000 lb. The largest quantity against any name is opposite KAW, (three estates besides large quantities of purchased leaf,) the figures being 300,000 lb. at 1s 3¼d. This is a result of which the Manager, Mr. Megginson, may

well be proud. The next highest figures for quantity are opposite Vellaioya, 187,500 at 1s. Then we get 154,000 for Dunedin at 1s 1¼d and exactly the same quantity for Kandaloya at 1s 0½d. Mariawatte sold 137,000 lb. at an average of 1s 2¾d, Dewalakanda 136,000 at 1s 1d, and Imboolpittiya 135,000 at 1s 2d, Hope 100,000 at 1s 0¼d, Campden Hill 102,000 at 1s 0¾d and Windsor Forest 100,000 at 1s 3d. Gallamudena sold 92,000 at the fine average of 1s 3¼d, and Elston 76,000 at 1s 2d.

Messrs. Wilson, Smithett & Co. have also attempted to range the various tea producing districts, according to the averages realized by their produce. In this list (from which are excluded 650,000 lb. as "untraceable,") the comparatively young district of Bogawantalawa takes first rank with 76,000 lb. at about 1s 4d; Punduloya comes next with 54,000 at 1s 3d, while Ambagamuwa with Lower Dikoya, shows 1,130,000 at 1s 2d. Maskeliya will be put on her mettle to find herself No. 10, sharing the average of 1s 1½d with Upper Dikoya, Dimbula and Dolosbage. Badulla and Haputale begin well with 1s 2d, the same figure being against Hewahette, while Kadugannawa shows 1s 1⅞d. As the years advance it is more than probable that the relative rank of districts may be altered, but as a first attempt to classify, the list is interesting and useful.

We have no doubt planters and others interested will have criticisms to offer, when we publish the full details.

Wilson, Smithett & Co's Ceylon Tea Memmoranda for 1886.)

London, January 21st 1887.

Although the average price realised for Ceylon Tea, which we estimate at 1s 1¼d during the past year as against 1s 3½d for 1885, shows a considerable decline, yet those interested in the industry may well be congratulated on the firm hold the article has now obtained upon popular favor. The Colonial and Indian Exhibition afforded an excellent opportunity for bringing Ceylon Tea more prominently under public notice, and it is now readily admitted that the public were thus enabled to taste and appreciate the delicious flavor of absolutely pure Ceylon Tea—the majority of them, undoubtedly for the first time. This gave a great impetus to the demand for the article, and a glance at our table of Deliveries on the last page, will show how well this demand has been maintained. But that the article may not fall in the estimation of consumers, we trust that some means may be found to stop the wholesale traffic in spurious Ceylon Tea which many small and unscrupulous dealers do not hesitate to promote. The names of sundry "crack" gardens are pirated in the most shameless fashion to further the sale of the commonest China Tea, and we think it is worthy of the consideration of the Planters' Association in Ceylon to try and devise some measures to counteract this.

Complaints of loss in weight continue to be frequent; in order to avoid this, care should be taken at the factory to fill every package in a break with exactly the same amount of Tea—nominally a certain number of full pounds, but actually a ¼ lb. more to allow for any evaporation that may take place, and in order to ensure the scale being well turned. If this be carefully done the importer can guarantee that every package in each break is of an equal net weight and he will enter the goods at the warehouse for, "net-weighment;" this means that 10 per cent. only of each break will be turned out to test the accuracy of the merchant's statement, and on this proving correct the invoice weights are accepted, are so entered in the books of the warehouse, and cannot be delivered except at these weights. Should, however, a majority of the 10 per cent., in proportion to the size of the parcel, prove the given weights to vary, the whole of the invoice will be turned out, and the *tares* taken; in this process weight may be easily lost, for, should the package scale an ounce over a certain number of pounds, an extra pound is counted, and thus almost a pound a package may be lost; it is also advisable so to arrange that the weights of every chest, lead-lining, &c. may be equal and just under a certain number of pounds. We may observe that there are also frequent occurrences of gain in weight, however, and this suggests the enquiry whether planters have their scales tested and adjusted, a precaution which is continually being taken, under the superintendence of the Customs, at the London warehouse, and which would be still more necessary in a climate like that of Ceylon. In conclusion, we give an instance where a loss of nearly 2lb. a package is made under the system of "average taring." Suppose the gross weight of a chest to be 1 cwt. 20 lb. 15 oz. and the tare 19lb. 1 oz. the net weight will then actually be 113 lb. 14 oz.; the warehouse weights, will stand—gross 1 cwt. 20lb. (for in weighing gross the importer is not credited with the odd ounces) and tare 20lb., giving the net weight as 112lb. thus leaving an actual loss of 1 lb. 14 oz.

A great many "Factory Bulked" Teas still arrive in a condition requiring re-bulking here. We only advocate factory-bulking on estates where ample space is available. Machine-packed invoices from Kintyre have come under our notice where the appearance, size and color of the leaf was perfectly even, and bearing unmistakeable evidence that a thoroughly even pressure had been exerted in the process of filling.

Invoices have been much more satisfactorily graded of late. Small parcels are now frequently sent home in an unassorted shape, instead of being split up into several small breaks. We do not, however, advocate the wholesale manufacture of unassorted Teas on large yielding estates, but we think that the proportion of Broken Pekoe should be comparatively small, and that of the thickest and finest description.

Summary of Ceylon Tea sold at public auction in London between January 1st and December 31st, 1886. Estimated amount in lb. and average prices realised:—

	About lb.	About per lb. s	d
Blackstone	20000	1	9½
Agarsland	12000	1	9
Loolcondura	34000	1	6½
Elbedde	20000	1	5½
Mooloya	17500	1	4½
Chapelton	15000	1	4
St Leys	8000	1	4
Tillyrie	11500	1	4
Gorthie	8000	1	3½
KAW	300000	1	3½
Agrakanda	5000	1	3½
Gallamudena	92,00	1	3½
Hardenhuish	32500	1	3½
Meanagalla	30000	1	3¾
Calsay	25000	1	3
Deanstone	16500	1	3
Errol	11000	1	3
Gallebodde	78000	1	3
Gingranoya	8000	1	3
Oyoca	45000	1	3
Rookwood	20000	1	3
St. John Del Rey	9500	1	3
Windsor Forest	100000	1	3
Bogahawatte	9000	1	2¾
Dedugalla	14000	1	2¾
Dunsinane	24000	1	2¾
Glassaugh	6000	1	2¾
Hayes	37000	1	2¾
Heeloya	11000	1	2¾
Mayfield	13500	1	2¾
Wallaha	6000	1	2¾
Alton	15500	1	2½
Barcaple	40000	1	2½
Mariawatte	137000	1	2½
Norton	13000	1	2½
New Caledonia	7000	1	2½
Pundaloya	19000	1	2½
Tunisgalla	8500	1	2½
Venture	5000	1	2½
Barnagalla	43500	1	2¼
Leangapella	21500	1	2¼
Lankapura	6000	1	2¾
Peradenia	5500	1	2¼
Adams Peak	59000	1	2
Bunyan	31000	1	2
Dalleagles	14500	1	2
Darrawella	31000	1	2
Diagama	22500	1	2

	About lb.	About per lb. s d
Elston	76000	1 2
Fordyce	29000	1 2
Glentilt	34000	1 2
Great Western	33500	1 2
Goatfell	16500	1 2
Havilland	31000	1 2
Imboolpittia	135000	1 2
Lindoola	46000	1 2
Mipitiakande	62000	1 2
Morar	8000	1 2
Mottingham	13000	1 2
Panmure	12000	1 2
Penrhos	10000	1 2
Strathellie	67000	1 2
St. Vigens	11500	1 9
Torwood	26000	1 2
Arapolakande	56500	1 2¼
Conon	5000	1 2¼
Downside	14500	1 2½
D K E	7500	1 2¼
Longford	7500	1 2½
St.Helens	41000	1 2½
Anningkanda	35500	1 2½
AEW	12500	1 2½
Craigie Lea	8050	1 2½
Culloden	50000	1 2½
Doronakande	32500	1 2½
Erlsmere	11000	1 2½
Glencairn	8000	1 2½
Glengariffe	20500	1 2½
Kintyre	66500	1 2½
K E W	16500	1 2½
Loonoogalla	6500	1 2½
New Forest	5500	1 2½
Penylan	75000	1 2¾
St. Leonards	5000	1 2¾
Tommagong	8000	1 2¾
Tippany	8500	1 2¾
Udabage	7000	1 2¾
Ythanside	9000	1 2¾
Atherfield	30000	1 2¾
Dunedin	154000	1 2¾
Helbodde	47000	1 2¾
Indurana	53000	1 2¾
Kabragalla	17500	1 2¾
Norwood	11000	1 2¾
Paruselle	14500	1 2¾
Summerville	35500	1 2¾
Warwick	6000	1 2¾
Abbotsford	53000	1 3
Avisawella	21500	1 3
Becherton	11000	1 3
Bitterne	16000	1 3
Crurie	9000	1 3
Cyprus	10000	1 3
Dewalakanda	136000	1 3
Eastland	15000	1 3
Ernan	20000	1 3
Goorookoya	31000	1 3
Gneiss Rock	30000	1 3
Ivies	13000	1 3
J, CC in triangle	7000	1 3
Kellie	37000	1 3
Luccombe	45500	1 3
Laxapana	30000	1 3
Middleton	9000	1 3
Sheen	12000	1 3
Scarborough	31000	1 3
Templestowe	7000	1 3
Theberton	22500	1 3
Waltrim	20000	1 3
Abbotsleigh	7000	1 3¼
Ardross	45000	1 3¼
Binoya	14000	1 3¼
Campden Hill	102000	1 3¼
Elkadna	39000	1 3½
Kaluganga	13000	1 3½
Massena	11000	1 3½
Moray	37000	1 3½
Rangbodde	18500	1 3¾
Wayveltalawa	42000	1 3¾
Bellongella	6000	1 4
Beaumont	8000	1 4
Comer	26000	1 4
Emelina	26500	1 4
Epplewatte	7000	1 4
Ferndale	7500	1 4
Gangwarily	8000	1 4
Hoolankanda	7500	1 4
Kandaloya	154000	1 4
Labookellie	41500	1 4
Lavant	57000	1 4
Meddecombra	35000	1 4
Mukeloya	7000	1 4
Nilloomally	15500	1 4
Oliphant	44000	1 4
Orwell	38500	1 4½
Penrith	9000	1 00
Taprobane	5000	1 4½
Woodstock	27000	1 4½
Wattekelle	5000	1 4½
Yellangowry	28500	1 4½
Castlemilk	11000	1 4½
Columbia	11000	1 4½
Damblagolla	13500	1 4¾
Elfindale	30600	1 4¾
Gavatenne	6000	1 4¾
Haddington	11000	1 4¾
Hope	110000	1 4¾
Hunasgeria	16500	1 4¾
Kowlahene	13000	1 4¾
Laxapanggalla	16500	1 5
Mahacudagalla	11500	1 5
Ooonoonagalla	67000	1 5
Dalhousie	9500	1 —
Farnham	10000	1 —
Frogmore	7000	1 —
Glenalla	32000	1 —
Hatherleigh	5000	1 —
Mahalla	6000	1 —
Morton	25500	1 —
New Peradeniya	16000	1 —
Pooprassie	18500	1 —
Parragalla	7500	1 —
Sogama	83000	1 —
Sembawatte	96000	1 —
Upcot	7000	1 —
Vellaioya	187500	1 —
Yaha Ella	7000	1 —
Elchico	7000	0 11¾
Sinnapittia	31000	0 11¾
Springwood	21500	0 11¾
Amblakanda	8500	0 11½
Delta	6500	0 11½
Kelani	30500	0 11½
Oodewelle	9000	0 11¼
Rangwell	7000	0 11½
Broad Oak	6500	0 11¼
Coolbawn	18000	0 11¼
Koladenia	25000	0 11
Lauderdale	20000	0 11
Chertsey	6600	0 10¾
Doteloya	35000	0 10¾
Lebanon, Middleton and Leangolla	20000	0 10½
Tymawr	6000	0 10½
Kurulugalla	13500	0 10¼
Morningside	5000	0 10¼
Hangranoya	10000	0 10
Hazlewood	12000	0 10
Koorococoodie	6000	0 10
Sundry Marks	650000	1 0½

Estimated Yield and average Price realized on the different Ceylon Tea Districts, compiled from the Public Auctions held in London between Jan. 1st and Dec. 31st, 1886 :—

	lb. about.	Av. price per lb. about. s. d.
Bogawantalawa...	76,000	1 4
Pundaloya	54,000	1 3
Ambegamuwa, with Lower Dikoya ...	1,130,000	1 2
Badulla and Haputale	7,000	1 2
Hewahetta (Upper & Lower) ...	285,000	1 2
Kaduganawa	177,000	1 1¾
Dikoya (Upper)...	273,000	1 1¾
Dimbulla (Upper and Lower ...	350,000	1 1½
Dolosbage	506,000	1 1½
Maskeliya	594,000	1 1½
Yacdessa	457,000	1 1¼
Kalutara	203,000	1 1¼
Kelani Valley	886,000	1 1
Nuwara Eliya with Uda Pussellawa and Maturata...	101,000	1 1
Saberagamua	304,000	1 1
Matale with Hunasgeria, Kellebokka, Knuckles, &c.	290,000	1 0¾
Pussalawa and Kotmale	270,000	1 0½
Ramboda	61,000	1 0½
Hantana and Nilambe	51,000	1 0½

N.B.—Untraceable marks to the extent of about 650,000 lb. are not included in the above estimate.

TEA MACHINERY AND PATENTS.

Of course no man whose rights are invaded or his interests injured should be debarred from his legal remedy, but one is naturally inclined to ask what patents are good for and the investigations on

which patents are granted, if they leave the door for litigation as wide open as ever. The process with regard to tea rollers has been curious, if the facts as we apprehend them are correct. Messrs. Kinmond and Jackson were rival inventors in India and the High Court of Calcutta decided that Mr. Jackson had invaded Mr. Kinmond's patent. Mr Jackson compromised the matter with Mr. Kinmond by a money payment, and went ahead, until he gave tea planters the "Excelsior" roller. Then by a kind of poetic justice Mr. Jackson had to take action against invasion of his patent rights, being in this case successful. Then, we are told that Mr. Thompson's "most peculiar" Challenge Roller embodied a principle which Mr. Kindmond invented but did not patent here. What Mr. Thompson took over from Mr. Kinmond, Mr. Barber transferred from Mr. Thompson's Challenge, and challenges Mr. Thompson to follow up his advertisement by an action. Like a man who was recently shot dead in America, Mr. Thompson has "made no remark." While Mr. Jackson was prosecuting an invader of his rights, Messrs. Law and Davidson actually obtained a patent for a new roller and as proof of their good faith the fact is mentioned that they requested Mr. Jackson's agents to manufacture their machines They found they had gone into the lion's den, for *they* also are to be prosecuted for invading Mr. Jackson's patent. Finally and lastly Mr. Kinmond has again, in defiance of the proverb that "a rolling stone gathers no moss" gone in for another roller, which we trust will not generate such fearful heat as his former machine did, when we witnessed its performances on Dunedin. There is a full but not quite accurate description of the new Kinmond roller in the local "Times." We have been told that there is incorrectness in the addition of the words "or rolling surface" to the following passage :—

It seems to differ from the present Jackson's roller principally in the motion imparted to both upper and under rolling surfaces. This motion is not transverse, but rotatory, the pressure being obtained, as in Jackson's, by means of a loose weight in the upper jacket.

We are also told that ignorance of engineering principles is evident in the following passage :—

One would suppose that, when full power was applied, the rolling surfaces would move out at a greater rate than there was any necessity for, since a reduction in power to half still generates sufficient pace to give the leaf a good roll.

The errors in the local "Times" description do not of course affect the merits of Kinmond's new roller, regarding which our contemporary has been told that

The patentees are sanguine that they have hit upon a roller destined to eclipse all others at present in use here or elsewhere, and this can only be proved by time and experiment. We believe Mr. Hardengue is about to erect another of these machines on some estate in Dikoya, [one being at work on Lebanon.—Ed. C. O,] the name of which has not reached us, placing it alongside another of Jackson's rollers. The fact seems to us to be that Messrs. Marshall & Sons, the makers of Mr. Jackson's machines, and Messrs. Robey & Co., the makers of Mr. Kinmond's machines, compete keenly with one another, and the latter are anxious to show that they can turn out as well devised and well executed machines as the first-named firm have undoubtedly done. Of Mr. Jackson's machines tea planters in Ceylon have now had a lengthened experience in practical working, and, if the patentees of the Kinmond-Richardson intend to beat either the Excelsior, or the Universal rollers in public estimation, they have a task indeed before them.

So far for the contest as between the giants. As to the case of Jackson against Law and Davidson we are assured that the defendants feel assured they can successfully resist the claim made. It is added that Mr. Jackson must inevitably bring a fellow case against the patentees of the Kinmond-Richardson roller, as it appears to embody the very feature Messrs. Law and Davidson are accused of taking over, but which accusation they hold is groundless. Such seem to be the facts and while we, on behalf of the public appreciate the ingenuity devoted to improved tea machinery, by so many ingenious men, we can only trust that the right may prevail and that good profits to patentees and manufacturers may be found to be compatible with moderate prices.

CEYLON PLANTERS' ASSOCIATION: CINCHONA STATISTICS OF JAVA.

Planters' Association of Ceylon,
Kandy, 8th February, 1887.

The Editors, the "Ceylon Observer," Colombo.

Sirs,—I beg to enclose for publication, and to invite attention to, copy of further letters received from Government on the subject of Cinchona Statistics and Cultivation in Java. I am, sirs, yours faithfully,

A. PHILIP, Secretary.

Colonial Secretary's Office,
Colombo, 20th Jan. 1887.

The Secretary Planters' Association, Kandy.

Sir,—With reference to my letter of the 13th ult., I am directed by the Governor to forward for your information the annexed copy of a letter from the Governor General of the Netherlands India.—I am, &c,

(Signed) H. C. P. Bell,
for Colonial Secretary.

Batavia, 14th Dec. 1886

No. 24, Enclosure 1.

To His Excellency the Governor of Ceylon.

Sir,—With reference to your Excellency's letter of the 26th August last, I beg to enclose a report on cinchona cultivation in Java, which, whilst treating upon the different questions put by your Excellency contains some further informations regarding cinchona planting in these parts, which I venture to believe will likewise prove of interest.—I have, &c.,

(Signed) C. Van Rees.
Governor General of Netherlands India.

Report on Cinchona Cultivation in Java.

I.—Which kinds of cinchona appear to have the best chance of success and which descriptions are chiefly grown? For cinchona cultivation only the following species deserve consideration:—

(a) *C. Ledgeriana.*—In regard to type, this species stands foremost as it contains the highest proportion of quinine (ripe barks contain from 6 to 12 per cent quinine) and in the bark of which no cinchonidine or even traces of it are to be found. In comparison with the *C. Succirubra* the *C. Ledgeriana* is of an extremely slow growth and therefore more particularly adopted to fertile and specially to virgin forests' soils. The altitude at which *C. Ledgeriana* is being cultivated with success, varies from 3,500 to 5,000 Rhynland feet above the sea level. An elevation of some 4,000 feet is deemed the most favourable to cultivation, unless in very moist climates in which at an altitude of about 3,500 feet the growth is strongest.

(B) *C. Succirubra* from which highly valuable barks, best fitted for chemists' purposes are obtained. The ripe barks only contain a limited proportion of quinine, averaging about 1 per cent against 4 per cent of cinchonidine. These barks, therefore, are not so much used for sulphate of quinine manufacture, unless the McIvor process has been adopted, by which a new bark containing from 1½ to 4½ per cent quinine is generated. McIvor's method, however, is gradually finding more and more antagonists, and does not answer expectations because: 1stly, its application (partial stripping of the tree) requires a good deal of labor and most minute superintendence; 2ndly, it is highly injurious to the development of the tree; 3rdly, mossing the partially stripped tree attracts all kind of insects causing much damage and sometimes the trees to die,

The value of succirubra barks is not determined by the proportion of alkaloids they contain, but exclusively by their outward appearance. Undamaged thick quill barks, doubly rolled, if possible 1 meter in length, of a silver-white colour and covered with all kinds of moss and inside of a dark-red colour deemed the best. It requires from 15 to 20 years to obtain such barks and this leads to the conclusion that they will always command good prices on the European markets. It is true that their quill-barks of less length and also root-bark of C. Succirubra yield an article still highly valued by druggists, but it is obvious that owing to the rapid growth of the C. Succirubra the market will soon get overstocked with inferior bark of this kind.

(C) *Hybrids of C. Ledgeriana and C. Succirubra.*—These hybrids differ from C. Ledgeriana by their growth, which, if not fully equal to that of C. Succirubra, at least comes very near to it. Among these hybrids, some specimens may be found containing 10 per cent quinine with more or less cinchonidine. Great extension is given to the cultivation of these hybrids and there is good reason for it as they yield an important quantity of bark for the manufacturers' market within a comparatively short time. And if it might appear that owing to their composition they were less fit for manufacturing purposes, they will always prove valuable to chemists.

II. What is the area under cinchona cultivation and the average production of bark per acre?—No accurate information is to be obtained as to the acreage of cinchona. At all events the number of cinchona plantations is not likely to increase, confidence in cinchona cultivation being shaken by the constant fall in prices. Existing plantations, however, will scarcely fail to bring all the land granted in hereditary lease under cultivation. According to incomplete and rather untrustworthy information supplied by planters the yield of private plantations in Java for 1883, 1884 and 1885 is set down at 379,728, 667,894 and 659,492 *Amsterdam* pounds respectively. (125 Amsterdam lb. equal to 136 lb. English.) The Government plantations extend over about 1,000 Bahoes or about 1,750 acres, and now yield a product of nearly 500,000 *Amsterdam* lb., which may be gradually increased to about one million, without any noteworthy extension of the present acreage but merely by the high culture being resorted to. As to the yield per bahoe or per acre the following remarks in regard to the cultivation of both C. Ledgeriana and C. Succiruba may prove of use:—The price of manufacturer's barks is determined by the yield in quinine. Barks containing 1 per cent quinine (calculated for air dried bark) yield 1·346 per cent sulphate of quinine. The accessory alkaloids being of but little value are left out of account. In the trade the price of manufacturers' bark is calculated per unit viz., per pound and per cent of sulphate of quinine, which may be extracted therefrom. If that unit (as according to the latest market reports) be *c.* 0·15, barks with 1 per cent quinine will realize 1 x 1,346 x 0,15 *c* 0·20 per pound or half kilogram. Now *c* 0·20 per half kilogram is already very near to the limit at which bark can be supplied to home markets as it covers the cost of harvesting, drying, packing, shipping and sale in *Europe*, or in one word, the expenses of laying out plantation, however, of management, taxes and keeping up the estate in general, are left out of account. It is evident that with a rising market inferior barks may cover the collecting expenses, whereas they will be left on the plantations on prices falling, and this will make it clear that the production per bahoe or per acre is chiefly governed by the market value or the price per unit assumed. If it falls, the yield decreases, whereas on its rising crops at once become more plentiful. This also shows that there is no very marked difference between barks for the manufacture of sulphate of quinine and those for chemists' use. For if the latter are no more up to the mark owing to superabundant production, they may still be perfectly suited for wholesale manufacture of sulphate of quinine, as for instance damaged succirubra quill barks of unequal lengths without lichens and without silver white colour containing about 1½ to 2 per cent. quinine and succirubra root, bark yielding 1 per cent quinine. As to barks for the druggists' market their production per bahoe or per acre is determined by constantly increasing requirements. With a falling market the collection of branches, twigs and of the upper parts of the stem does not cover cost. These will, therefore, be abandoned on the plantations and only the finer barks selected for shipment. The following figures may be considered as minima of production:—Virgin soils subjected to high culture may yield per bahoe in Ledgeriana bark, after 3 years 300 lb. averaging ½ per cent in Quinine yield.

„	4	400	„	„	2	„ „
„	5	500	„	„	2½	„ „
„	6	600	„	„	3	„ „
„	7	700	„	„	3½	„ „
„	8	800	„	„	4	„ „
„	9	900	„	„	4½	„ „
„	0	1000	„	„	5	„ „

per acre (taking the acre at 6-10ths of a bahoe) after from 3 to 10 years 180 to 600 lb, averaging from 1½ to 5 per cent quinine, such productions may be obtained merely by clearing and thinning out no more than absolutely necessary without injury to the density of the plantations which, after felling and uprooting still may yield a return of at least 4,000 lb. per bahoe or 2,400 per acre containing 5 per cent quinine after ten years. It is to be observed that no accurate information is to be obtained as to the production of Ledgeriana bark, the collection of twig barks having considerably decreased under the influence of low prices, whereas felling type Ledgeriana plantations on the Government estate is still out of the question. It is even more difficult to procure information as to the return per bahoe or per acre of succirubra barks. Production is entirely ruled by the magnitude of supplies to home markets and in connection herewith by the increasing difficulty in meeting requirements. In addition to this the price of the unit for manufacturers bark has also to be taken into consideration, because as stated above, in certain cases, also a portion of succirubra barks is also taken for making sulphate of quinine. A couple of years ago the yield of succirubra plantations after the third year already was not an unimportant one. Actually harvesting has been postponed till the 5th or 6th year and even then the crop is a small one. Under favourable circumstances the following figures may be assumed as minima of succirubra production:—

After	the	5th	year	300	Amsterdam	lb. per bahoe
„		6th	„	400	„	„ „
„		7th	„	500	„	„ „
„		8th	„	600	„	„ „
„		9th	„	700	„	„ „
„		10th	„	800	„	„ „

or after from 5 to 10 years from 180 to 480 lb. per acre and this result may be secured merely by uprooting stiled and not sufficiently developed trees. The object is to retain robust trees in order to obtain those thick and long quill barks of a fine appearance which are always in such good request. The production to be obtained by felling plantation from 15 to 20 years old is not to be stated with accuracy but may be safely set down at 5,000 lb. per bahoe or 3,000 per acre. Planting hybrids of C. Ledgeriana and C. Succirubra has only been recently introduced and therefore no figures of production can be given.

III.—Is the yearly product regularly exported or stored in anticipation of an improved demand?—As far as known it is customary in *Java* immediately to ship off the bark to *Europe* and have it sold as quickly as possible.

IV. What will be the quantities for export during the next years?—The crop at the Government plantation is estimated at fully 450,000 lb. in 1886, 500,000 lb. in 1887 and 550,000 in 1888. It is very difficult to frame an estimate of private production, but it may be safely assumed as constantly increasing. The course adopted at the Government estate of promoting as much as possible the growth of robust cinchona trees, by the application of

high culture is universally imitated. Much importance is attached to obtaining dense plantation so as to check weeds as much as possible. To secure this end the trees are planted at very small distances into the unbroken soil 4 × 4. Rhynland feet may be taken as minimum distance. The plantations having densely grown up, thinning out is commenced with by uprooting stifled trees and trees about to be stifled, or merely by cutting twigs if it might appear that the open space left by the tree being felled would be too large. "Early, frequent and moderate harvesting" may be taken as a rule. This mode of working has proved in the long run to be the most profitable one to planters, because it requires but little care in keeping up plantations and leaves the trees to develop powerfully and undisturbedly. On production falling off by thinning out, felling of the whole plantation will have to be resorted do. Barks are generally sun-dried, owing, however, to the damp climate in which estates are situated, drying kilns are gradually getting into use.

GUM LEAVES FOR DISEASED FOWLS.—A correspondent writes to the *Town and Country Journal* that there is a remedy for the ills of the poultry-yard always at hand in the gum trees around it. He says:—"For diarrhœa, dysentery, and cholera in fowls, get a quantity of eucalyptus leaves (white or blue gum; I have used both) Dry the leaves sufficiently to make them brittle, crush, and make into pills with the aid of a little bread or dough. Put as much of the powder (*i. e.*, crushed or powdered leaves) as you can lift with a shilling into each pill. Give one to each fowl affected, and if necessary repeat the dose next day. I have not had a single death amongst my fowls since I used the foregoing remedy. I lost seventeen in two days with cholera, and the four I saved out of the twenty-one I had, could not stand when I gave them the pills. They are now fine healthy birds. I have recommended the remedy to several people, and in no case has there been a single failure. I lost at the same time a collection of Australian parrots from the same complaint, and it was by observing a flock of parrots on the white gum tree that I found out the remedy. I have not lost a single parrot since. I give any parrot ailing a little powdered leaf in a tube, inserting one end into the throat of the bird, and blowing the powder into it. Put a few leaves into the cage for them to eat. Finally I may add that I have taken a large pill, composed of the blue gum for a very severe attack of dysentery, which proved effectual, and the best remedy I have ever used. I have been a severe sufferer. I think the eucalyptus is Nature's remedy for the foregoing complaints, and is worth trying."—*Queenslander.*

AGRICULTURE AND PLANTING IN KWALA LUMPUR AND KLANG—Quite close to the town lies the property of the "Selangor Sago and Paddy Company," a block of land six thousand acres in extent; the land appears to be suitable in every respect for the cultivation proposed, but it is no secret that the estate has been dreadfully mismanaged, and that its prospects are not very bright. Arab gentlemen in general have many admirable characteristics, but they have yet to make their mark as successful managing directors of public companies. There appears to be a good deal of young sago on this plantation, but I saw no paddy. Another enterprise under native management is the plantation of about a thousand acres belonging to the Datu Dagang who conducts his business on truly oriental and patriarchal principles. He has attracted some hundreds of Javanese to settle on his land by offering them each a house and a plot of land plus forty dollars per annum in hard cash, in return for which they have to plant up his estate, all crops, except those grown in their own vegetable gardens, being the property of the Datu; the system seems to work very well, the Javanese, who did not appear to me to be working any harder than was good for them, are quite contented, and as for the Datu, although he does not expect to see any speedy return for his money, as he thinks it will pay best to principally plant fruit trees which will have to be in the ground for some years before they bear a crop, yet he is convinced that in the long run it will become a very valuable property, and says that if he does not live to get his money back, it will make a very good provision for his children. I greatly regret that I had not time to visit Mr. Stephenson's pepper plantation which has frequently been described to me as being a very successful and profitable enterprise; I rode over Mr. J. G. Davidson's gambier plantation, about which, however, it is difficult to say anything of much value, as the plants are very young and the place is terribly overgrown with lalang and weeds of all kinds, but for plants less than a year old, grown under such circumstances they looked very well; and clearing for pepper planting is in progress on this estate. I forgot to mention that there is a steam saw mill a little way out of Klang, belonging to the ubiquitous firm of Hill and Rathbone. The revenue for the district of Klang during the first half year of 1885 was $62,803, and since then the duties on oil, rice, and tobacco have been abolished, in spite of which judicious concessions the revenue for the first six months of the present year was $78,736 or an increase of $15,935, a most gratifying result which clearly shows what progress the country is making. Mr. Turney, like Mr. Syers, has acquired the art of managing the natives and getting them to do what is wanted of them without any bother or trouble. —*Straits Times.*

CEYLON TEA ADVERTISING.—A planter writes: —"I send you a circular being distributed in Aberdeen. The "*unwashed Mongolian*" is very fetching!" The main parts of the circular are as follows:—

CEYLON TEA! CEYLON TEA!! CEYLON TEA!!!—Having just arrived from Ceylon, where I was for several years superintending the cultivation and manufacturing of Tea, I have decided to open a business solely for the sale of *Pure Ceylon Tea*, importing it direct from the factories, so as to enable me to put before the public the pure article at lowest possible price. In Ceylon, Tea grows from an elevation a little above sea level up to 6,000 feet, and according to the height where the leaf is grown and manufactured so is its strength and flavour. Knowing the altitude of most of the estates in the island, I will be able to buy Teas so as to make a blend comprising both Strength and Flavour. CEYLON.—In the minds of the British public, the name has been chiefly associated with the production of Coffee, but now that Coffee in many districts has almost entirely collapsed the Planters have turned their attention to the cultivation of Tea, and, with their characterstic perseverance, are turning out an article, such as their Coffee was, *The Finest in the World.*

All Ceylon Teas are cultivated and manufactured under personal European supervision, and with the highest-class machinery to be had, packed on and shipped direct from the estates, which insures consumers getting the pure, clean article. China and Japan Teas are mostly cultivated in small patches by peasantry, who gather the leaves and prepare the Tea in their huts in a very unfastidious manner. Petty dealers hawk the country, buying up these small quantities, and selling to larger dealers, who manipulate and sell to merchants. Did the people thoroughly understand the difference between British-grown Tea —such as Ceylon and that of China or Japan, it is certain that those who could get the pure, clean machine-prepared leaf, which is turned out from the Planters' factory, would never touch the far from pure article prepared by the hands and feet of the unwashed Mongolian. Ceylon Tea is the most economical (in so far that one pound will go as far as 1½ pounds of China), Pure, Wholesome, and Pleasant. Purchasers are cautioned to see that they get the genuine article. Every lb. sold by me is guaranteed PURE CEYLON TEA.

The outside pages of the circular show a very fair engraving of "a Ceylon Tea Estate and Factory" and "The Interior of a Ceylon Tea Factory."

MANILA NEWS.

(*Translated for the Straits Times.*)

The devising of a machine for preparing Manila hemp, which has fruitlessly been exercising the wits of successive inventors, has apparently been solved by Don Abelardo Cuesta. The invention since it was first hit upon, has been improved upon materially, and is based on a principle which only needs to be fully applied to command success. To admit of the Philippines progressing satisfactorily, the present method of preparing hemp must be discontinued within a few years. It is destructive to the article under notice, and turns out an unsightly product. In these days of machinery to economise labour, it is certainly high time to improve the preparation of hemp, which, hitherto, has not shared in the march of industrial advancement.

The *Comercio* quotes from a Cuban newspaper a paragraph announcing that a scientific trial was about to be made there of an apparatus invented by Senor Aycart, who, so it is said, has solved the tough problem of perpetual motion, which has hitherto defied the ingenuity of many aspirants for inventive fame. It is said the invention took forty years to reach perfection, and can develop power equivalent to that of ten horses. The simpleness of its construction and mechanism is wonderful &c., &c. The etceteras cannot fail to strike one as evidences of mistrust. The discovery of perpetual motion would indeed be a wonder. It would prove to be the most thoroughgoing revolution ever carried out. The world would become in that case quite transformed. Businesses now yielding high profits would prove ruinous altogether. Others now unprofitable would turn out to be inexhaustible mines of wealth. Probably, however, this invention will go the way of all previous attempts to solve this knotty problem.

COMMERICAL SULPHATE OF QUININE.

It appears to be the fate of pharmacists that they should occasionally be startled into wakefulness regarding the purity of the drugs they handle. Fortunately the rude awakening seldom proceeds from without, it generally being the case that dwellers within the camp cause the commotion. Quite recently we have had a case in point in reference to the quality of European sulphate of quinine. Dr. de Vrij, the veteran quinologist, in a paper published in this Journal (May 1, page 378), stated that the quinine sulphate prepared by English, Dutch, French, and German manufacturers contained cinchonidine sulphate varying in extent from 4·73 to 12·448 per cent. In this respect English quinine was placed in a bad position undoubtedly, but in respect of the fact that our home-made quinine contains much less water than that which comes from the Continent, its actual quinine content is greater than that of any other production. So far we take Dr. de Vrij's figures as they are given, for it is not our object in this note either to contradict or to defend them. A few days after the publication of the paper in question, Dr. de Vrij gave a *résumé* of it before the Paris Pharmaceutical Society (*The Chemist and Druggist*, May 8, p. 404), and, as a result thereof, the Society at a subsequent meeting appointed a committee to experiment with the Codex test, which was impugned, and to check as far as possible Dr. de Vrij's alarming statements. The French Codex text is a modification of Kerner's test, a modification in so far as the exact temperature at which the test is to be performed has been unintentioonally omitted. This test of Kerner's is an old one, comparatively, and has been adopted in the German as well as in the French Pharmacopœia, and with, slight modifications in the United States Pharmacopœia. Its application is simple; 2 grammes of the quinine under examination are agitated and macerated in 20 c.c. of distilled water at 15° C. for half-an-hour; 5 c.c. of the solution are then filtered off and cautiously mixed with 7. c.c. of 10 per cent solution of ammonia, when a clear solution should be obtained. The principle of the test is also simple; firstly, the sulphate of quinine alone gives a precipitate soluble in excess of ammonia, or, more correctly speaking, in the ammonia and ammonium sulphate which is formed, and no other salt of quinine responds to the test. Secondly, cinchonidine sulphate—the body which the test is mainly designed to detect—is about six times more soluble in plain water than is quinine sulphate, consequently a small proportion is made apparent, and its hydrate, or ammonia precipitate, is quite insoluble in excess of the re-agent; therefore by suitable means the insoluble alkaloid may be separated, weighed, and the percentage of cinchonidine so determined approximately. The French committee, in addition to working with this test, repeated the polariscopic test used by Dr. de Vrij, with the result, as stated in our last week's issue, that they reported through their convener, M. Jungfleisch, that commercial quinine sulphate contains 8, 10, 12, and sometimes as much as 16 per cent of sulphate of cinchonidine. They also corroborate Dr. de Vrij in his statement that the light or bulky quinines contain most cinchonidine.

These facts are by no means new, and have been pointed out repeatedly by quinologists. Our own Pharmacopœia permits 5 per cent of impurity in sulphate of quinine, and gives an excellent test whereby that, or less or larger, amount may be detected and separated. Absolute purity, though obtainable, is not advisable or practicable, owing to the cost of producing a salt of the kind.

In the the course of his statement before the Paris Society, Dr. de Vrij mentioned another simple test, which is due to him, and which may be readily applied according to Mr. David Howard's modification. It is as follows:—Dissolve 10 parts of quinine sulphate in 9 parts of acid, sulph. dil. B.P., and 15 parts of water. Allow the acid and sulphate of quinine to crystalise and drain off the mother liquor; wash the crystals with a little water, and then shake the liquor with ether and ammonia. It is necessary to keep in mind when applying these tests that cinchonidine will be found; it is only as to its amount that a question arises, and on this point we have sufficient faith in our manufacturers to feel that retailers will be satisfied. —*Chemist and Druggist.*

SOME FACTS ABOUT TODDY.

The correspondent who has been supplying us with accounts of the peculiar temperance movement in this Presidency sends the following facts about toddy from Gujerat:—

Toddy comes from nearly every kind of palm tree, and is simply the extracted juice or sap. In these districts it is chiefly derived from the coconut, date, and brab palms. The coconut is supposed to yield the best, but is usually tapped only every second year. The fruit and flower stalk is first well bruised and then cut, and the toddy exudes freely. The same process is carried on with respect to the brab tree also. As to the date tree, an incision is deeply cut into the trunk of the tree close into the tuft of leaves at the top, from whence the juice flows. Fastened to the top are small earthen chatties or jars to hold the liquid. These are usually emptied morning and evening. The usual yield from a brab tree is from sixty to one hundred and twenty gallons. It seems almost incredible that such a large amount of liquid should flow through the trunk of one of these trees, and that after all this has been taken away, the tree should seem to thrive as well as if it had not been touched. The fruit of the brab tree is a glutinous substance of little or no value. The date tree in this country yields no marketable fruit. The coconut is very valuable, even if it yields no toddy, on account of the fruit.

The men who collect the toddy are called Bundaries. The same man however, will not usually tap, or collect from different kinds of trees. Besides this, each caste, if they may be called castes, has a different manner of climbing the tree. The coconut bundarie, for instance, has notches cut in the tree from bottom to top, to assist him in his ascent. With a strap around his body and the tree he fearlessly walks up the most slender and lofty, apparently as easily as

up a ladder. While in Rangoon a few years ago, we watched one climb a tree growing out of the base of the great Pagoda and leaning for over the edge, so that had he made a slip he would have fallen hundreds of feet to the bottom of a precipice. His danger almost caused our blood to chill, and for days the sight was deeply impressed on our minds. The risk was exceedingly great for the small amount of value received in the little toddy procured. The date tree climbers have no need of notches as the cast off branches of the tree leave it sufficiently rough to hold their feet. But we have often wondered how one could possibly reach the little chattie fastened many feet high in the green top of the smooth barked brab tree. We have been in this country over ten years, and only the other day was our curiosity on this matter satisfied. It was simplicity itself, yet very curious. The bundarie takes a small coil of rope the strands of which are not much thicker than rope yarn, and makes it into a short loop of many strands. This is not more than eighteen inches long. In this loop he places his ankles. It serves to hold his feet together as he places them against the trunk of the tree. A similar loop, a little longer, he places around the tree and around each wrist. The arrangement allows him the fullest use of his hands, and enables him to firmly hold the tree. Thus he is equipped for a journey to the top of the tallest and smoothest. As he ascends he appears like a huge frog springing up the tree. To descend, he has only to loosen his grip, and he comes sliding rapidly to bottom. His feet are worn thick and hard in great ridges. Of course their knives and other implements, and a large chattie, are fastened to a strap around their waist.

This toddy, fresh from the tree, has a sweet, pleasant, and slightly aromatic taste. It is said to be healthful and non-intoxicating. It soon ferments, however, when it becomes slightly intoxicating. Most of the natives prefer the fermented toddy, but even this is so little impregnated with alcohol that it takes from a quarter to half a gallon to make a man top-heavy. If it were not for the formation of an appetite, that toddy cannot satisfy, and the waste of money in its use, there could be little said against it; but these are sufficient reasons, we think, for any people to wholly abstain from this the least harmful of intoxicants.—*Madras Mail.*

SUGAR-PLANTING IN FIJI.

The New Zealand Sugar Company's new mill on the Ba River made its first start on Monday, the 12th inst. The concern is an offshoot from the Colonial Sugar Refining Company, which has its Fijian headquarters at Nausori, on the Rewa River. But in the Ba venture there is also a large amount of New Zealand capital invested by shareholders having an interest in it alone. The prosecution of this enterprise has opened up for cane culture one of the most important districts of the colony. The river itself, the mouth of which is on Viti Levu, about 80 miles from Levuka and 120 from Suva, is the second largest in the group. It is inferior only to the Rewa, and it has the advantage of greater depth. At half-tide the passage is open for craft ranging up to 80 tons, and once over the flats the river offers an open course for 15 miles. The stream holds its way between banks of rich chocolate soil rising from 7 ft. to 10 ft. above ordinary level, and on either hand stretches back rich country.

The attraction of soil and easy means of water transit were not overlooked in the earlier settlement of the country. In the days when cotton was more largely grown the river banks were dotted with the homesteads of pioneer planters. Cultivation was carried on with vigour and perseverance, and the Ba was one of the busiest centres of European population outside of Levuka. But the settlers seemed to have failed to agree with the natives. The mutual relations were always those of an armed truce, often breaking out into open hostilities, and, with the Kai Colo especially, there was carried on a constant war of reprisals. The two saddest results of this were the murder of Messrs. Spires and M'Intosh in 1871, and the massacre of the Burns family, father, mother and childern, and labourers, in 1873. This led to the interposition of the Government forces between the settlers and the mountaineers. But as the former had long been in violent opposition to the authorities constituted under King Cakobau, they hotly resented this interference. One by one the settlers succumbed to the influence of the cotton failure, and the cultivators dwindled to a few, who still clung to the old location.

Upon this state of things the New Zealand Company broke in during 1883 by purchasing the Rarawai plantation. The purchase of other contiguous blocks followed, until about 3,000 acres were available for immediate cultivation. There are now about 1,500 acres under crop, and the cane, young and old, has a splendid appearance. About half the above acreage is ready for crushing, and it is expected to put through 1,000 acres this season.

The Ba flats are more open for cultivation than the Rewa lands, and because of the rainfall being much lighter the tillage must be more thorough and systematic. Steam and gang ploughs have been employed, and the land has been thoroughly subsoiled, so that the cane may strike deep into the moisture. But it is recognised that recourse must eventually be had to irrigation, and a scheme has been already plotted, the cost of which, it is said, will approach £25,000. Until recently the labourers employed on the estate numbered about 450 coolies and nearly 200 Polynesians. To these 500 more coolies have recently been added. Fijians are only employed as casuals. It is intended to add to this crushing and manufacturing power as cultivation increases. The buildings at headquarters form quite a small town in themselves, and there are besides many blocks erected for working convenience in other parts of the estate. Land transit, as regards the carriage of cane to the mill, is provided for by about 15 miles of tramway, and for water transit the company has its large iron punts and a powerful steamer of 80 tons.

Good as the harvest promises to be throughout the colony, grave doubts are entertained as to the richness of the reward, and in view of the low prices ruling the market, one of the largest planters and millowners, Mr. Jas. Muray, of the Navua Company, has written to a local paper sketching future prospects in very dreary tints. It is the effect of beet competition that he dreads; and until this shall have been placed on a different footing he anticipates anything but profitable results from the manufacture of cane sugar. Nevertheless, it is significant that the Ba enterprise has been entered upon chiefly by the old established Sugar Refining Company, whose experience has been gathered in other than Fijian fields, and after it had spent over a quarter of a million of money in testing the capabilities of the colony. Had the result been other than encouraging it is scarcely likely that it would have so largely increased its investment.—*Australasian.*

PLANTERS AND COOLIE BROKERS.

In Deli, Chinese craft and persistent combination have once more scored a remarkable triumph over European disregard of the axiom that "Union is strength." For a long while, coolie brokers in the Straits, as is the way with monopolists, had taken advantage of their position as such, to exact higher and higher commissions on concluding labour contracts with planters in that colony, until their exactions so outwent all bounds that the planters, losing patience, determined in 1885 to free themselves from such galling thraldom, when the broker charge on each coolie delivered rose in amount to $60 and even more, of which the labourer only got one half. The planters formed a ring and decided upon giving no more than $50 as advance on each coolie. The brokers here, being taken quite aback by this unlooked for show of that unity which alone gives strength, dissembled, and made believe to assent to the new arrangement

The planters in bringing the brokers to put up with a fixed maximum amount for coolies engaged through them, met with cordial co-operation from the Protector of Chinese in the Straits, on that official finding that it was indeed high time to check the rapacity of the Chinese recruiters. The Protector in an annual report announced his readiness to back up employers against the exorbitant demands of the brokers, but he warned the planters that it was only by the closest co-operation, and the strictest observance of the agreement come to, that they could make head against the crafty Chinese who earn a living by the coolie trade. In Deli, too, there was no lack of voices raised to urge the planters to stick together and present an unbroken front to the brokers as their only chance of bearing up against them, and that, rather than yield, they should strive to bring about direct immigration from China. It was too evident that the powerful brokers' ring would never rest until it had brought the planters upon their knees, unless the latter remained firm and united. As usual, European disunion proved no match for Chinese craftiness and artfulness. The final result was a call for a meeting of planters in Deli to be held on the 14th instant. The object of holding the meeting was to register submission to the demands of the brokers.

That is the outcome of a contest begun with such a flourish of trumpets and determination never to give way to rapacious monopolists. The planters had, however, no other alternative. Those among them who had made up their minds to resist, were boycotted by the brokers, and could get no coolies. Their less scrupulous fellows got as many as they wanted. No doubt self-preservation prompted them to this step. Still had they stood out unitedly and braved the wrath of the brokers, the triumph of the monopolists might have been less assured. As Lord Randolph Churchill puts it they "have chucked up the sponge," for the same reason that brought on the break down here of every combination among European firms to check adulteration and fraud among Asiatic dealers. The lesson, hard as it is, will doubtless be thrown away and prove barren of beneficial results.—*Straits Times.*

DELI NEWS.

(*Translated for the Straits Times.*)

The Deli *Courant* in its retrospect for 1886, calls attention to the striking circumstance of that colony's steady prosperity throughout last year. Elsewhere in Netherlands India, in Java especially, the past year has proved to be a period of unbroken disaster and adversity to the commercial and planting interests. In Deli, on the contrary tobacco cultivation spread wellbeing and contentment abundantly. Although the crop of 1885 estimated at 125,000 bales did not prove superior to preceding ones in unusual fineness of quality, and though there was no immediate prospect of prices rising, confidence in the future of Sumatra tobacco continued as great as ever both among planters and cigar makers. Prices, especially for the finer and better cured kind, rose materially. But, far too much of inferior qualities have been brought to market to arouse complaint in Holland and Germany. The best testimony to the indispensableness of Sumatra leaf notwithstanding this drawback, arises from the fact of the average prices continuing so high in 1886. Satisfactory as is the outlook, far-seeing people find ample grounds for uneasiness in the distant future. The principle that the price of every article hangs upon the supply, works undeviatingly enough to admit of the anticipation that, as soon as the supply of leaf tobacco exceeds the demand, prices will assuredly fall. At present, Deli has no formidable competitor in the European market. The yield of tobacco from other districts under cultivation brought forward during the year, did not turn out encouraging enough to justify basing any alarming forecast of the future upon the result of experimental planting there. A better outcome befell a consignment of tobacco from North Borneo where, by last advices, this satisfactory result had led to a larger area of land being put under crop with the utmost vigour. Next season, that colony will probably yield a larger quantity of tobacco. Another quarter where competition looms in the distance is the island of Bacham in the Moluccas. Trial planting there has resulted satisfactorily, judging from the samples produced. These circumstances prove that the success attending tobacco growing in Deli, has stirred up competing enterprise in the same direction elsewhere. Deli planters have every reason to keep awake and look out sharp. They would do well not to depend upon the high reputation of their produce, but to strain every nerve to improve still more both the quantity and the quality of the outturn they send to market. On the spot, high expectations are entertained regarding this year's crop. Its outturn is estimated at about 140,000 bales. Should the rainy season not set in too early and damage the crop, which usually looks its best in June and July the quantity may prove to be 15,000 bales more. From the coast estates, the information to hand is less satisfactory. On the average, the results attained there have fallen far below the mark. New comers in that quarter have still to plod along to reach the goal. To them, the struggle is the harder from too many of them starting rashly with an insufficient command of capital. It is very doubtful whether these pioneers can stand one or two more bad seasons. Other articles of produce have not come under cultivation in any way worth particular mention. Several planters did not experiment with coffee, cocoa, and rameh but their praiseworthy efforts did not result in proving that any of these articles would thrive there. Their cultivation indeed cannot make any appreciable headway owing to scarcity of labour. Even for the tobacco estates, it was hard to get labourers throughout the year. Towards the close of the year it became almost impossible to secure the required number of Chinese coolies from the Straits. As matters now stand unless a remedy for this evil be found, resort will be had to foul means to get hold of labourers at any cost as used to be the case in bygone years. Javanese coolies were obtainable in sufficient numbers, the only objection to them being their unsatisfactory quality. Trade and navigation during 1886 were brisk and lively enough. The chief port, Labuan by name, lies under the disadvantage of an inadequate supply of good drinking water. The Government looks upon the privations of the unfortunate inhabitants with indifference, although the Sultan of Deli had offered to meet the want in some measure by sinking artesian wells at his own expense.

The beaconing of the entrances into that port underwent no improvement. Communication on land was materially facilitated by the opening of the first section of the Deli Railway, which has indeed been worked at a high profit.

A meeting of planters was announced to be held on the 14th January to take into consideration the difficulties in the way of engaging coolies in the Straits, at rates fixed by the Deli planters mutually. The Straits coolie brokers refuse to abide by these rates.

PLANTS THAT EAT.

Among the many rare and interesting plants forming the collection in the Botanical Garden at Washington U. S. there has recently been got together an almost complete set of insectivorous plants, so called from their being so constructed as to attract insects, capture them in various ways and feed upon them. A few of these plants have been gathered from their native habitats in the swamps of North Carolina and California, and others have been sent from India, Australia and Madagascar. Perhaps the best known of the group, and certainly the most wonderful plant in the whole vegetable kingdom, is *Dionæa muscipula*, commonly known as Venus Flytrap. The leaves vary from one to six inches long, and at the extremities are placed two blades or claspers, the shape of which may be said to resemble two hands placed together between the palms and the wrists, and the fingers held backward. The palms of the hands represent the inner walls of the trap, while the fingers represent

the marginal hair or teeth. On the inner walls of these claspers there are placed six irritable hairs, any one of which receiving the slightest touch from an insect is sufficient to bring the two blades together with such rapidity as to preclude any possiblity of the fly escaping. A correct idea of how the trap closes on its victim may be obtained by bringing the two hands rapidly together, the fingers of the one being firmly pressed between those of the other. This plant readily discriminates between animal and other matter; thus, if a small stone or piece of wood be dropped into the trap it will instantly close, but as soon as it has found out its mistake, and it only takes a few minutes, it begins to unfold its trap and the piece of wood or stone falls out. On the other hand, should a piece of beef or a bluebottle fly be placed in it, it will remain firmly closed until every particle of organic matter is absorbed through the leaf. It will then unfold itself and is ready for another meal.

Next in interest comes Sarracenia purpurea. This species is popularly and most appropriately called "The Vegetable Whisky Shop," as it captures its victims by intoxication. Here is a most excellent theme for temperance advocates. The entire shop is shaped after the manner of a house, with the entrance projecting a little over the rim. Half way round the brim of the cavity there are an immense number of honey glands, which the influence of the sun brings into active operation. This sweet secretion acts as a lure to passing insects, and they are pretty sure, should they come within its influence, to alight on the outside edge and tap the nectar. They however, remain there but a brief period, as there is something more substantial inside the cavity in the shape of an intoxicating liquid, which is distilled by the plant. The way down to this beverage is straight, there is no crossing over, as the entrance is paved with innumerable fine hairs all pointing to the bottom, and should the fly walk crooked, its feet become entangled in them. When the fly has had its first nip, it does not stop and fly right out, as it could do, but indulges until it is more than "half seas over"; it then come staggering up, and reaches that portion where the hairs begin; here its progress outward is stopped owing to the points of the hairs being placed against it. The fly is now in a pitiable plight; it attempts to use its wings, but in doing so, only hastens its own destruction. It inevitably reaches the bottom, gets immersed in the liquid and dies drunk.

Another species of the last-mentioned genus, *Sarracenia psittacina*, also distils an intoxicant of its own; but owing to the peculiarly complicated formation of the entrance to its inner parts, it excludes the great majority of insects and admits but a select few. In Europe it is known as the "city club insecticide." The individual pitchers somewhat resemble an inverted parrot's bill, with a narrow leaf-like expansion running along the top. The color is light green, beautifully shaded with crimson. The inside of the pitcher is divided into three parts, the first, nearest the entrance, is studded with minute honey glands, and is called the attractive surface; a little further down the inside, very minute hairs are situated, with their extremities all pointing to the other chamber. This is the conducting surface. Lastly, the small hairs give place to the longer ones, amid which are placed secreting pores, which give forth the intoxicating nectar; this is termed the detentive surface. When the pitcher has caught a sufficient number of insects the nectar gives place to a substance which has been ascertained to be identical with gastric juice in its constituents. This is evidently to enable the plant more readily to digest its food.

Another species which, were it plentiful, would prove a boon and a blessing to man, is *Drosera dichotoma*, the mosquito catcher. It grows about one foot high, and as its specific name implies, the leaves, after *reaching* a certain height, bifurcate into long narrow spathes, which are densely covered with club tipped, rose colored hairs, each of which is coated with a bright gummy substance. This during sunshine, gives to the plant a most magnificent appearance. This curious plant would seem to have great attractions for the mosquito, for if a plant be placed in a room where they abound, all of the troublesome pests, will in a brief period, be in its deadly embrace, at first struggling to disentangle a leg or wing, anon finding itself more and more within its toils. It is most interesting to watch the method by which it secures its prey. Immediately the fly alights on the leaf, it may be that only one of its six legs stick to the sweet, viscid substance at the extremity of the hairs, but in struggling to free itself it invariably touches with its legs or wings, the contiguous hairs, and is immediately fixed. The hairs meantime are not idle; being sensitive, they slowly but surely curl round and draw their victim on the very centre of the leaf, thus bringing it into contact with the very short hairs which are placed there in order to facilitate the process of sucking the life blood from the body. This interesting plant is besides a few others, very difficult to cultivate. Even after imitating nature as closely as possible, the plants thrive but indifferently.—*Washington Co. N. Y. Mail and Express.*

THE RAISING OF PLANTS FROM SEED.

Mr. J. Hart, Superintendent of the Government Cinchona Plantations, writing in the *West Indian Field*, says:—

When a seed is sown, certain chemical changes have to take place before it can develope its parts and grow. The agencies which bring about this change are heat and moisture. A certain proportion of moisture must be absorbed, but not too much, or the result is, that unless it belongs to aquatic or semi-aquatic orders, the seed will speedily perish. Great care is therefore necessary—especially with the smaller and more delicate seeds—to place them in soil which contains a suitable amount of moisture. If the seeds are known to be such as soon lose their vitality or have been kept so long that it is evident a loss of growing power has taken place, a more delicate system of treatment is required than for those which are known to be fresh and recently matured. The best practice with such, is first of all to place them in earth which contains only a very small, or scarcely perceptible quantity of moisture, and to let them remain in it until they commence to show that a sufficient amount has been absorbed to give rise to the act. or process of germination. When this is seen by examination to have taken place water may then be given in daily increasing quantities until the plants are sufficiently strong to stand the application of water in larger quantities.

As a rule seeds should only be covered with earth to the depth represented by the average diameter of the particular kind sown, but many seeds possess a vital principle so strong, that to scatter them on the surface of the soil is sufficient to ensure a speedy development of their germinating powers. Some have the power of burying themselves in the earth by an inherent property possessed either by themselves, or the plant producing them; a familiar instance being that of the earthnut or Pindar, Arachis, hypogea, many others could also be mentioned, but this instance is sufficient to call to miud the peculiar properties possessed by some plants to further the reproduction of the species, and to maintain themselves in the "battle for life."

The covering of soil serves the purpose of surrounding the seed with an equable but slightly varying temperature, provides for the absorption of the necessary moisture, and preserves them against the effect of light and too rapid evaporation, all of which have prejudicial effects upon germination; but is not essentially necessary to allow the process of germination to take place, as can be shown by keeping seeds by other means in a state, in which the conditions supplied by the soil are fairly represented, if such are provided germination takes place in most instances, very freely. An opinion is sometimes entertained that seeds should be deeply buried, that they may have a good hold of the ground, but this is quite unneces-

sary, and even injurious, for the root, of its own power, plunges itself downwards, and the stem progresses upwards from a common starting point, which is the seed itself, hence the result of burying a seed too deeply is, to cover a portion of the lower part of stem of the plant, which we know from experience to be inimical to its future welfare.

Some objection may be taken to this, when taking into account the germination of the Leguminosæ and other plants which raise their cotyledons or seed-leaves about the ground, but such will be found to be groundless, when it is considered, that although the seed-leaves are raised above the surface, they are so raised from the exact spot at which germination took place, and it is at this point that the differentiation between stem and root commences.

Seeds germinate also very unwillingly and slowly if buried too deep, for it is necessary that a certain communication with the atmosphere should be provided, if the process is to be maintained in healthy state, they are known to possess a large proportion of carbon, in proportion to their weight, than any other part of a plant, while they remain charged to a full extent with this element, they are not in position to put forth their dormant germinative powers. To rid themselves of this principal, a supply of oxygen is necessary to convert the carbon into carbonic acid, and thus enable the seed to grow, the necessary amount of oxygen being principally obtained from water, and the surrounding atmosphere.

There are noticeable instances, especially in the tropics, of seeds taking a very long time to germinate, and these are mostly found to possess a very hard outer coating, which requires to be partially removed to procure speedy germination. In a natural state this is accomplished, by various agencies, but principally by the action of water, which softens it and enables the embryo to attract a proportion to itself sufficient for the purpose, development. It is well however, when seeds of this kind are to be raised, to use artificial means to allow of this absorption of moisture by the inner portion of the seed and this may usually be accomplished by removing a part of the *testa* or outer covering with a knife or file. During my experience in Jamaica I had certain native seeds under my care, which were sown in the usual way, but after waiting for some twelve months, they had failed to germinate and I determined to try the process of removing a portion of their outer covering. I found on tryiug to cut it, that it resisted the efforts of a strong knife, and I therefore procured a file and with it removed a suitable portion taking care not to cut deep enough to injure the dormant embryo. Though it had laid in moist earth for the many previous months without growing, in about fourteen days after the operation they had developed into plants. In numerous instances since, I have followed the same practice and with similar results. When seeds are sown thickly the plants are apt to become "drawn." In their search for light, the plants have a tendency to unduly develope their stem in a perpendicular direction, instead of becoming sturdy and strong, and the same action takes place when seeds are sown in an unduly shaded position. In such cases they are rendered very susceptible to the attacks of Microscopic Fungii, and are also very easily injured when water is applied, unless the process is conducted with the greatest care. It is always best therefore if the room can be spared, to sow the seed very thinly, so as to avert these contingent disadvantages, but in case we are restricted in regard to room they may be thickly sown if, as soon as they are large enough to handle, the plants are 'pricked off' into other soil at wider distances apart. 'Pricking off' consists in carefully raising the plants, one by one, by placing a small stick or other instrument beneath the roots, carefully raising them, and then dibbling them into holes at proper distances, shading them for a few days until they recover from the check due to the transplanting.

Seedlings should always be 'pricked off' at some stage or other, and not left to develope themselves in the original seed bed until large enough for final potting or transplanting, for if this operation is performed they will become much more sturdy, and more easily lifted, than if left with their roots straggling and intertwining in their first position—until required to be placed in their permanent quarters. The operation tends to develop a larger quantity of fibrous roots, than would otherwise be the case, and these are the feeders which supply nutriment to plants in greater proportion, than the single and larger roots which would be developed if the operation was not performed. In British nurseries where plants have to be kept in large quantities from year to year, it is the practice to regularly transplant at certain intervals —dependent upon the nature of the plant—all kinds of trees, shrubs, and herbaceous plants, and this is done, so that the loss of plants consequent upon removal may be reduced to a minimum. That it does retard and prevent growth is well understood, and is an advantage in the cultivation of certain classes of plants and fruit trees; but when planted in their permanent quarters it has, otherwise, no prejudicial effect. Cultivators, therefore, need not fear periodic transplanting, if the operation is performed with care, and with sufficient frequency, as it will enable them to maintain a stock of young plants such as oranges, etc., until times when the ground they are intended to permanently occupy is fully prepared for them. If the system of frequent transplanting when in their younger stage of growth, be followed with such plants as the orange, they can be finally planted with greater disregard for seasons, than could possibly be the case, when other systems are followed.

Although it is the general nature of a seed to reproduce the species to which it belongs, it cannot be relied upon in ordinary cases, to renew a particular variety, yet there is always a tendency to produce a plant more like the parent, than any other form of the species. For instance the seed of a Number Eleven Mango cannot always be relied to produce a Number Eleven, but it will produce a mango of some kind. The special property of producing a particular variety is confined to leaf buds, and seems to be owing to the seed not being specially organised after the exact plan of the branch on which it grew, but merely possessing the elements of such organisation. Hence cultivators should not rely upon seeds for the production of special varieties, but should have recourse to the simple operations of budding and grafting, or propagation by cuttings if they wish to perpetuate any special variety.—*Planter and Farmer.*

THE USE OF LIME IN AGRICULTURE.

During the past week the Government agricultural chemist has suggested that the market gardeners about Caulfield, Brighton and that neighbourhood, who have for many years past been in the habit of applying to their land heavy dressings of stable manure, might find it advantageous to stop the supply of manure for some years, and use instead a small quantity of lime. He bases his suggestion on the fact that the soils of many of the market gardens have, owing to the practice of heavy manuring, accumulated a great amount of fertile material during the past years, and that if the fertile ingredients could by any means be rendered more accessible to the plants it might be unnecessary for some time to add to the store already accumulated. Lime, it is known, possesses the power of liberating the ingredients locked up in the soil and rendering them available for the immediate use of plants. Hence it may be supposed that if lime were added in a suitable manner to these soils, now so rich in manurial matter, a sufficient amount could be set free year by year to serve for the growth of crops without a further use of fresh manure.

There is undoubtedly reason in the suggestion; and if good crops can be grown for a period without the heavy cost of manuring, and without injury to the soil, the gain will be very great. Nevertheless the abundant use of manure is such an old established practice amongst the market gardeners of Victoria, especially amongst those who cultivate the naturally poor sandy soils lying to the south of Melbourne, the

it has come to be regarded amongst them as a cardinal necessity of successful cultivation, and the proposal that they should use no manure at all for a time will doubtless seem to some a very striking and radical change, and its very novelty might deter them from putting it to a practical test. It may be useful, therefore, to look more closely into the proposal.

The use of lime for agricultural purposes is no new thing. It is as old as the history of agriculture itself. The beneficial effects of lime when applied to certain soils were known centuries before the nature of its action was understood. Indeed it is only within the last half century that men have learnt why the addition of lime is frequently of so great advantage. In all the old civilised countries, and now in many parts of America, lime is regularly added to certain kinds of soils. In England it has passed into a saying—too general, no doubt, as such sayings usually are—that "the use of lime is the foundation of good husbandry." In Victoria, where many, probably the majority, of the cultivators of the soil have commenced their work without the advantage of the many sound traditions founded on generations of experience which serve as a guide to farming men in the old world, and have had to take things as they found them and work out methods of practice for themselves, it is not surprising that the proper use of lime, and indeed the rational use of all manures, should not have been clearly understood.

Lime, when applied to the soil, has a fourfold action. Firstly, it serves, like all other manures, as food for the plants themselves; secondly, it alters the texture of the soils, stiffening sandy ones,* and loosening clays; thirdly, it assists in the decomposition of the soils, more especially of the vegetable accumulations contained in them, and thereby sets free and accessible to plants those substances needful for vegetable growth; and fourthly, it neutralises the acidity of sour soils, and renders them sweet and healthy. We may still add a fifth benefit which results from the use of lime, namely, that it discourages the growth of many kinds of weeds, and drives away several injurious grubs, notably the wire worm

As regards the necessity of lime as a plant food, it is only necessary to point to the many instances of soils poor in lime being of very low fertility, and the good effects obtained in such cases by the addition of manures containing lime. For purely manurial purposes the most usual way of applying lime is in the form of gypsum, or sulphate of lime. Some comparative experiments conducted by Ville, in France, gave the following results:—

	Wheat. Bushels per acre.	Beetroot. Tons per acre.	Potatoes. Tons per acre.
Without lime	41	18¾	8 1-5th
With lime (gypsum)	43	20¾	11 1-7th

In another case clover was experimented upon by a German experimenter, Körte. The clover was top dressed with gypsum; and in this case the effect varied considerably according to the time at which the dressing was applied, this variation being of course due to the effects of the season. The yield from each small experimental plot was as follows:—

The undressed plot yielded	100 lb.
The plot dressed on the 30th March yielded	132 lb.
The plot dressed on the 13th April yielded	140 lb.
The plot dressed on the 27th April yielded	156 lb.

Of the effect of lime in the form of gypsum on peas and beans there are several recorded instances; with weak and sickly plants people have described its action as simply "magical;" such effects being produced, however, as it is necessary to bear in mind, only in such soils as are absolutely deficient in lime. It has also been observed that lime, in its action simply as a manure, hastens the development of crops and brings them to early maturity.

As regards the action of lime on the texture of soils, it is to be remarked that whilst slaked lime or marl may always be added with good results to clay soils, it must be used spoaringly and with caution to light sandy ones. Five, ten, and even twenty tons to the acre, may be worked into a clay field; the clay will be loosened, and be less liable to harden during droughts, and its fertile qualities improved. But such a quantity added to a sandy soil would be likely to have disastrous results, rendering it so light and porous* that it would retain no moisture. But small doses of lime may be applied to light soils with advantage, the effect being frequently to bind them together.

It is the third and fourth effects, above mentioned, of the use of lime with which we are most concerned at present. Sandy soils, such as those at Caulfield and Brighton, contain in their natural condition only a small proportion of vegetable detritus, or, as it is called, humous matter; and as they are light and porous, their fertility is readily washed away by the rain, after they have been cleared of their native protection of verdure. But their condition becomes entirely changed after several years of cultivation with heavy manuring. The composition of stable or farmyard manure is very variable, but a good sample may be taken to contain 70 per cent moisture, 25 per cent vegetable matter without nitrogen, 3 per cent sand and other useless mineral matter, and 2 per cent of useful fertilising ingredients. The moisture of course counts for nothing, and has little effect one way or another upon the manure beyond increasing its weight. The really valuable substance for which the farmer or gardener pays when he buys farm yard manure is the 2 per cent of fertilising matter. The 25 per cent of nonfertilising vegetable matter is not, however, to be left out of account in calculating the value of the manure, for it has this effect, that it locks up that 2 per cent of really valuable fertilising matter so that the plants cannot get at it. And until the vegetable matter of the manure is decomposed and the fertilising matters liberated, the buyer of farmyard and stable manure can get no return for his outlay, he, in fact, locks up his capital in the manure; and it takes a long time for the decomposition of the manure to take place, so that for the first year, not more than 1-10th to 1-5th of the total value of the manure can be realised. The remaining 4-5ths becomes stored up in the soil, except what is washed out by the rain.

So far, therefore, it may be considered that this vegetable matter contained in the manure is not only useless, but absolutely disadvantageous, since it prevents the farmer from gaining a full return for his capital laid out. But it is not altogether useless, for this vegetable substance is not readily washed away by the rain; if it were so then the 4-5ths of unused fertilising ingredients would be wholly lost; but inasmuch as they are locked up in the vegetable matter, which in its turn is not readily washed out by the rain, then they also for the most part are retained in the soil. It results therefore, that after several years of heavy dressings of farmyard or stable manure, a soil accumulates a large quantity of vegetable, or as it is called, organic matter, together with its contained fertile ingredients. And the soil especially if it be a sandy one, is greatly benefitted by this accumulation, since it is prevented from having its fertility washed away with the drainage waters.

This accumulation in time becomes very great. Lawes and Gilbert, to whose work we have had occasion of late to make frequent reference, found that a plot of land on which they grew wheat for 40 years consecutively, and which they manured every year with 14 tons of farmyard manure, had accumulated 5000 lb. nitrogen to the acre, a result very noteworthy when it is borne in mind that wheat is very exhausting to the nitrogen of the soil.

But there is a degree beyond which this accumulation cannot be allowed to proceed without injury to the condition of the soil. For the organic matter in the soil after a time generates vegetable acids which render the land sour, and everyone knows that a sour soil, will not grow satisfactory crops. When this stage has been reached it is absolutely necessary to add lime.

If then a certain amount of lime is added, it will sweeten the soil, and it will do no more. But if still more lime be added, it will set those fertile ingredients free for the nourishment of the crops. In other words, the lime renders active those substances which hitherto

* Is this a fact?—Ed.

* Entirely inconsistent with the previous statement about stiffening.—Ed.

were lying latent; it puts into circulation the capital which had been lying idle.

It needs no illustration, however, to show that the continued use or lime on this principle would sooner or later exhaust the soil unless more manure were added. Indeed, it is an old saying that lime "enriches the father and impoverishes the son." There seems no reason to suppose, however, that it could not be safely used until the crops grown under its influence began to indicate that the surplus of the soil's accumulation was at an end, and that a further continuance of this treatment would be drawing upon the soil's necessary fertility. When that stage was reached, the use of lime—always in moderation—need not necessarily be discontinued—but stable manure should also be used. Or the use of the lime could be discontinued, and artificial manures, with occasional applications of stable manure, substituted.

We have thus presented the theory of the use of lime, and of its application to soils rich in accumulated manures. The general theory is reasonable enough, and will, we should think, commend itself. But its successful application in practice depends no doubt upon a variety of conditions. Fortunately, we are not altogether in the dark in the matter; for the action of lime in a manner similar to that suggested has we learn been already tried by a market gardener at Balaclava, and the results, we are given to understand, are very favorable, there being a marked superiority in the vegetables grown with lime as compared with those growing in an adjoining plot in the same garden, and which have been treated with the usual heavy dressing of manure.

It will be readily understood, from what we above stated, that lime will have a similar action upon stable manure that it has upon a soil rich in manurial accumulations. It does, in fact, liberate and render immediately accessible to plants much of the remaining 4-5ths of fertile matter which we stated could not, under ordinary conditions, be used for some years. Hence, when lime is used together with stable manure a much smaller quantity of the latter is required than when lime is not used. So that in any case the judicious use of lime is likely to prove very profitable to those concerned. And we would suggest that some market gardeners, whose ground has been heavily manured for years, should grow some vegetables on, say three adjoining plots, treating one with a small quantity of lime only, another with lime and a small quantity of stable manure, and the third with stable manure only. It is necessary to point out that much depends upon the proper application of the lime, and as this is a matter of importance, we will recur to it in a subsequent issue.—*Melbourne Leader.*

BORNEO TOBACCO.—Shareholders in the Chinese Sabah Land Farming Company will feel interested in the following extract from the November number of *Tobacco*:—On Thursday, October 14, there was great excitement in the narrow footway called Fenchurch Buildings, which connects Fenchurch St. and Leadenhall St. At No. 8—the smartest house in the passage—is the firm of Messrs. Horatio N. Davis and Co., who, a year or two since, removed from their old quarters at 107, Fenchurch St. The firm was founded in 1722, and are the oldest tobacco-brokers. In the capacity of tobacco-brokers for the British North Borneo Company, they had offered for sale by public tender the first shipment of tobacco to England from that colony. The tobacco was divided into two lots, *i.e.*, 35 bales 1884 crop and 293 bales 1885 crop. On the day of the sale and the three preceding days, samples of the tobacco, together with cigars made from the several marks were on view. They were keenly examined by experts of London; Liverpool, the tobacco centres of the Continent, and even the United States. Opinion agreed that the tobacco was equal in all respects to the valuable cigar tobacco produced in the neighbouring island of Sumatra. At two o'clock the tenders were opened and the 'winners' announced. So great was the excitement that the presence of the police was required. The bulk of the tenderers were present, and some were full of confidence. One was so full that he had gone to the expense of reprinting the marks of tobacco, so that he might be ready to sell immediately he was announced as the happy man. When the tenders were opened, Messrs. J. Siemssen and Co. were found to be the highest for the 293 bales, and Messrs. G. W. Brangwin and Co. for the 35 bales. Dutch firms had been confident that no English house would be in a position to secure the tender, and it is, therefore, satisfactory to see that they are beaten in London in price for the description of tobacco in which they thought they had a monopoly.—*Straits Times.*

THE KINMOND-RICHARDSON ROLLER.—When we touched on this subject the other day, we did so with diffidence, and would not have done so at all but that we desired to give our planting readers information concerning this new roller which claims to eclipse even Jackson's machine. We seem likely in the not distant future to witness a veritable war of tea-roller patents, an Armageddon, which, if it should establish who has a right to a particular contrivance, will not be without its uses. But as the remarks we made the other day regarding the Kinmond-Richardson roller appear in one or two respects to be inaccurate, we are desirous of correcting the mistakes. We learn, from a letter received from Mr. J. C. Kinmond for publication, that "although he assisted in the design and construction of the roller," as stated by us, he in no way introduces it to the Ceylon public. "Messrs. Robey & Co. finance make and sell the Machines," we understand from Mr. Kinmond, and his visit to the island is not connected with the introduction of the roller in any way. In regard to the statement made by us, on the authority of a correspondent, that it took 50 per cent. less power to drive one of these machines than one of Jackson's of equal capacity—a statement for which we were unable to account except on the supposition the new machine was lighter and more simply geared—Mr. Kinmond says that the rollers are about equal weight, and adds "that the only reason why the Kinmond-Richardson can be driven with so little motive power is that the motive power is applied direct to roll the leaf with the minimum of loss in friction." We certainly should like to see one of these machines at work, for ocular demonstration is very much more satisfactory than any other, and we are anxious to see a roller which professes to work with less friction and with half the motive power required for the Excelsior. Mr. Kinmond's letter, explaining the difficulty we had in accounting for this we think it better not to publish, for such facts as he has to give us, other than the correction of the mistake we fell into, come with better grace from one unconnected with the machine in any way. We have seen a woodcut of the roller together with the explanatory letter press. Its most noticeable feature appears to be the circular motion of the lower rolling surface which has a hitching action between each stroke of the upper plate, the necessary pressure for the roll being obtained by means of a weight in the upper rolling surface adjusted by a screw as in Jackson's. The whole business of and interest in the roller belongs to Messrs. Robey & Co. of Lincoln who intend to push its sale in India and Ceylon.—Local "Times." [If the latter statement is correct the reticence and diffidence of Messrs. Robey & Co's local Agent are quite phenomenal. He does not seem to have been our contemporary's informant, or so many inaccuracies regarding the new roller would not have required correction amongst others from Mr. Kinmond, whose repudiation of direct interest in his own child is what Mr. Thompson would term "most peculiar." The *Observer* we may venture to assert, is read by the vast majority of the planters of Ceylon, but neither in person, by letter nor by advertisement has any communication been made to our office, by an Agent said to have come hither for the express purpose of pushing the sale of a machine used only by planters. The Agent is probably waiting until trial has established the merits of the new competitor for the favour of tea manufacturers.— a wise resolve.—ED.]

Correspondence.

To the Editor of the "Ceylon Observer."

THE SILO PROCESS APPLIED TO THE COARSE PATANA GRASSES OF CEYLON.

Feb. 5th 1887.

Sir,—In reading your report of Sir E. M. Grant Duff's "Review Minute" I noticed that he speaks of a weed "bidens glabra" which after treatment in the silo is suitable for feeding cattle. Would it be possible to convert our coarse patana grass into nourishing food by silo? We are surrounded by patana grass here, but of so coarse and rank a nature, that except after a burn—when the young shoots first appear, our cattle can scarcely find pasturage on a run of several acres, and in the dry weather get to resemble the thin and ill-favored kind of Pharoh's vision. If by means of ensilage they can be made "fat, flushed and well favored," I think it would pay well the trouble of making silos. Probably the idea has been already mooted or is not feasible, but as I am rather a recent importation and have only lately entered upon the pleasure and privilege of studying such subjects under the able guidance of such aids to knowledge as the *Tropical Agriculturist*, I must plead my rawness as an excuse for troubling you.—Yours, GREEN HORN.

[This is a good idea which ought to be practically tested. The question has a strong bearing on the subject of milk giving cattle, treated of in our editorial columns today.—Ed]

PUTUPAULA TEA.

Putupaula, Kalutara, 6th Feb. 1887.

Dear Sir,—In your paragraph relating to Ceylon tea sales you mention Putupaula as coming after Lindula in its average of only 1s 4d.

Kindly allow me to say the Putupaula teas were a complete break including dust and the exact average was 1s 5d.26.—Yours obediently,

H. A. TIPPLE.

[We give the teas and the prices just as they are reported.—Ed.]

DELICATE AND HARDY VARIETIES OF INDIGENOUS TEA.

"Sana" estate, Ratnapura, 8th Feb. 1887.

Dear Observer,—I send today something to show what this side can produce in the way of my dark-leaved indigenous. You will observe the difference between the ordinary delicate, too delicate for *very high*, and also too delicate against low-country spiders, &c., "Singlo," while my dark-leaved indigenous is hardy enough to defy these natural causes. I believe mine (and crossed, perhaps, with Assam Hybrid) will be "the jat of the future?" With salaams.—Yours truly, Wm. G. SANDISON.

P. S.—I think you will find one of the leaves quite a foot long.

[We are simply at a loss for superlatives wherewith to describe the tea leaves Mr. Sandison has sent us. If the English language permitted of such a form, we should say they were the most *magnificentest* we have ever seen, especially those of the dark and hardy variety. The leaves can be seen at our office.—Ed.]

RUNG OR RINGED.

10th February, 1887.

Dear Sir,—In your para anent the ringing of the gum trees on the Udapussellewa road your correspondent uses the word 'rung' as the past tense of ring. Ought it not to be ringed?'

AN INQUIRER.

[We should think so. In Australia they always say "ringed" in regard to a process at the desolating effects of which lovers of forest trees have *wrung* their hands. It is at marriages that hands get *ringed*.—Ed.]

MR. JAMES SINCLAIR AND CINCHONA STATISTICS.

Bearwell, Talawakele.

Dear Sir,—The letter appearing in your columns from the Chairman of the Maskeliya Planters' Association, disavowing non-compliance with the desire for cinchona statistics, also Mr. Wickham's letter in the local "Times" and other circumstances compel me as the originator of the idea, to ask space for the following. At the last meeting of our local Association it was stated that several District Associations, including the Committee of the Parent body, had refused to co-operate with us in collecting these. I forget who was responsible for this statement, but had the Secretary or late Chairman, who should have known the facts, not acquiesced in allowing these to gain currency uncontradicted, my action at the meeting would have been different, for I should not have allowed the matter to drop; I only did so under the impression that several Associations had declined to assist us, nor would I have accepted the decision of the Central Committee, for I intended to have brought it before the general meeting next week. I am throwing no blame on our Secretary, I dare say he was so pre-occupied thinking how best to dispose of his repleted treasury, that he did not hear all that passed. It now appears that the Badulla Association is the only one that stops the way, but surely the men of Uva will reconsider the matter! I happen to know that their present worthy Chairman was not averse to co-operation, but even if they refuse, sufficiently accurate figures for our purpose could be got even from Badulla.

With reference to Mr. Wickham's opinion that it would be impracticable to get accurate figures, I must repeat I do not see where the difficulty lies. It is different to five or six years ago, when there were thousands of acres only just laid out in cinchona, and whether these would reach a harvestable age or not, no one could say. Now we know better what we are doing, there is but little under three years, we are more accustomed to such estimates and could, I am sure, give fairly accurate figures of the total quantity now growing. I do not think it of vital importance that a correct estimate of the output for the next three years should be arrived at, so much depends on the ruling prices and the death-rate (some years being more disastrous than others in the latter respect) but most people have intentions on the subject of the quantity they will harvest during the period proposed, therefore if they gave in their return to that effect, it would be sufficient for our purpose. What in my opinion is of vital importance, is to have some idea whether we have at this moment growing in Ceylon 40 million or 200 million pounds. Could we as we stand, disprove that either figure is not within ten million pounds of the total? I say, no. It is the feeling that Ceylon may ship *more* this season than last and that she will for an indefinite period yearly increase the output, which keeps prices so low. The statistics I propose, although I am well aware that only an approximate estimate can be procured, would suffice to dispel the existing uncertainty in London, and also tend to cause those who could do so, to hold off the market, knowing that later on better prices would be going, and thus give a

better chance to those who must perforce continue harvesting. I am too late for a resolution on he subject for the coming meeting, but I hope he matter may not be allowed to fall to the ground, for apart from every other reason, it will be a little ungracious to Government, to say nothing of the Java Association, whom we asked to procure information for us.—Yours faithfully,

JAMES SINCLAIR.

[The conditions of cinchona cultivation are such that only a very distant approximation can be obtained and we believe the compiler of the Ceylon Handbook will come as near the mark as is possible. It would be to the interest of planters, no doubt, that a low estimate should be given, but all who have travelled and used their eyes must feel that there is much cinchona culture still in Ceylon.—Ed.]

PETROLEUM AS FUEL.

Colombo, Iron Works, 14th February 1887.

Dear Sir,—The question of petroleum as a fuel for use on tea estates is one which from time to time has engaged the attention of your correspondents. As the day cannot be very far off when firewood will be at a premium in Ceylon, there will be room for some other fuel and realizing this fact we have for a considerable time been collecting what reliable data we could get regarding petroleum fuel and the appliances for using it. In August last year our Mr. Frank Walker, accompanied by Mr. J. L. Shand, inspected a boiler fitted with a patent liquid fuel apparatus for the consumption of petroleum. It is claimed for this fuel that a ton of crude petroleum will get up as much steam as 2½ tons of coal and there is no smoke dust or stoking. The apparatus can readily be put into existing furnaces and taken out if the oil should run out of stock. There is no doubt about the working and getting up steam, and so far as Ceylon is concerned the whole question hinges on the price of the unrefined oil in Colombo.

Now this question of price is our difficulty and we fear that for the present all thought of using this liquid fuel in our tea factories must be abandoned.

The nearest oil wells are in Burmah and we have for some time been in correspondence with the proprietors of these wells regarding the importation of the crude oil into Ceylon.

The result of our enquiries is that we estimate the *cost* of this oil at R120 per ton (say 6 casks of about 40 gallons each to the ton) delivered in Colombo. Coal costs say R24 per ton and 2½ tons coal costing R60 are required to develop as much steam as one ton crude oil costing R120. That is to say, the oil is just double the price of coal. The oil is cheap enough at Rangoon where it only costs 25 cts. per gallon. The charges to Colombo double the original cost. The casks cost R1 each and we cannot get a freight quotation by steamer under R3.50 per cask.

With regard to the method of using oil as fuel and the results to be obtained from it as compared with coal the following extracts from a letter from the Rangoon Oil Company may be of interest to your readers:—

"We may say that we use steam injectors and we have also recently made trial of a series of of troughs placed one above another in the flue of the boiler. The oil runs first into the top trough and overflows into the second and so on according to the number of troughs used. This latter plan has an advantage over the steam injector in as much as it is necessary to get up steam on the boiler before the injector can be used. With regard to results as compared with coal there seems to be a great difference of opinion and probably very much depends upon the kind of work which has to be done. We notice from the report of a lecture delivered at Bombay by a Mr. F. Wallace that the heat producing power of a pound of coal compared with a pound of petroleum is roughly as 12 to 19, but that experiments conducted on a large scale have given results much more favourable to petroleum. He adds that a good ordinary boiler such as may be found in many of the mills in Bombay will evaporate 6½ pounds of water per pound of coal burnt and taking this as a basis of comparison, results have been obtained from petroleum as follows:—

		lb.
By Richard at the Cotton Mills in Tiflis, Caucasus		10.83
,, Nobel Bras at Baku		14.
,, Government Exporters at Moscow		14.
,, Karl Ludig at Baku		16.
,, Brandt on Locomotives, Baku ..		16.
,, Hydon at Woolwich Arsenal		19.5

He takes the average at 16 lb. or 146 per cent. beyond the effect of coal."

The patentee of the apparatus inspected by Mr. J. L. Shand and Mr. F. Walker states that "weight for weight or bulk for bulk, the liquid fuel will do from twice to two and-a-half times the work of coal." Any way we regret to say our enquiries have satisfied us that nothing can be done at present in this colony with petroleum as a substitute for firewood, but it is impossible to say what changes may be brought about in the course of a few years. The fuel is cheap enough at the seat of its production, the mechanical appliances for using it are satisfactory and the only question now remaining to be solved is how to overcome the difficulty and cost of transport.—We are, dear sir, yours faithfully,

JOHN WALKER & Co.

A Forage Plant.—The eastern districts of the Cape are indebted to Mr. J. B. Hellier, who brought with him from Cape Town a plant of a recently-introduced cactus from Mauritius, which is like the ordinary prickly pear in appearance, except for the important difference that it has not a single thorn or hair upon it. It is used in Mauritius as a forage plant, and it is expected that it will prove a most valuable boon to colonial farmers, as furnishing food for their stock in the dry season without the hindrance of damaging the mouths of the cattle as the prickly pear does.—*Colonies and India.* [Might be found useful in the north and east of Ceylon?—Ed.]

The British Borneo Trading & Planting Co. (Ltd.) is being circulated privately for subscription at the present time. It has a capital of £100,000 in £1 shares. Of these the present issue is £30,000. The Company has been formed for the purpose of carrying on the business of merchants, agents, and planters, in and with British North Borneo, and of acquiring a concession of 20,000 acres of land granted by the Government of that territory, and conveniently situated in the neighbourhood of Sandakan. It is proposed to carry on trading and planting, the profits of the company being derived from the following sources, viz:—The sale of the timber, forest and other produce on its estates, and the cultivation and sale of agricultural produce. Advances to natives or planters for agricultural purposes, and purchase and sale of the produce. The business of land agents, acquiring building land, advances on property, erecting houses, &c. From royalties on fibre machines, for which the Company have made arrangements with Mr. Death for the exclusive rights to use and let on royalty in the territory his patent fibre extracting machine. The payment to be made for the concession and the rights over Death's machine has been fixed at £3,500 in cash, £1,500 fully paid ordinary shares, and £10,000 in fully paid deferred shares. The *concessionaire* is Mr. J. J. Dunn.—*L. & C. Express.*

The Phylloxera Pest in France.—The average yield of the French vintage for the four years from 1875 to 1878, inclusive, was 1,275,000,000 gallons. The last three vintages have decreased at a greater rate than 100,000,000 gallons per year, and now it is reported that in the vintage of 1886 more than one-fifth of the yield was produced from dry raisins and dregs of the first and second press. Although it is beginning to be the fashion to ascribe this decrease chiefly to mildew and other causes, the presence of the phylloxera must be regarded as one of its principal causes. After a variety of researches only one method has been found to effectually kill this insect, and that is by inundation, begun in November and continued for forty days. The vineyard on which this experiment was tried was one of the first to be attacked. In 1867 the wine produced was 925 hectolitres; in 1868, 40; in 1869, 35; in 1870, the first year of submersion, 120 hectolitres. Since that year the quantity produced has gradually increased, until it has nearly reached its normal figure, and the vines have regained their vigour. The commission appointed in France, which publish every year such a heavy report, have chiefly studied methods for killing the insect underground, and but little practical benefit has attended their action. Had they directed their energies to a policy of extermination above ground very different results might have been attained.—*Colonies and India.*

A Tour through the Brazilian Coffee Districts.—By permission of Messrs. Behrens & Landsberg, the following interesting Santos report, dated 1st September, was reprinted in Messrs. Carey & Browne's weekly circular of the 24th October.—We have lately visited Campinas and around as far as Sao Carlos do Pinhal and Belem do Descalvado. The impression received on the spot may interest our friends. Brazil is an undeveloped mine of wealth, and, whatever may have been said or written against it, there are many bright highlights perceptible. The labour question is by far more serious than we dreamt of. It should not be lost sight of, being a great factor in the reckonings with coffee for the next six years. There are yet vast territories suitable for the cultivation of coffee; but without hands to harvest it, it is no use thinking of extension. Even with improved machinery, which replaces a great deal of manual labour, we have seen planters in despair, unable to get hands for gathering in the crop, although offering higher wages —and this with a medium of 1886-87 crop, which in all likelihood will not prove beyond 2,000,000 bags. Of course, as long as there are no statistical bureaux, all crop-estimates must be more or less guesswork. The balance of the 1885-86 crop left in the interior has surely been over-estimated; wherever we came, no more old coffee was to be seen. What is wanted here are hands! Many attemps have been made to attract colonists, but, we are afraid, without the proper understanding of the situation. Planters offer colonists, a neatly built house and garden, against which they have to engage themselves to work for 3,000 reis per day as long as planters require their labour for the harvest. Germans, in fact the Saxon race, are the preferred colonists. Now, considering that Brazil wants colonists who stay, found a home, marry and intermarry—unlike the Latin race, which comes here to earn a scanty amount in order to retire on rice and corn to their mountains—this does not seem to us to be the way to persuade Germans, Scandinavians, or Crofters. Unfortunately, the large landowners here are disinclined to selling land, which must sooner or later not only prove shortsightedness but to their detriment. Looking at the States—Canada and Australia—where land is given to colonists, it is evident that some inducement must be held out to get out of the dilemma. Church marriage being too expensive, civil-marriage, so far illegal, ought to be recognised at once. Not until such radical changes are made, and only then, will the labour problem have a chance of being solved. If not enforced, we may see in the next future crop yields go down for a time. The 1886-87 crop has suffered from two causes—from frost in some parts, from drought in others. We have seen plantations where two to three feet of the branches have died off, and to recoup such damage, means one to two years. The incessant rains during the last month produce another anxiety; plenty of coffee on the terreiros is mildewing and much under the trees is washed away."—*Grocer.*

Manuring Cinchonas.—From the Madras Government we have received the following correspondence. Messrs. Arbuthnot and Co., addressed Government on 2nd December 1886, thus:—

We have the honor to acknowledge with thanks receipt of the Director's very interesting report on the Government Cinchona Plantations for 1885-86, furnished us in accordance with G. O., dated 20th November 1886, No. 7,034. 2. We observe that the experiments in manuring cinchonas in order to ascertain the effect upon the alkaloids were on a very small scale, and that the Government, in its order of 15th instant, express the desire that investigations should be continued with trees of other varieties. 3. We venture to suggest that experiments should be conducted upon a far larger number of trees, and if no selection of any particular varieties is to be made for the purpose that it shall include *C. Succirubra* and *C. Robusta*. We propose ourselves to experiment upon *C. Ledgeriana*, both with cattle and other manures. 4. It occurs to us that since the date of the Director's report further experiments in manuring may have been conducted and the results ascertained and if so, we should be very glad to receive particulars. We may mention that mainly influenced by the advices of the Director's letter of 9th November 1885 to the Collector of Malabar, we have abstained from manuring our cinchonas (though recommended by planters to do so), as according to that letter experiments made up to that date had shown that the yield of alkaloids per pound of bark was *not* increased by manuring. 5. We therefore have the honor to request that Government will obtain from the Director or the Quinologist, as the case may be, and communicate to us the expression of his opinion whether, taking into consideration the views held in November of last year, and the result of the experiments conducted in the past season, he would recommend manuring of cinchonas from a commercial point fo view, and if so, whether cattle or artificial manure would be the more beneficial. If he be of opinion that the latter is the more desirable, we should be glad to know his views as to what components would be the best. Possibly the investigations of the Government Quinologist into the inorganic constituents of cinchona bark may have arrived at a sufficiently forward stage to indicate the class of manure that would have the greatest effect in increasing the quantity of alkaloids.

Dr. M. A. Lawson replied as follows:—

I am at the present time carrying on the extended experiments as to the value of different kinds of manure, and the first harvesting of the manured plots will take place next April, after which the bark will be analysed and any information will then be communicated to you. 2, Mr. Hooper's report on the inorganic constituents of cinchona bark, printed in G.O. No. 1,032, of the 24th November 1886, is the first of a series of analyses which he is engaged upon the result of which will be communicated to Government in due course.

We are surprised that after the results obtained by MacIver and noticed by Broughton any doubt of the effect of manuring should be entertained, although we can well understand hesitation to apply manure to a production the market value of which has gone so low. Those who manure now, however, may have their reward a few years hence. We should suppose that a very large proportion of the bark sent from Ceylon was from trees growing amongst coffee and so manured equally with the primary cultivation.

THE ANALYST'S REPORT OF PRODUCE.

We have received a copy of the annual report of the public analyst for the parish of Kensington (Mr. Charles E.Cassal, F. I. C., F. C. S.), which contains some interesting information, and from it we extract the following :—During the year ended March 25, 1886, a total of 524 samples of food were submitted for analysis by the inspectors appointed under the Act. Two out of the three samples of China tea were of very inferior quality, containing exhausted leaves. The adulterated samples of cocoa examined contained added starch and cane sugar, as follows :—

Added starch, per cent.	Cane sugar, per cent.
At least	At least
55	30
50	30 (2 samples)
40	35
40	30 (2 samples)
40	25
35	30
25	30
20	16 (labelled "Epps' Cocoa ")
15	20

Of the 44 samples of coffee there were 75 per cent genuine, and 25 per cent adulterated. Of the 11 adulterated samples one contained at least 45 per cent of chicory, one 20 per cent, and nine 5 per cent. The black pepper, of which 27 samples were examined, showed the proportion of 22·2 per cent genuine, and 77·7 per cent adulterated. Samples of genuine commercial black pepper should not yield more than 5 or 5·5 per cent of total mineral matter. Any sample yielding more than 7 per cent must be considered within the meaning of the Act.—*Home and Colonial Mail.*

MANUFACTURE OF LIME JUICE IN TRINIDAD.

REPORT OF CONSUL TOWLER.—The lime tree grows wild in Trinidad, and when I came here three years ago, the fruit was not exported. I recommended a gentleman of enterprising disposition to ship a few barrels of limes to America as an experiment. The fruit decayed in the transit, and the attempt was a failure. Another plan was resorted to, namely, the neutralization of the acid juice with chalk ; but this plan has been abandoned, and the expressed juice itself is now exported either in the simple state as obtained by pressure, or after evaporation to about one-tenth its volume. The simple juice finds a market in America, and the condensed juice in England.

CULTIVATION OF THE LIME.—There are only two parties here on this island that cultivate the lime for exportation. From one of these I have received the following information:—Lime trees grow and bear in any soil, but the better the soil the larger the fruit. They are planted from 12 to 16 feet apart. When young they have to be pruned and trained to assume the shape of an umbrella. When about to form a lime plantation it is best to form a nursery a year beforehand, and then to transplant the young trees, pulling them up from the soil, cutting off the end of the pivot root, and then placing them in the ground where they are to grow. A lime tree yields on an average 10 gallons of juice. The fruit is allowed to drop off, and is then collected and conveyed to the works, where, the limes are passed first through the cutter which rips them open, and then through rollers and the press to separate the juice. These cutters, rollers and press are constructed in a very simple and primitive way, and admit of very great improvement. The juice is then, as before remarked, exported either in this condition or it is condensed by boiling. A barrel of limes yields 7 gallons of juice.

COST OF JUICE.

	Cents.
The cost of collecting a barrel of limes is...	10
Carting a barrel to the works	3
Cutting and pressing	3
Cost per barrel	16

The cost of lime juice, including packages, should not exceed 12 cents per gallon ; lime juice is generally sold at a price varying from 36 cents to 60 cents per gallon.

The essential oil of limes is extracted from the rind before crushing by grating on rasps with the hands ; the oil thus extracted is called the hand made-oil, which is obtained from the crushed limes and by distillation. A hundered gallons of juice will yield by distillation about three quarts of the esssential oil. This branch of industry is capable of great expansion by means of capital and intelligence : the soil is always ready to do its duty.—*Oil, Paint and Drug Reporter.*

CLIMATE AND VEGETATION.

Many of our readers will recall with pleasure the interesting series of articles published in this journal on the climate and vegetation of the Riviera, and on horticulture as practised by Dr. Bennet at Mentone. Those articles form part of Dr. Bennet's delightful book, *Winter and Spring on the Shores of the Mediterranean.* Of the general correctness of Dr. Bennet's views there can be no doubt, and it is certain that for the physician's purposes an investigation into the effects of climatal changes on plants at various stages of their growth affords more trustworthy information than the mere study of thermometric records. Mr. Charles Roberts, to whom we owe various interesting and useful publications relating to "phenology," is following up this question of the combined and continuous effect of various meteorological factors on plant life. "A meteorological instrument," he says, "records a momentary atmospheric condition. A plant does this, and much more ; it records the current conditions, and sums up or registers all the past meteorological and geological conditions to which it has been exposed. Phenologists cannot accept mere inferences, however probable they may appear to be, and nothing short of simultaneous records will satisfy them."

Pursuing these ideas, Mr. Roberts selects for observation in the Riviera the plants mentioned in the accompanying list:—

"The plants and trees included in the schedule are well known in our winter health resorts, and require not botanical skill for their identification ; but observations should not be recorded when there is any doubt on this head. The plants are arranged in three groups, to indicate roughly the chief varieties of climate of the Mediterranean basin. The first group indicates a hot, arid, sandy or rocky soil, and a dry, sunny atmosphere, like those of the south-east coast of Spain, Upper Egypt, and the borders of the African Desert. The second group characterises the colder and damper climate and soil of the Riviera, Southern Italy, Sicily, Malta, Algeria, and Lower Egypt ; and the third group the still colder and damper climates of the Italian lakes, the West Coast of France, Spain and Portugal, end the South of England. This last group brings the ordinary climate of England into relation with that of the Mediterranean, and will connect this schedule with the one which I have specially prepared for differentiating local climates in the British Isles.

"It would be desirable to make concurrent observations on the maximum and minimum shade-temperature at each station (by means of verified registering thermometers, exposed in Stevenson's stands), to ascertain the extreme range of temperature, and the lowest which each plant will survive. We know, for instance, that the Lemon tree is killed by a temperature of 24° Fahr., and the Orange by 21° Fahr.; while the Olive tree will bear 16° Fahr., although its young shoots are killed by a temperature no lower than 25° Fahr. ; and we gather from these facts that, at stations where these trees flourish, the temperature never falls so low as these figures indicate, even for a night or two, during many consecutive years. As observations on the rainfall cannot be carried on all the year, the relative dampness or dryness of different stations cannot be determined

by the rain-gauge; and we must rely on the known habits of plants, in their relation to moisture of air and soil, to help us in this respect. Any one who has passed quickly between Nice, Palermo, and Algiers, cannot but have noticed the difference in the general aspect of the vegetation at each place; its greater activity at the latter station indicating a greater amount of moisture in the air and soil than at Nice, while Palermo holds an intermediate position.

"The following observations should be recorded of each plant in the list. Does the plant or tree grow at the station? Is it protected from the cold, sun, or wind? Does it blossom? and at what date does the first blossom appear? Do its fruit or seeds ripen and at what date do they arrive at maturity? With respect to the deciduous trees (Pomegranate, Vine, Fig, Almonds, and Horse Chestnut), at what date do the leaves open (first leaf-surface visible); the first blossoms open; and the first fruit or seeds ripen?

(1) Carob or Locust-Bean (Ceratonia Siliqua)
Prickly Pear or Indian Fig (Cactus Opuntia)
American Aloe (Agave Americana)
Date Palm (Phœnix dactylifera)
(2) Pomegranate (Punica Granatum)
Banana (Musa sapientum)
Lemom tree (Citrus Limonum)
Sweet Orange (C. aurantium)
Olive (Olea europæa)
Australian Blue Gum tree (Eucalyptus globulus)
Bamboo (Bambusa vulgaris?)
Dwarf European Palm (Chamærops humilis)
Oleander (Nerium Oleander)
(3) Magnolia (M. Grandiflora)
Camellia (C. japonica)
Myrtle (Myrtus communis)
Vine (Vitis vinifera)
Common Fig (Ficus carica)
Adam's Needle (Yucca gloriosa)
Almond (Amygdalus communis)
Horse Chestnut (Æsculus hippocastanum)

"By means of simultaneous observation on these plants, or a small number of them, it will be easy to lay down on a map isopheual lines similar to, but by no means identical with, the isothermal lines laid down by meteorologists; and thus produce a diagrammatic representation of correspouding climates, and the difference of one station from another."

Following up this subject Mr. Roberts discusses, in the *Transactions of the Sanitary Institute of Great Britain*, the evidence afforded by plants as to the relative degree of purity of the air in large towns, and he gives a diagram representing a series of squares one within the other. Thus, in his illustration it is shown that in the outermost square the Larch, the Scotch, Fir, and the Heather, will grow and lichens may be found on the trees. In the succeeding square, supposed to represent a more deteriorated atmospheric state, the plants included in the outer square will not grow, but the Sycamore, the Horse Chestnut, the Yew, the Deodar, the Arbutus, the Laurustinus, and various fruit trees will still thrive, which they will not do in the next square, and so on, till we come to the central space, in which—doleful spot—no plants at all are mentioned; but even here Poa annua, and Polygonum aviculare, and Docks will grow, as every one who will visit the courts and alleys of London can see for himself.

Some quarter of a century ago and more there was a tradition that evergreens would not grow in London, and, therefore, the squares were planted with Privets, and Lilacs, the deplorable aspect of which in the winter months was but too familiar. People are beginning to find out, however, that many evergreens do relatively well in the most confined places, especially those with thick leathery leaves like the Holly or Yucca, and which are well provided with chlorophyll and consequently proportionately vigorous. Conifers, as a rule, do not do well in such places, indeed one of the best rough tests of the purity of the air may be obtained by the observation of the common Arbor-vitæ, Thuia or Biota orientalis. If the reader will wend his way from the suburbs, say at a distance of 4 or 5 miles from the Thames on either side towards the banks of the river, he will have ample opportunity of noting how the lower branches of this shrub gradually become denuded of leaves, till at length the wretched plant resembles a disorganised Birch-broom with a few loaves at the top, and then it disappears entirely. Much to our surprise, however, we know of cases in which Pinus excelsa grows in localities where the Biota will no longer do so.

As a matter of practice much depends upon the care bestowed by those in charge. Frequent cleansing with a syringe or garden-engine will enable plants to grow in the most unlikely places, and in the cases we have in view this demands so little time and attention that we can but press it on the attention of the Society over which Lord Brabazon presides. We know from our own experience of a garden where Roses had long since ceased to blow, but where now not only a large assortment of choice evergreens may be found, but where also an occasional Moss Rose may now be plucked; and this we attribute, not to any improvement in the atmosphere, which is probably more smoky if not fouler than formerly, but to increased attention to syringing.

It is obvious that the sources of fallacy and exception are so numerous that it will be long before we can speak with any degree of statistical precision. Such an amount of precision is, however, quite within the bounds of probability, and it must be attained by extended comparative observations on plants under all conditions and circumstances, such as Mr. Roberts advocates from the point of view of hygiene.—*Gardeners' Chronicle.*

THE PROCESS OF LIMING.

No. II.

Last week we drew attention to the many good effects which may result from the proper application of lime to the soil, and recommended the more extended use of this material in Victorian agriculture. It is well to bear in mind, however, that these good effects are to be expected only from the proper use of lime. When used improperly there may, on the one hand, be no results whatever, either good or bad, in which case the time and labor and money spent will have been thrown away; or, on the other hand, the soil may receive absolute injury, the rectification of which will involve a further expenditure of labor.

There is one case in which lime may always be used without fear of injury, in which, indeed, it must be used if the soil is to be brought into a thoroughly healthy condition. We refer to the case of the land being sour. There is no doubt that very many, probably the majority, of Victorian soils are sour. Most newly cleared lands are sour, and it is a frequent custom to let such lands remain for a year or more uncultivated, in order to sweeten. The sweetening could be effected at once by a dressing of lime. When these newly cleared lands are exceptionally rich, their fertility may be, and indeed often is, such as to mask the effects of their sourness, and abundant crops can be obtained, even though the soil has not been sweetened. But where the soil is of poor or only medium quality, it is useless to expect large returns without the use of lime.

We may here remark that it is often regarded as unnecessary to add lime to soils in limestone country. Yet several instances are known of soils actually resting on a limestone bed which yet are almost destitute of lime; and in many other cases the amount of lime is so small that it is not sufficient to neutralise the natural sourness of the soil. The reason for this apparently contradictory condition of things is not far to seek. The lime is washed away from the surface by the rain, and either runs off with the drainage waters, or forms a layer at the bottom of the soil. Sometimes this layer forms a hardened cake, and is then one of the many forms of "hard pan," being then known as a lime pan. In these cases of limeless soils in limestone country subsoil ploughing should be resorted to; or if the limestone is too deep, then trenches may be dug along the fields and the limestone or marl thrown up from these and spread over the surface.

Every farmer may find out for himself if his land is sour or not in a very simple manner. There can be purchased of all chemists, for a few pence, some small slips of blue paper, called "blue litmus paper." This paper is turned red by acids, so that if a small quantity of a damp, sour soil be pressed with the finger and thumb against a slip of this blue paper, wherever the soil touches the paper it will produce a red color, and if this red color remains after the paper has been exposed to the air for a few minutes, it is a sure sign that the soil needs lime. If the soil is very sour it will produce a bright red color, but if it be only slightly sour it will cause only a bluish pink or purple color; and by this means a rough idea of the amount of lime required can be formed. For a purple color only two or three hundredweights of lime to the acre may be necessary; but for a bright red, half a ton or a ton may be required; it being always borne in mind, however, that a strong clay soil will require, and can bear, a heavier dressing than a loose sandy one.

Liming will do no good if the soil contains sufficient lime already. And here again is a case in which the farmer can apply a simple test sufficient for most purposes. If vinegar be poured on to a piece of limestone or a piece of old lime, it will cause a bubbling up or effervescence similar to, but less than, that which takes place when water is poured on a mixture of carbonate of soda and tartaric acid, or when carbonate of soda is put into a mixture of vinegar and water, as is sometimes done for making a cheap drink in the bush. If then a little soil be placed in a tumbler or wine glass, and sufficient water be poured on to cover the soil and to allow all the bubbles of air to rise out of it, and if then vinegar be poured into the glass, those soils which contain lime will bubble up; and the more lime there is the more will be the bubbling up. If this effervescence should occur, it may be certain that it would be a waste of money to add lime to such a soil. But, if this effervescence should not take place, and if also it has been found that the soil is not sour, then the only way to ascertain whether the soil is deficient in lime or not is by having it analysed.

Liming may injure the soil in three ways—first, by rendering it too open and loose, so that it will retain no moisture; secondly, by forming a mortar, and so hardening the land that neither water nor roots can penetrate it; and thirdly, by exhausting the land. But all these dangers can be readily avoided. As pointed out previously, lime should be used very sparingly on light, sandy or gravelly soils. If it is found necessary to add it to such soils, then it should be put on in the form of a compost of one part of lime with six or eight of fine earth, the compost being allowed to stand some time before using; or, if marl can be had readily, the lime may be put on as marl, about half a ton or a ton to the acre. Or, if the sand rests on a clay subsoil, then the clay may be dug up in trenches, as is done in the fen country in England, and spread over the soil, the clay being afterwards ploughed in, and then the lime sprinkled over the surface; or, if neither marl nor clay can be had, then an abundance of vegetable matter should be given in the form of farm yard or stable manure, or in the form of green crops, particularly root crops, ploughed in the lime being added afterwards. All sandy soils, it should be borne in mind, are greatly improved by an admixture of clay, and it is exceedingly likely that a process of claying, similar to that adopted in the fens in England, would greatly improve the sandy soils lying to the south-east of Melbourne.

The setting of the lime into a mortar can only take place in heavy wet soils, and it may be taken as a general rule that all wet clay soils and swamps should be drained and ploughed before they are limed. But at the same time no fear may be entertained of the hardening of the land unless very heavy dressings of lime, such as 20 and 30 tons to the acre are used.

We have, on a previous occasion, referred to the exhausting action of lime. It is this very quality, however, which, when rightly applied, renders the use of lime so specially advantageous in many cases. The lime liberates for the immediate use of plants the various ingredients of the soil and manures which are ordinarily locked up in an inaccessible form, and by so doing it greatly increases the returns. In fact it enables the farmer to turn over his capital quickly. But if he thereby gets more out of his soil, he must return more to it in the form of manure. Exhaustive farming in any case is bad; it is just as bad to exhaust a naturally fertile soil as to exhaust one rendered fertile by lime. The object of the farmer in any case should be to improve the land if it be poor, or to maintain it at a good level if it be rich. And the preventive of the exhausting action of lime is just the same as the preventive of the exhaustion of a good soil, namely the proper use of manures.

The forms in which lime may be used are marl, crushed limestone shells, and shell sand, and quick and slacked lime. All the forms are best strewn, over the surface, the more evenly the better, the dressing being put on some months before seed time. Quicklime acts most rapidly, slacked lime the next, shells and shell sand the next, and crushed limestone and marl act the most slowly. Limestone, shells, and shell sand may be converted into quicklime by burning; but it is generally most convenient to buy quicklime of the lime burners. Quicklime is only used for sweetening heavy and very sour lands, such as recently drained swamps. Of all forms of lime, the slacked lime is the most useful; it is made by the farmer himself, by sprinkling quicklime with water, when the lime becomes hot, gives off steam, and if good, falls into an exceedingly fine powder. If it does not fall into this powder, either the lime is not good, and is of less value, or too much water has been added, with the result of causing the lime to chill. The great point to be aimed at is to get the lime into this fine powder, for it is then much more effective in its action, and a small quantity of it goes a great way.

We last week referred to the action of lime in increasing the immediate effectiveness of stable and farm yard manure. It is well to bear in mind, however, that the lime should not be mixed with the decomposing manure heap; but should only be mixed with it in the form of a compost immediately before using. If mixed with the decomposing manure heap, it causes the escape of ammonia, and thus a valuable part of the manure is lost.

The action of shell sand on the soil may be seen, near many of the fresh water lakes of Victoria, as for instance along the margin of Lake Corangamite, where fine shells blown up yearly by the winds and strewn over the ground, induce a surprising degree of fertility. Similar cases are known in almost all countries. An instructive case may be quoted which occurred in France, where a sandy soil, similarly composed, was every other year laid an inch thick over land which produced only a threefold crop of rye, and caused it to yield an eightfold crop of wheat for several years; but—and this is the point to be borne in mind—after 40 years of this treatment, without any other manure being added, the land would produce only a fourfold crop of wheat.—*Leader.*

AGRICULTURE IN ECUADOR.

Consul Beach, of Guayaquil, says that Ecuador covers an area of 150,000 square miles, and has a soil and climate scarcely equalled by any other country in the world. About one-fourth of the extent is of tide water level, and the remaining three-fourths of various altitudes embracing hills, mountains, and mountain valleys, the highest altitude being that of Chimborazo, 21,220 feet. There are about twenty mountain summits that are more than 10,000 feet in height. The great difference in altitude will serve as an explanation of the wide diversity of climate and variety of soil productions, both of which are much greater than would be conidered possible in the equatorial region. The mountains, though all of volcanic orgin, are yet somewhat varied in their elements, but each has the characteristic of quite

rapid decomposition, which decomposition provides a soil more or less fertile for all of the mountain surfaces, and affords abundant material to be carried down by the streams to the mountain valleys, and to the level lands adjacent, to the numerous rivers in the lower sections. Ecuador, on both sides of the Andes, abounds in rivers and smaller streams, which greatly enhance the productions of the country, and the rivers themselves provide a water communication with the markets. The climate is exceedingly diversified, having the wide range from an average temperature of 75° Fahrenheit on the Pacific Coast and upper tributaries of the Amazon to that of the summits of the Andean range, where there is perpetual snow and ice. Between these extremes there are all the degrees of variation from the tropical to the arctic. The difference of temperature resulting from the difference of altitude permits the growing in Ecuador of nearly all the fruits and varieties of grain and vegetables grown in all other parts of the world. Everything pertaining to the tropics is produced in profusion, and in addition, wheat, oats, barley, apples, pears, peaches, cherries, strawberries, and vegetables of every kind. Consul Beach says that Ecuador has many natural advantages that might be rendered a great blessing, but the people appear to be wanting in the main essentials of industrial progress, and the country makes but trifling advancement, as may be seen by an examination of the agricultural implements now in use. The implements of most varied uses is the *Machete*, a heavy blade about two inches in width, two feet long, with a handle about five inches long. Most of the blades are straight, but some of them have a slight upward curve. A field is prepared for rice by cutting down all the weeds and bushes with a machete; an opening for the seed is then made with a broad-ended bar, and the seed dropped in. When the rice comes up, the grass and weeds between the rows are cut with machetes, which operation is repeated at intervals. For Indian corn and sugar cane the land is prepared in the same manner, and the planting and cultivating is performed with the same tools, and in the same manner as previously described. The rice is cut with sheath knives, and the corn and cane with machetes. The rice, after being cut and cured, is first trodden out by peons or labourers, and then put into large wooden mortars, and milled by the use of large wooden pounders wielded by peons. Ploughing is done in the interior, for grain and potatoes, with ploughs made by pointing round sticks with iron—these implements being very similar to those in use in many parts of Italy. There are no harrows, field rollers, cultivators, reaping and mowing machines, drills or horse rakes. In the cultivation of potatoes and other vegetables large hoes are used. Timber-cutting and hewing are done with broad axes, and the timber sold is drawn to the rivers by oxen, having yokes strapped to their horns, and a pole strapped to the yoke. Chains are not used, the logs being attached to the ox-pole by raw hides. The small wood, from three inches in diameter downwards, is cut with machetes. On the plantation no saws are used, but the tools chiefly in use are machetes, hoes, iron-pointed stick ploughs, bars (wedge-shaped at one end), sheath knives, and broad axes.—*Journal of the Society of Arts.*

FORESTRY.

A Select Committee of the House of Commons was appointed on Friday, May 15th, "to consider whether, by the establishment of a Forest School, or otherwise, our woodlands could be rendered more remunerative."

The committee held three meetings, with Sir John Lubbock as chairman. The following draft report was agreed to on July 24th:—"Your Committee are of opinion that at this late period of the session it will not be in their power to conclude their investigation; they have therefore agreed to report the evidence already taken to the House, and to recommend that a Committee on the same subject should be appointed in the next session of Parliament." The evidence has now been printed and issued to the public. The first witness examined was Mr. William G. Pedder, head of the Revenue Department of the India-office. The forest organisation in India, he said, originated in 1846; and in 1863, further steps were taken to secure the scientific training of Indian forest officials. Last year the gross revenue had risen to nearly £1,000,000, and the net revenue to nearly £400,000. But the improvement which has taken place in the forests was a much more important element than the mere increase of net revenue. The forests were in course of being so completely destroyed in the various parts of India that the duty of the Forest Department had been rather to conserve them. He thought that, by the improvement of the education of our forest officials, we might produce somewhat similar improvements in England to those which have resulted in India. Forest schools existed in Germany, France, Russia, Italy, and Switzerland. Believing there might be some improvements effected in training the forest officials, we requested the French Government to send over an experienced officer to examine and report upon the state of the English woodlands, and the authorities sent over Professor Boppe, who made a tour of inspection of some of our forests, accompanied by Colonel Pearson, then forest officer at Nancy, and some of the students. He made a report, which witness handed in. In this report the Inspector of French Forests says that were it only for the purpose of replanting the five or six millions of moor and waste land which cover one-third of the Highlands, he should consider there was a sufficient reason for the formation of a Forest School. He recommended that a National Forest School be founded in Great Britain, and that Professorships of Sylviculture be instituted at Cooper's Hill and at Edinburgh. Mr. Pedder expressed an opinion that in twenty or thirty years hence, when the result of what is now done has become apparent the net returns of the revenue from the Indian forests, will become very much larger. The Indian Government established their school at Dehra Dun because it was desirable that officers, even of the lower grade, should have some special training. It had only been established for five years, so that they could not tell yet what the result of it might be. There was nothing of the same kind in Great Britain at present. At Kew there was a magnificent school of botany, but not of forestry. He belived the establishment in England of a similar school to that of Dehra Dun would be advantageous.

Colonel James Michael, who was at the inception of the Forest Service in India, said he concurred with the foregoing evidence. He thought the management of our woodlands, in England, might be improved, and that a forest school in this country would have very beneficial effects. There was a good deal of land in England and Scotland which would bear planting. Timber in this country would always pay for its carriage.

Dr. Hugh Cleghorn, who was for twelve years conservator of the Madras forests, said he also concurred in Mr. Pedder's view. It was unquestionable that, if we had more trained officials, our woodlands would be rendered more remunerative; and it was marvellous that we should not at an earlier date have begun to adopt some means to preserve them. The establishment of a Forest School in each of the three kingdoms would be a great advantage to this country. The supplies of timber coming from abroad were rapidly diminishing, and it was of great consequence that we should endeavour to increase our own production. There were many places in this country exceedingly suitable for planting, but it would be necessary to exclude sheep for perhaps thirty years.

Colonel Pearson, who represented the Indian Government for eleven years at the Forest School at Nancy, said he had the general charge of the forest students, and had been through most of the principal French forests. He had also been through the British forests with the French professors. Several English colonists had applied to him for officials to take the management of forests, and, being unable to find any qualified Englishmen; he had been obliged to recommend French officials. The school at Nancy was an admirable one, and had done great service by instructing a very able body of men, who were now carrying on good work in India. He was in favour of supplementing the general education given in this country by giving a special

forest education in some convenient place, where there should be a museum supplied, with an instructor in forestry, who might give lectures on the subject, and conduct the pupils from time to time into difficult forests with the view of enforcing the instruction of the lecture-room. A forest school might be set up in this country for an expenditure of £600, per annum in salaries. He did not know one mature forest in England or Scotland at present, and, therefore, for an important part of the instruction relating to the removal of the crop, the students would have to go abroad. It would be desirable to interest in this subject persons concerned in the education of land agents. We should suffer in the future if this matter were not taken up now. He would give three courses—elementary, for the wood manager; more advanced for the land agent; and a higher course for the man who wanted a thorough education but for the complete course men ought to go to the Continent. There was one spot in the Forest of Dean especially suitable for instruction; but neither there nor in the New Forest could anything be shown regarding the management of conifers.

MR W. T. Thiselton Dyer, Assistant Director of the Royal Gardens, Kew, said Kew performed, to a large extent, the part of a botanical authority to the Government, and when the Colonies applied for information, the Government sent to Kew for assistance. It had been found impossible to recommend to the Colonial-office properly qualified persons either to report upon or to manage colonial woods. Apart from the trained officials of the Indian Forest Department, it was practically impossible to meet the requirements of the Colonies; and that department had only spared men temporarily, which had caused great inconvenience. A good many of our Colonies had now come to that state of things that there will probably be a demand for persons who understood the management of forests. He would make the demand for India a kind of nucleus of a school which should be utilised for the education of such gentlemen as wished to undertake colonial service, and for the instruction of land agents and persons competent to give advice as to our own woods.

Mr. Julian C. Rogers, secretary to the Surveyors' Institute, said he agreed with the previous witnesses as to the general advisableness of instituting a Forest School, both for this country and for the Colonies.

The report of M. Boppe on a visit to the English and Scotch Forests, by the professors and students from Nancy Forest School (see *Journal*, vol. xxx. p. 772) is printed as an appendix to the report of the committee.—*Journal of the Society of Arts.*

CINCHONA STATISTICS.

From the following documents it would appear that the number of cinchona trees of all ages planted on 21,000 acres of private land in Java, is thirty millions, or close on 24,000 per acre. It will be a good many years yet before the bark from these will closely affect the markets.

Colonial Secretray's Office, Colombo, 12th Feb. 1887.

The Honorary Secretary, Planters' Association, Dimbula.

SIR,—With reference to your letter of the 7th July last, I am directed to transmit to you the enclosed copy of a letter from the British Consul at Batavia,—I am, sir, your obdt, servant.

H. C. P. BELL,
for Colonial Secretary.

No. 18. British Consulate, Batavia 18th Jan. 1887.

Sir,—I beg to acknowledge receipt of your despatch of the 24th August last handing me copy of a letter received by you from the Secretary of the Dimbula Planters' Association, asking for information regarding the cinchona cultivation of Java, on receipt of which I addressed the Planters Association here on the subject and have only just now received its reply, which accounts for the delay which has occurred in my forwarding you the information. According to the estimate of the Association, the area privately planted is 21,000 acres; the number of trees planted 30,000,000, (of which 14.000,009 C. succirubra;) and the crop for 1887 1,433.250 lb.; and I believe these figures may be taken as practically correct, or as nearly so, as it is possible to come. The average proportion of sulphate extracted from the bark is estimated by the Association to be about 3 per cent. At the end of September 1886, the statistics of the Government estates were as follows.—

Plants in the nurseries { 1,249,000 Ledgeriana
560.000 Succirubra

Plants in open ground { 755,700 Ledgeriana
74,000 Calisaya & Hasskarliana
556,000 Succirubra and Calloptera
234.000 Officinalis
8,000 Lancifolia

In 1883, the last year for which returns are available of the area of land planted by the Government it was 1,778 acres.

CINCHONA STATISTICS.

Years.	Government crop.	Private crop.	Amount realized for Govt. crop.	Plants in Nurseries.	Plants in open ground.
	lb.	lb.	£.		
1881 ..	179,520	25,290	18,204	736,600	2,036,480
1882 ..	275,264	35,259	28,036	1,205,800	2,099,400
1883 ..	453.424	172,733	28,915	1,533,000	1,966,500
1884 ..	380,800	275,762	30,000	1,516,500	1,753,900
1885 ..	458,728	—	—	1,390,000	1,567,000

Trusting the above information may prove of use to the planters of your island.—I am, &c.,

(Signed) N. W. NEILL,
H. B. M.'s Consul.

MANURES AND MANURING.—It is well to bear in mind that no cast iron rule can be laid down on the subject, different factors having to be considered before it can be settled what manure is best. It has been truly said that "the essential ingredients that must come from the soil are potash, lime, magnesia, iron, phosphoric acid, sulphuric acid, a small amount of chlorine, perhaps a minute quantity of silica, and, finally, considerable nitrogen. Consequently, in order that plants may grow and thrive, they must have at the disposal of their roots in the soil a sufficient quantity of each of these ingredients of their food. If any one of the more important constituents—potash, lime, phosphoric acid, or nitrogen—be deficient, the whole plant suffers."—*Planter and Farmer.*

WE note in the Batavia *Handelsblad* of the 11th January that a concession, formerly held by the Kali Anam Company at Langkat on the East coast of Sumatra, comprising about 26,600 acres of jungle land, has been taken over by Mr. O. Eckels, owner of the Mabar tobacco estate in Deli, and Baron P. de Lapeyrie agent for the firm of Decauville in Netherlands India and the Straits Settlements. These gentlemen intend to start a company with a capital of $60,000 or so, half of which has already been taken up, in order, on a large scale, to set about growing pepper, cubebs, nipah, and India Rubber. The market value of these products has risen high enough of late to warrant confidence in this first experimental venture in that line set on foot by a European settled in Sumatra. The land formerly owned by the Kali Anam Company, is especially suitable for pepper growing. At the head of this enterprise, which will bear the name of the "Sumatra Pepper Company," Baron P. de Lapeyrie will be put in the capacity of manager. The head quarters of the company will be at Tanjong Robia between Sunghy Tungkan and Sunghy Halaban. The promoters of this novel enterprise deserve every success. They intend to turn Siamese laborers to account, above all, for pepper cultivation. Siam is certainly a new quarter upon which to indent for plantation coolies in this part of the world. We are informed that the concessionaries will begin work in May next, and as this will be the first European enterprise of the kind in Sumatra, we wish the Baron and his partner every success.—*Straits Times.*

CEYLON UPCOUNTRY PLANTING REPORT.

THE WELCOME RAIN—COFFEE BLOSSOMS AND CROP PROSPECTS—MR. COCHRAN'S ANALYSIS OF COCA LEAVES—FUNGUS IN TEA—THE SAU TREE.

14th Feb. 1887.

The welcome rain which we had last week has made us all jubilant. Even the depressed and despised coffee has responded to the genial showers, and it is quite a sight to see how the shuckest trees are putting on blossom. Where the bushes are in any kind of heart at all, be it native or otherwise, every branch and twig is full of spike, and in a few days more they will be clothed in a clustering magnificence of white. This promise, and the prospect of good prices, are stirring the inert native. The little patch of native coffee which still remains after the inroads of neglect, leaf disease and hug—a relic of an all but vanished past—is being seen to; the weeds are scuffled off, the jungle stuff cut down, and hopes built up, which are likely to be discounted to the wily Moorman at a ruinous rate, long before the harvest can be reaped. If the blossom will but set—and one that was out about a fortnight ago has already done so—those who have any coffee remaining, may have cause for satisfaction in that they spared it. We will be having erelong some man going in for a new clearing of Arabian coffee; as it is I have heard of an enquiry for Liberian plants so hopeful is the Ceylon planter, prepared even to double back if there seem but a possibility of success. From Mr. Michael Cochran, M. A., F. C. S., our local chemist, I have been favoured with a report of a chemical examination of coca leaves, which, as being interesting to the readers of the *Observer*, I now enclose. I was indebted to Mr. J. A. Ferdinandus, of the Royal Botanic Gardens, Peradeniya, for the sun-dried leaves which formed the basis of the report, and I would like when mentioning that gentleman's name, to bear my testimony to his unfailing courtesy, and his readiness to oblige on all occasions. Indeed this willingness to serve the public is the distinguishing feature of all the officials connected with the gardens. Mr. Cochran's report is a valuable and exhaustive one. Whether coca will yet be a much cultivated article in Ceylon remains to be seen: any how those who do try to grow it, will find that the harvest of leaves is very much increased if the plant be grown in the shade. In the open it is more apt to produce seed. As to the profitableness of the culture, there are many opinions current. But experience in the matter is very limited and while you hear a good deal which tends to its disadvantage, still there is an under current of belief in its future.

The dying out of tea trees, in threes, and fours, which is a common enough thing in most new clearings, is now traced to a fungus on the roots. After having destroyed the rootlets, it attacks the tap-root, and then, what before seemed a flourishing bush, withers and dies. I understand that it is not a thing likely to spread. The fungus is caused from the rotting of the soft wood jungle trees,* and with the decay of that useless stuff there will die out that which starts the fungus into life. The Sau tree, which is favourably regarded as a shade tree for tea, and a general opener of the soil, is being pretty extensively planted out in nurseries. I learn that there is a considerable demand for the seed at present, the dry weather we have come through lately, giving many the idea that a light flickering shade such as is thrown by the graceful foliage of the sau, would prove beneficial to the tea plant in the dry months, and not be altogether an objection in the rains. By and bye we will know more of this. PEPPERCORN.

* We were the first to notice it, and we have never traced the fatal fungus to any tree but one, a species of symplocos.—ED.

PLANTERS' ASSOCIATION OF CEYLON.

The following are extracts from the 33rd annual report for 1886-7 of the Ceylon Planters' Association read at the annual meeting on 17th February, 1887:—

PLANTING PRODUCTS.

2. *Coffee.*—The acreage under this product has been reduced during the past year, and, notwithstanding the satisfactory prices now obtainable, your Committee believes that in some localities a further area now under Coffee will in the coming year give place to tea.

The Exports for 1886 were 179,210 cwt. against 315,649 cwt. in 1885.

Tea.—Satisfactory progress in connection with this product, which is rapidly becoming the staple of the Island has to be recorded. The acreage under cultivation is constantly being extended both in supercession of other products and in fresh land. The season, so far, has not been altogether favourable to an abundant yield, as the excessive damp of the South-West Monsoon has been followed in many Districts by a failure of the North-East rains. The unaccountable fall in price which took place early in the year, was soon succeeded by a firm market. Further advances have been made in the improvement and cheapening of machinery, but in the latter respect much remains to be desired.

The Exports for 1886 were 7,849,888 lb. against 4,372,721 lb. in 1885.

Cinchona.—The same causes which led to the large export during 1885 have occasioned a similar export during 1886, and consequently prices have fallen to a barely profitable point. It is impossible to say for how many months this export may continue; but it is unlikely to be for long, and it is maintained entirely at the expense of the future. Your Committee while fully alive to the desirability of obtaining the statistics connected with the probable export of bark, as suggested by the Dimbula Planters' Association, has felt that it would not be possible, at the present moment, to obtain figures which would be even fairly reliable.

The exports for 1886 were 14,675,663 lb. against 13,736,171 lb. in 1885.

Cacoa.—This valuable product has asserted for itself a position of no mean importance among exports, while high and remunerative prices have been maintained. The increased production has been very marked during the past year, and bids fair in the current year to exceed that of any previous year. The "Helopeltis scare," is practically at an end, and the attention of those who have hitherto held aloof from cacoa cultivation is being drawn to it by the very encouraging results obtained on the older plantations. That its successful and profitable cultivation will be confined to certain localities is no doubt true, but your Committee believes that, with patience and perseverance, a larger acreage can be advantageously made available.

The exports for 1886 were 13,056 cwt. against 7,192 cwt. in 1885.

Minor Products.—Of these cardamoms remain the most important, and the crop for the past year has been an abundant one.

The exports for 1886 were 238,947 lb. against 184,142 lb in 1885.

Liberian Coffee—is at present the only other minor product deserving of notice, but it is being gradually cleared out to make way for tea, and may probably soon cease to be an article of export.

The exports for 1886 were 3,834 cwt. against 5,325 cwt. in 1885.

INDIAN AND CEYLON TEAS IN 1886.

The rapid advance in public favour made by Indian and Ceylon teas is the feature of the last year's trade. The *Grocer* commenting on this and the past and future of the trade generally, makes the following comments, which show a distinct prejudice, on the part of the writer, against Indian tea:—"Now, with reference to quality, we are sorry to see that it is being sacrificed in order to produce quantity. India says, 'The Grocer, can't do without us, therefore let us compete with China, produce the quantity, and knock down the price,' They have knocked down the price of the bulk of the Indian tea, and they are now on a level with China, viz. 6½d to 9d per lb.; but, after all this is done, what will be the result, and will Indian planters benefit themselves? We decidedly say, 'No.' The gardens may be, and we believe are, able to produce now even at present value, and still leave a profit, but there is a limit to their consumption, as the India teas are so raw and pungent that no retailer will keep his trade long if he uses only Indian tea—even now we believe it will be found that the home consumption of Indian and Ceylon tea is on a par with China congou, or say, half-and-half; and it is much to be feared that in time this striving to produce the quantity will have such an effect on Indian and Ceylon teas that the public will turn against them. The public like something pungent and flavoury, hence the reason of the ever-increasing demand for Indian teas instead of China teas, but if they are only to be given a bitter nauseous compound and no flavour (which the lower grades of Indian tea are quickly coming to,) there will soon be a reaction in favour of the more delicate and refreshing China growths, and which only require to be made properly to be appreciated." It then goes on to say—"Indian and Ceylon teas are fast becoming the principal market in the trade. Dealers will neglect China sales but the greatest attention has to be paid to Indian growths. As fast as they are bought they seem to be sold again in the country, and consumption goes on increasing yearly. As regards Indian tea, the results to the dealer cannot be so satisfactory as would be imagined, owing to their increase in consumption and favour with the public, for several reasons. Firstly, owing to high firing, the teas taste well on arrival, but if they are kept they soon lose their quality and freshness, and become coarse and bitter. . . The bulk of the teas that have come in this season consist of teas under 10d. per lb., and under the very heavy weight of sales each week prices have fallen 2d. to 3d. per lb. within the last two months for these grades; it can therefore be well understood that dealers must be left with some bad stock. All these teas have a good leaf and very fair liquor, consequently the increase in the deliveries of Indian tea for the last two or three months of the year has been very large, as they now can more than compete with the low China growths, and of course are taken in preference. When fair grades of Indian souchong and pekoe cost 9d to 1s. per lb. they could not be used so freely in cheap mixtures, but now that they are actually cheaper, than common China growths *price for price*, an enormous trade in them is the result, as they have more point and strength in a low-priced mixture." As regards Ceylon teas, they continue growing in great favour. The reasons for it are many, viz., that they have kept up their quality this season, which both India and China have failed to do; again, they draw a dark liquor, and possess a beautiful soft flavour, thus enabling them to be drunk alone without any mixing.—*The Grocer.*

COFFEE CURING.

Sir,—Mr. W.A. Lyrtle's rejoinder to Mr. Johnstone's letter in your paper, *re* the above subject, calls for a few remarks from one, who was a Ceylon, and is now an Indian coffee planter, of, I believe, of longer standing, and of greater experience in the "Spicy Isle" than Mr. Lyrtle's letter leads me to think he has gained there, Mr. W. A. L. writes about the exorbitant charges for curing on the part of the Colombo agents. Again he forgets, if ever he knew, that most estates were heavily mortgaged from their very earliest infancy to, or through their several agents, and that, consequently, the proverb of "charity begins at home" might have been not inaptly applied to the non-reduction of the agents' curing charges. I admit that when times were bad the big curing firms did not respond, as they should have done, to the proprietors of the vanishing coffee. It *is* possible to cure coffee at a lower rate than was usually charged in Ceylon by the big curing firms, who at the same time usually acted as financial agents to the estates whose coffee they cured. The ordinary rate was R2-4-0 per cwt. whilst Baker and Hall's rate was R1-12-0, still I maintain these prices offer no parallel. The big firms were mixed up in financial estate transactions, and the latter firm were merely curers *pur et simple*. Mr. W. A. L's. ideas about sending down coffee to the coast at a ton a cart; are absurd, in view of the state of the roads down the ghats. He evidently has just woke up from a dream of the Spicy Isle, and fancies that the peerless roads we had there are duplicated in this or any of Her Majesty's Dominions. There is *one* grain of wheat in W. A. L's letter and I would strongly advise my planting brethren to sift it for themselves, and this grain resolves itself into "when once the color is established in the bean, dry the latter no further, keep it turned over in the store daily till despatch." He is perfectly right when he says that long exposure will result in a loss of color; and with good sun, color, if there is *any* in the bean will come out in five days; but your correspondent does not say that leaf disease effects the color of the bean, as it undoubtedly does; or, did he reach Ceylon when leaf was at its height, and is the color of the bean, under these circumstances his *beau ideal* of what the color of a coffee bean should be?

SALAWAKIELLIE.

Sir,—For the information of your correspondent who replies to my letter on coffee curing I may state that I had ten years' experience in Ceylon, and though that may not seem much beside the assumed hoary antiquity of this veteran, yet I submit that it is long enough to enable one to understand what he writes about with reference to coffee. Will your correspondent kindly respond, and state how long his "standing" was? I do not see that the fact that our friend of the strange signature is "acquainted with Mr. Johnston" is made use of as an argument, or in support of an argument. I am glad that he supports my argument so well when he says "The latter firm (B and H) were merely curers *pur et simple*." Yes, *merely* so. Hence their success. As for the difficulty in sending a ton down the ghats, I maintain that it is an easy matter with the dry weather and dry roads during crop in India. In Ceylon this load is almost universal in rainy weather; so the advantage gained by the metal is counteracted by the weather, I may also inform the gentleman whose letter is under reply, that I have procured a cart from Ceylon, which, with the exception of extreme length of pole, forms a tremendously favourable contrast to the Mysore jimcrack affair. It is not because of inferiority of the roads but rather because of inferiority of carts that makes a ton seem a preposterous load. This leads me to point out that your correspondent, while admittiug the inferiority of the roads here, yet fails to notice what I said about the needlessness of sending coffee down the ghats. If leaf disease affects the colour of the bean then there was no call for Mr. Johnston's letter. I merely stated what I considered to be the extent of the planter's duty. I may now in addition state that good cultivation in an Indian climate seems to counteract to a great extent the evil effects of leaf-disease. *Hemileia vastatrix*, being a fungus, never ceased from its deadly ravages on the food cells of the leaves in the moist hot climate of Ceylon. In India the prolonged drought, as well as the sunless, ceaseless, drip of the monsoon,—checks the reproduction and activity of the pest, and gives the weary planter some respite, some breathing space to prolong the heavy fight. Your correspondent flippantly refers to mortgages, and admits he was not always used to "Mysore Curry." I

have had heavy and early acquaintance with the former, which makes me thankful if I can get the latter. W. A. Lyrtle.
—*Madras Mail.*

CHEMICAL EXAMINATION OF COCA LEAVES.

I have much pleasure in reporting to you the results of my first attempt at the chemical examination of the leaves of Coca Erythroxylon, which you were good enough to obtain for me. One portion of the sun-dried leaves yielded ·544 per cent of crude cocaine alkaloid; another smaller portion of the sample, which I treated with fully one and-a-half times the proportion of solvent used in the first case, yielded ·648 per cent of crude alkaloid. These results are good, but the total amount of alkaloid obtained from the quantities of leaves operated on seemed to me too small, viz., 4·2 and 2·6 grains respectively, to admit of an accurate determination of the pure alkaloid being made by the process followed. In assaying the leaves by this process, indeed, it is not customary to proceed further than the actual determination of the crude alkaloid. Determinations on the large scale shew the proportion of impurities (another alkaloid called hygrine and decomposition products,) which usually accompany the crude cocaine, and a corresponding deduction being made from the impure alkaloid obtained by assay, the difference is regarded as a close approximation to the amount of pure alkaloid. I should like to obtain a larger supply of leaves, both for the purpose of trying other methods of extracting the alkaloid, and also to determine for myself the amount of purified alkaloid obtainable from the crude alkaloid. I have before me two leading chemical journals, in both of which the process I used is given, yet the one authority states (giving instances from actual working) that the crude alkaloid usually contains from 20 to 25 per cent of impurities, while the other authority gives no examples, but states that the crude alkaloid "contains on an average 20 per cent of alkaloid with much impurity." The crude alkaloid which I obtained was a clear, almost colourless substance, resembling varnish, which by and bye crystallized, the crystals spreading out from star-shaped nuclei. The crystals even after long drying remained somewhat viscous to the touch. A small portion when laid upon the tongue and pressed against the roof of the mouth had a slightly bitter taste, and about a minute, there was experienced an increasing feeling of numbness. The effect, which was not very strong, but quite marked, passed completely away in a few minutes. A portion of the alkaloid obtained was dissolved in hydrochloric acid to a clear and neutral solution, and evaporated to the consistency of varnish. After standing for some time and being stirred it changed its physical condition to what looked like a moist nearly white amorphous powder, but, under the microscope, its structure was revealed as a mass of clear, but very minute, prismatic crystals. This is the cocaine hydrochlorate, the use of which as a local anæsthetic is now fairly established. A little of it placed upon the tongue soon produced a sensation (or want of sensation) resembling that of a painless blister. I dissolved the salt in water, adding a minute quantity of salicylic acid, to prevent the growth of low organisms in the solution. I have ent you a portion of this solution, which is clear and but slightly tinged with colour. A good way to test the effect of it on the mucous membrane of the mouth, is to put a drop of it on a small piece of blotting paper, which is then pressed between the tongue and the roof of the mouth. A comparatively short time ago, the crystallized hydrochlorate of cocaine was retailed in Colombo at R2·50 per grain, now it may be had for 25 cts. per grain.

As I have not in the course of my reading seen any analysis of the ash of coca leaves, I used a portion of the sample of leaves to make an analysis of the mineral ingredients left after burning the leaves. This is interesting, as showing the inorganic matter removed from the soil by a crop of coca leaves.

The sun-dried leaves gave off 10·8 per cent of moisture, when dried at 212° Fahr., and when burned, yielded fully 6 per cent of ash, including carbonic acid, which is not an ingredient of the leaf, but a product of combustion. The following are the detailed results:—

Composition of the ash of coca leaves.

Silica	3·06
Oxide of iron &c., ...	3·38
Lime	27·86
Magnesia	8·50
Sodium chloride	5·74
Postassium chloride ...	1·26
Potash...	13·94
Phosphoric acid	16.81
Sulphuric acid	4·61
Carbonic acid	14·84
	100·00

Since writing the above, I have come upon and interesting research into the composition of tea leaves, in the January number of the *Journal of the Chemical Society*, which, by analogy, may throw some light on the discrepancy of the two authorities referred to on the matter of the amount of pure cocaine obtainable from the crude alkaloid. O. Kellner has made systematic analyses of fresh tea leaves plucked from May to November, and it would appear from his tables of analyses that the amount of ethereal extract and of the alkaloid theine are variable, and in something like inverse proportion to each other. In May the amount of ethereal extract was 6·48 per cent. and the theine 2·85 per ct. calculated on the dry leaf, while, in November the figures were 22·19 and 1.00 respectively The constituents of the ash shew similar changes. The potash *e. g.* in May constitutes 49 06 per cent. of the ash, and it gradually decreases, till, at the end of November, it is only 17·31 per cent. Conversely the lime in May is 11·95 per cent. an at the end of November 30.46 per cent.

M. COCHRAN.

Colombo, 7th Feb. 1887.

Substitute for Coffee amongst the Natives.—A planter has sent us pods of a leguminous plant, asking,—"Have you heard of the new coffee that is now sold at the *kaddies* on the road side called *Toor atta*?" Having submitted the question to Mr. W. Ferguson, he writes:—These fruits (pods) are those of the *Sesbania Ægyptiaca Persona*. The plant is common about cooly lines all over Ceylon and has been grown in the island for several centuries. It is given as a native in Dr. Trimen's list, but though known to the Tamils as *Karum-chembai*, it has no Sinhalese name and it is not one of the Toras, (Cassias, or Cajanus). The leaves are used as poultices, and the wood makes excellent charcoal for gunpowder, but I do not believe the seeds are used for any purpose.* Those of a species of Cassia, had quite a run as a substitute for coffee sometime ago."

* Our correspondent distinctly states that they are now used as a substitute for coffee.—Ed.

INDIAN FIBRES SUITABLE FOR PAPER MAKING.

We have been favoured with a copy of the following official Report of a Conference held in the Commercial Room of the Imperial Indian Court of the Colonial and Indian Exhibition, 2nd July 1886.

Present:—Sir E. C. Buck, LL. D., Dr. G. Watt, C. I. E., Mr. John Wilson, Mr. F. G. Lloyd, Mr. E. H. Joynson, Mr. E. Bevan, Mr. Clayton Beadle, Mr. J. Buchanan, Mr. T. Christy, Mr. W. E. Death, Mr. F. P. Banlow, Mr. Routledge, Mr. Lascelles-Scott, Mr. B. Donkin, jun., and Mr. T. A. Archer.

On the tables were displayed, a large assortment of fibres suitable for paper-making, as also Indian power and hand manufactured papers. The following may be mentioned as the more important fibres shown:—

Pollinia eriopoda.	Rice straw and roots.
Saccharum Munja.	Dhup and other wild grasses.

Also bamboo half stuff and paper, prepared by Mr. Routledge, of Sunderland, and a number of the cheaper bark fibres of which those of *Bauhinia vahlii* were deemed the most hopeful. *Opuntia dillenii*, the cactus which has overrun large tracts of the drier regions of South India, was pronounced useless, but plantain fibre and half stuff was viewed as most hopeful. Jute waste and rags, and other waste materials used in India for paper-making, were also placed on the tables, but as these are articles of established trade they received only a passing remark.

It was admitted by the gentlemen present that paper might be made from almost anything; the question was one of price. It would never, for example, pay to cultivate any fibre for paper, and especially a fibre that required to be put through a preparatory process before being thrown into the paper-makers' vats.

Mr. Death said that, in his opinion, the most promising fibre in India for paper-making was the common edible plantain, but the great difficulty in utilizing it was the cost of carriage. What was therefore wanted was a machine that would strip the fibre on the spot, reducing the stems and leaf-stalks to a condition in which they would be baled economically. Experiments were being tried, with this object, in Costa Rica, and he expected to receive a report in a few days, which, he believed, would be favourable. He very kindly promised to communicate this for the information of Government in case it might be desired to have the same experiments repeated in India. Should his anticipations be realized he felt sure the fibre would come into general use in papermaking, and there was no doubt very good paper could be made from plantain stems, in fact this had been proved by practical test, and he would be glad to furnish samples of plantain paper.

D. Watt explained that this fibre had received considerable attention in India, and that the Bally Paper Mills showed in their case, samples of plantain paper. The difficulty that, in his opinion, would always stand in the way of a great development of plantain fibre was the collection of the stems. It was all very well to talk about a machine that could be used on the spot, but for whatever cost such a machine might be had, the owner of half a dozen plantain stems was not likely to purchase it. There are few plantations of plantains, and the supply would have ultimately to come from the hundred peasant homes within every square mile, since the plantain did not exist in sufficient abundance as a wild product in accessible regions.

It was stated to be indispensably necessary in a fibre intended for paper to reduce the bulk to a minimum so as to lessen the cost of freight to Europe, provided that this reduction did not entail any elaborate or costly process. Simple methods for doing so are known, such, for example, as beating to remove dirt, hydraulic baling of the fibre into conveniently sized packages.

It was urged that it was essential that information should be afforded respecting the quantity available and the probable cost of any proposed new fibre. Quantities of 10 tons were needed for reliable experiment, and the material sent should be as much freed as possible from all useless matter, provided the doing so did not increase the cost of the fibre too much.

Sir E. C. Buck suggested, that it would be well if the gentlemen present who were interested in paper making would go through the fibres shown in the Economic Court, and make a list of those which appeared most hopeful as future paper fibres, in order that samples of these might be sent from India beaten out and prepared in the desired manner. This proposition met with general approval, and it was again urged that to be useful to paper makers a fibre must be cheap, since all that the paper maker could pay for was waste from the fabric industries, or a fibre that, like esparto, might without any preparation be thrown direct into the vats. Esparto could be purchased at £4 a ton at the present moment in London, and wood pulp had so revolutionised the paper industry that, unless for special merit, the paper-maker could not pay more than £10 or £12 a ton.

The gentlemen present agreed that, while the *bhabar* and *munj* grasses were very good for paper it would never pay to import them in that condition, the more so since esparto was obtainable at a price far below what would be charged in freight alone from India. Unless these grasses could profitably be shipped in the form of half stuff they were out of the question. The only Indian fibres that seemed hopeful were bamboo, plantain, jute, and sunn waste, and the long stems of the *Bauhinia* creeper. Since the Conference perhaps some dozen paper-makers and textile manufacturers have asked and obtained samples of the last mentioned fibre, and it seems highly likely that as a direct outcome of the present Exhibition this creeper will come to be extensively used for a number of purposes. Everyone who has seen it has gone away pleased, and fortunately anticipating some such result; steps were taken to send to the Exhibition a large supply, and it has thus been possible to meet all demands for samples.

The practical result of the Conference may be briefly stated to be that fibres that are good enough for textiles are too good for paper-making. Bamboo has been tried, and may be viewed in as forward a position as it is possible to press a new material.* The gentlemen who attended the Conference agreed that the Government had best concentrate its energies on developing the plantain and *Bauhinia* fibres.

It was asked if the Government would grant any inducement to paper manufacturers who would be willing to undertake the necessary experiments, which, to be useful, must include technical trials as well as scientific analyses.

Sir E. C. Buck feared that there was no fund available for such purpose; but the fibres selected by any person desirous of experimenting, might be sent from India in the form of "stock," cleaned by the natives as near as possible in the desired manner.

After the usual acknowledgment to Sir E. C. Buck and Dr. Watt for the kind manner in which they had assisted at the Conference, the company separated. —*Planters' Gazette.*

THE VALUE OF MULCHING.

One of the greatest difficulties with which our New England farmers have to contend is the long and severe droughts with which our seasons are almost always accompanied, the cause being the peculiarities of our climate and the construction of our soils.

Water is continually passing from the soil into the atmosphere during the Summer months, either through vegetation, by the process of growth or through the soil, caused by the absorption of heat, which rapidly evaporates the moisture as it ascends to the surface through the capillary tubes of the earth.

The escape of moisture through vegetation, the intelligent cultivator would not check if he could, for upon this depends the quantity of our crops at harvest time. To prevent or check the escape of moisture on fallow lands, however, is one of the important labors of the agriculturist. This may be accomplished in two ways. One by repeatedly stirring the soil, by which means the continuity of the capillary tubes is served or bro-

*Young shoots and not well-grown stems being desiderated, we doubt if bamboo will ever be largely used for paper-making.—ED.

ken, so that the water does not ascend so rapidly to the surface. Another and more efficient method of preventing the escape of moisture is by mulching. This not only prevents evaporation, but also acts as a fertilizer to a certain extent.

When the ground is mulched the water ascends to the surface and brings with it fertilizing salts from, and even below, the subsoil. When the fallow is naked this water is, by the heat of the soil, converted into vapor before it reaches the surface, and the salts above referred to are left lower down in the soil, not infrequently below the reach of the plant-roots.

Mulching means shading, since both produce the same results. Evaporation progresses slowly where there is shade. The ground is kept cooler, and where such is not the case the intervening shade prevents evaporation. This latter is not so rapid on cloudy days as on bright ones, though there may be little or no difference in the temperature of the soil. Moisture accumulates under and about the stones, and we were once told that the stones drew water, but the truth is they prevent evaporation, or in other words, they mulch the ground.

The foliage of the trees in woods shades the ground, thus retarding evaporation, but the fallen leaves mulch the ground and retain the moisture; in such places the roots are found nearer the surface, and yet the foliage shows less effects of drought than the foliage of trees out in the open pasture, where the roots run deeper.

There are many crops grown which cannot be considered as mulching the ground, although they cover it, simply because they carry off more water by the way of their roots and leaves than would be evaporated from a naked fallow. Of such crops we may mention clover, grass and the cereals. On the other hand, corn, potatoes, tomatoes, squashes and the like act as mulches, because they shade the ground in the vicinity of their place of growth.

When corn first comes up it is cultivated and hoed to break the capillary tubes in the earth, so that evaporation may be checked, and the growing crop have the benefit of the moisture. When the corn has grown to a certain height, it then shades the ground, and in this way checks evaporation, preserving the moisture, to a certain extent, for its own growth. The same is true of potatoes and tomatoes, while squashes shade the ground more than any crop grown. They are perfect mulches. The roots of all these plants run out into the ground so shaded to obtain that moisture which their foliage retains for their use.

Great benefit is found from the practice of mulching in young orchards. The first season after setting out young trees is generally severe upon them. The young rootlets, not having secured good hold upon the soil, require the adoption of some means for retaining moisture in the soil. If not secured in some way, or applied by artificial means, many of the young trees are likely to die. The easiest way to effect this is to retain the moisture by mulching with matted hay, straw leaves or tan bark. These mulches will keep the ground moist and mellow. In the Fall they should be forked into the soil to prevent mice from harboring in them.

Continuous mulching is a great benefit to peach trees, resulting in finer and larger fruit than can be secured in any other way. Mulching currants tends to increase their size, while raspberries and blackberries should always be mulched. This latter process not only tends to supply moisture, but also assists in keeping down weeds. Through mulching, strawberries may be grown on much drier land than they would otherwise succeed in. In addition to keeping down the weeds, the fruit is kept clean and clear of grit, which latter is often thrown upon the fruit by rains.

There are some exceptions to the beneficial practice of mulching. Thus grape vines are considered better for not being mulched. The grape vine delights in a warm soil and the roots are generally very near the surface. While orchardists and raisers of small fruits are all agreed upon the value of mulching, yet, growers of grapes, as a rule, are equally certain that grapes do better if not mulched.

The question of mulching is an important one to farmers and of immense practical value. However, the science of evaporation, which embraces hte retention of moisture in the ground as well as the evaporation, of water through the foliage of plants, is one of the most interesting studies connected with the art of agriculture, and one which should be exprimented upon by every cultivator of the soil.—*American Cultivator.*

THE CULTIVATION AND MANUFACTURE OF SUGAR IN BRITISH GUIANA.

BY MR. B. HOWELL JONES.

The cultivation and manufacture of sugar occupied the attention of the early Dutch settlers in British Guiana, but the present system of cultivation of the low lands lying near the sea does not appear to have been adopted until the settlers found that the land in the interior was not so productive as the alluvial deposits on the sea border, as in the year 1756 the entry in the records of the Colony mentions that "the settlers, not finding the upper lands of the rivers so productive, are returning to the coast." It was, perhaps, as well for the Colony that the Dutch were the first settlers, as from the experience derived from the cultivation of the low-lying lands of Holland they were singularly adapted for establishing a similar system of drainage and navigation in a land of which a large portion lies some 3 feet below sea level; and the remains of old brick sluices and kokers tell us of the indomitable perseverance, courage, and knowledge they had in handling such difficult operations; and that they were right I think has been amply proved by the system having been carried on uninterruptedly since they established it. The cultivation of sugar did not absorb the whole attention of the population, as it does at present, until after the abolition of slavery, when the price of wages rose so considerably that it was found impossible to continue to cultivate cotton and coffee; these estates were consequently abandoned, whilst the sugar crop was reduced to one-half, and nearly all the estates changed hands. It was not until 25 years afterwards, with an importation of 45,000 immigrants from India, China, and Maderia, at an enormous cost to the planters, that the Colony once more regained its position as a sugar-producing country of any importance. The sugar estates are situated along the alluvial deposits bordering on the sea, and run in parallelograms at right angles, either from the sea or rivers, and extend four or five miles into the savanna which forms, in most instances, their other boundary. A line of dams is thrown up along the sea front, to protect it from incursions of the sea, and aback a line of dams to prevent inundation from the savanna, which in wet seasons gets flooded with rain water.

The estates are generally laid out with two centre-trenches, with a dam between them, known as the middle walk and middle-walk trenches, from which at right angles extend the cross canals which separate the fields from each other, and are used, as well as the middle-walk trenches, for the transportation of canes. At each side of the estate the side-line trenches, or main-drainage trenches are dug, and extend the full length of cultivation, and into these trenches the small open arterial drains, or small drains as they are generally called, discharge themselves. The main-drainage trenches either drain through sluices at low tide direct into the sea, when natural drainage is obtainable, or are united into one main trench, and artificial drainage by means of powerful pumps, is adopted. It is not the least important part of a planter's duties to see that both series of trenches, with their sluices, pumps, &c., are kept in thorough order, the importance of good drainage in a low-lying country such as British Guiana being a *sine quâ non.*

Keeping in mind the description, as just read, of how an estate is laid out, I will now describe the method adopted for planting and reaping a crop of canes. The cane plants, as a rule, are planted in rows running from cross canal to cross canal, and at right angles to the small or arterial drains of the field. I say as a rule, as in some instances, becoming rarer as time goes on, they are planted from middle-

walk trench to side-line, and parallel to small drains, and called Dutch rows—but this plan is not now generally adopted. The first operation when a field has to be planted is for the cane rows to be lined out, the distance apart depending on the opinion of the individual planter; but the plan generally in use is known as three by three—that is, pins are placed across the field 3 feet apart, the space next the middle-walk trench being left generally a foot wider, and is called the parapet. Then a cane row 3 feet wide is dug, a small portion of earth thrown out, the space carefully ploughed, and the earth levelled off—in fact, a seed bed is prepared. The next space is left untouched, then another cane row, and so on across the field, the space between the cane rows being known as the "bank." In the centre of these cane rows the plants are put in, sometimes a single row, sometimes a double row, the cane plant consisting of the last few joints of the cane, which is green and contains very little saccharine matter, or else they are shoots sprung from old cane stocks and known as "stumps," several of these shoots, with a portion of old cane from which they shoot, forming a stump. The plants are carefully selected and put into the ground at an angle of 45 degs., about 9 inches apart, care being taken that the eyes of the top are placed on the side, so that all spring; if otherwise, those placed below would not grow. In planting stumps care should be taken to see they are well and firmly set, all decayed matter having been first removed, so that no water lodges at their roots.

A field thus planted is left until the eyes spring, and the tender shoots are seen above the ground, which in fair weather takes place in nine to fourteen days. When fairly on their way the first weeding and moulding takes place, and the field generally cleaned up of all loose trash, pieces of cane, &c.: this, with the grass from the weeding, is placed tidily on one of the banks which for the time becomes the trash bank—the alternate bank, which is kept clean, being known as the clean bank. In moulding up the young shoots, the fine earth from the surface should be carefully spread over the head of the top, so as to protect it from the scorching influence of the sun. During the progress of the first weeding it is generally the custom—and I think advisable—to send in a gang of men, according to the quantity of work to be done, and carefully to put in new plants in place of any that may not have grown. This operation is called supplying. I think this should be done as early as possible; if not, the plants growing on either side, the new plants overshadow them, so much that they often die, or do not come away with the vigor desirable. As soon after the first weeding and moulding has been done it is desirable, if weather permits, to commence ploughing what is known as the clean bank; and often, when the first weeding has not been a heavy one, or if there has not been much trash left from the last crop of canes, both banks are ploughed together. This keeps down the grass, which in our climate is a serious matter, as it grows with wonderful rapidity, and would soon affect the growth of canes if left too long; and it is essential when canes are young to see they are kept from weeds. This work accomplished, manuring the young canes next occupies the attention, and this is done as soon as possible, generally six weeks or two months after planting. Various manures are used, according to the opinion of the manager of the estate, who judges what is required from the nature of the soil he has to contend with. Ammonia, nitrate of soda, Ohlendorff's guano, Lawes' cane manure, are all well known to us, besides many others made especially to meet the views of individuals; but, as a rule, mixed manures are shunned, except those that have stood a long test and have proved to be up to the standard at which they have been bought. With the assistance of chemists much has been learnt, and it may surprise some of my hearers to learn that on some estates an analysis has been made of the soil of every field, and in one instance that I know of an analysis of the first 3 feet has been taken, so as to arrive at the value of the subsoil. In a climate such as ours, with an excessive rainfall at one period and severe droughts with which we are periodically troubled with, the value of manure much depends on the season which follows its application.

A field cultivated up to this point, with both banks ploughed, drains well and neatly dug, and a vigorous growth of young cane, is a very pretty sight; and, a planter delights to show a fellow agriculturist a strip of young canes in this condition, or to hear from him the exclamation, "Ah! that's a fine young strip." Once a field is well established like this little more has to be done but to see it is kept clean, and it is not such an easy matter as an English agriculturist would imagine. At least one more weeding and moulding has to be done; sometimes a third is needed; but if not, and the canes are advanced enough, then the field has to be weeded and the canes trashed. Of course, the canes and the previous weedings have in a great measure kept down the grass, but care is needed to trash the cane, or, in other words, to pull off all dried leaves, and carefully pack them away on the trash bank. The cane stool must be freed from all rotten trash, and blighted canes picked out; this admits light and air to the canes, materially assisting their growth, and bringing the cane, with its crystallisable juice, to perfection. Care is required in trashing not in any way to injure the cane or to strip off those leaves which, from not being quite dry, might bleed the cane. The operation of trashing is generally performed three times, the last operation taking place a few weeks before the canes are cut; this not only assists in ripening the juice, but helps the cane cutter when cutting canes, they being always more ready and willing to cut when a field is well trashed and clean.

The age when canes come to maturity differs in Demerara according to season and locality; the average of a plant field such as I have described is about 14 months. On the river districts 15 and 16 months are often required to ripen canes; whilst on some of the coast lands 12 to 13 months often suffices, and I have known in dry seasons canes 10 and 11 months quite fit for the cutlass.

Such is briefly an account of cultivating a field of plant canes in British Guiana. I say plant canes, as that is the term generally used for canes grown on new land for first time; if planted on old land from which canes have been reaped they are termed replants. The second year of growth is termed 1st ratoons, the third 2nd ratoons, and so on until the field is again replenished. I have known fields to continue to yield well up to 25 years; but it is a question if any of the old stools remained, the supplies which from year to year have been put in having entirely supplanted them. As a rule, the stools are allowed to go on until they have become 4th ratoons when replanting takes place. The plant canes having been cut off and conveyed to mill by punts, a method hereafter to be described, it is necessary to prepare for the next crop, and as the cultivation is slightly different it will be found convenient to give and account of it here. The canes having been taken from the field, and the cane cutters, during the process of cutting, having removed the trash from the trash bank on to the clean bank, the trash is found lying loosely about the field and covering up the small drains. The first operation is to send in a gang of workers to clear up the field and to put straight the trash; this is called relieving, the workers taking the bands or leaves which form the head of the cane and tying round the trash, cleaning out all the drains, clearing the cane rows and weeding. Last year's clean bank now becomes the trash bank. The field is now left until the canes begin to spring; the first weeding and moulding is given as soon as they are established, and supplies put in where necessary. Sometimes during this last work the cane row is carefully ploughed, making it level and avoiding holes for water to lodge in. Then comes the working of the bank: sometimes it is ploughed as in plant canes; other times, especially if the land is stiff clay, or that the weather has been very heavy and canes suffering from over moisture, the bank is drilled, an operation which may be fitly termed surface drainage, and con-

sists in digging a drain, generally 2 feet wide by 1 foot deep, at right angles to the ordinary field drains. Some planters prefer 1 foot 6 inches by 1 foot 6 inches, but this is a matter of opinion, and the quality of the soil has to be considered: the earth which comes out of the drill is used for covering over the trash, which is allowed to rot under it. Should a field not require drilling, then as a rule the bank is ploughed as in plant canes, and the operation of burying trash on the other bank is usually carried out: this consists of turning in the trash with the fork or shovel. I may mention that all our ploughing is done with a four-pronged agricultural fork. The trash is completely buried, and allowed to rot. After whatever delving work has been done, weeding and moulding and weeding and trashing are carried on as in plant canes. In 2nd ratoons very similar work is done, only the trash is buried on the other bank to what it was last year, or the other bank is drilled; but, like everything else I know of in agriculture, no hard-and-fast rule can be laid down—so much depends on the soil and climatic influence, and in a tropical country with extremes of wet and heat, it is especially so.

We will now go back to the ripe cane field described as plants. We will imagine the arrow, or flower, of the cane blown. The cane cutter uses a sharp cutlass, or long knife, 20 to 22 inches long, cutting the cane as close to the ground as possible, with a clean cut, catches the cane by the middle, strikes off the upper leaves, which make the band mentioned when speaking of relieving, and with a second cut knocks off the top or plant. If the cane is too long the cane is then cut into two or three pieces, and put in bundles on the bank: these bundles are carried out to the cross-navigation trenches, or to the middle walk. Here they are picked up by the punt loaders, and put into punts. These punts are large flat-bottomed barges, 24 feet long by 8 feet wide and 3 feet deep, and, when full, contain about 3½ tons of cane, and are hauled by mules to the mill dock, to be dealt with in the factory. The foregoing does not pretend to be more than a general outline of cane cultivation in Demerara. Like everything in agriculture, opinions differ as to the best methods to employ to obtain the best results, and each may be right, as the position of estates, condition of soil, and effect of weather all have to be taken into consideration; but I venture to think that many agriculturists in England would be astonished to see the knowledge, care, and attention shown by the leading planters in British Guiana.

Manufacture.—The canes, once in the mill dock—and they are brought there as quickly as possible after cutting—are brought alongside the cane carrier, which consists of two endless bands joined together by cross-pieces of wood to form a table on which the canes rest, and are thus conveyed to the mill. The mills used by us are generally 3-roller mills, and vary in size from 5 feet by 24 inches to 6 feet 6 inches by 48 inches and the crushing varies, of course, considerably on different estates, and also according to the quality of cane which is being crushed, but I do not think more than 65 per cent is usually extracted. On some estates double crushing has been restored to—that is passing the canes through a second three-roller mill; and Mr. Russell's patent of maceration has also its strong advocates. This latter consists of passing the megass or crushed cane from the first mill through an iron chamber 30 feet long, the megass resting on an endless band of wire web: during its passage through, steam and hot water is turned on, and the megass absorbs as much as possible or whatever proportion is desired; it is then delivered into a second mill and re-pressed, of course the juice being of poorer quality than from first mill. By this method it is claimed as much as 77 per cent of original juice has been extracted. A five-roller mill, by McOnie, has recently been put up in the Colony, and the extraction hitherto recorded has been about 72 per cent, but it was during a season when canes contained a large percentage of woody fibre, and better results are expected. A large portion of the mills are now fitted with hydraulic power, which enables the planter to set his rolls as close as he likes, and to put on any pressure he may think desirable, and is a very great improvement on the old set screw, as, no matter what the feed is, an equal pressure is given to one cane as to a hundred, and thus a loss occasioned by an unjust or careless feed is avoided. The canes having been crushed, the megass passes away on a carrier, either to be burnt directly under the boilers, or is conveyed by trucks to the megass house, or logie, and there allowed to dry until fit for fuel.

The juice is first strained, then passed through a chamber where it is impregnated with sulphurous acid gas, which both bleaches and assists to coagulate some of the vegetable matter. It is then pumped into clarifiers, and milk of lime is added until nearly the neutral point is arrived at, a slight acid reaction with litmus paper being generally the point aimed at. Heat is turned on whilst the clarifier is being filled, and the temperature of the juice raised 190° to 200° F. When this point is reached the vegetable impurities have risen to the surface in form of a thick scum: this is carefully removed, and the clear liquor, which should be bright amber colour, is let down on to an open battery or into a triple effet which is gradually superseding and will in the future entirely take the place of the former; but whatever method is used the liquor is concentrated to the density required.

If the open battery or cropper wall, as it is called, is used, the liquor is passed from one trench to another as quickly as is consistent with the cleaning of the liquor, as, as the density increases, scum rises on the surface and has to be carefully brushed or skimmed off until it has had all the impurities removed; it is then gravitated, or pumped by a Monte-jus, into receivers, ready for crystallising in vacuum pan. Should the triple effet have been adopted the liquor from the clarifiers is run into open pans, or defecators, where it is quickly brought to the boiling point, and, as on the copper wall, the scum as it rises is removed; but concentration is not aimed at, and the liquor is run quickly into the triple effet, where the density is raised as required, and from there passed to the vacuum pan. Another method adopted when using the triple effet is to pass the liquor from the clarifiers straight into tripple effet, and when it is concentrated to run the syrup through bag filters to remove the impurities. Both methods have their advocates.

The syrup once in the vacuum pan is boiled *in vacuo*, as the name implies, at a low temperature, and gradually, grain is formed. More syrup is added until the pan is full of crystallised sugar; the pan is then struck out, the mass of hot sugar, with that portion of syrup not crystallised, or molasses, forming what is called the massecuite. This is either allowed to cool or is taken to the centrifugal machines. These machines consist of an inner case with sides of fine woven brass wire, or finely perforated copper, and an outer case of gun-metal; the inner basket is suspended from above on a spindle, which is made to revolve from 1,100 to 1,200 revolutions a minute. The centrifugal force thus set up, forces all the molasses and moisture from the massecuite into the outer casing, leaving the dry crystallised sugar on the inside of the basket. This is then taken out through an opening in the basket, and carried to sugar store, ready for packing into whatever packages it is considered most desirable.

We must go back a little in the process of manufacture, to where the scum is removed from the clarifiers, and from the copper wall. This is by no means wasted, but is received into tanks and brought to the boiling point: it is then allowed to gravitate through bag filters or is forced through filter presses of the Reaumur or Kroogs type, the clear liquor being either drawn straight into vacuum pans or used to mix with the molasses from the centrifugals to make a second quality of sugar. All the sugar which it pays to extract from the molasses having been taken out, the refuse is sent away to the distillery for making rum. This is briefly, and within the limit of the time alloted to me, a description of sugar cultivating and

manufacturing as carried out in Demerara. It may differ in details in the practice adopted on different estates, but it contains the general principles usually employed.

It has been said by people in England, and reported in the newspapers, that the reason why we do not succeed with sugar in the West Indies is that we do not employ the best means to extract the sugar from the cane, that our machinery is antiquated and not powerful enough—in fact, that we have stood still. Such, at all events, cannot be said of the planters of Demerara, unless, indeed, the English engineers have also stood still, as machinery of the newest design, without reference to cost, is, and has been for many years past, imported into the Colony from the best firms in England and America, and all that the planters and their agents can do is done to keep pace with the times. That this has been recognised is fully borne out by the constant visits of agents of engineering firms from England and the continental nations, and the adoption of their inventions, often the reverse of improvements, that have been palmed off on us.

I have been gibed at that we have not yet adopted "Diffusion," which, according to some, is to be the panacea of all our troubles. All I can say to that is, the matter is receiving the fullest attention and our leading proprietors will not spare their capital when they have before them such figures which will, warrant their destroying their present plant of machinery and in spending so large a sum of money. These have yet to be forthcoming, and it is as much the business of engineers who are connected with the sugar trade, and whose business is, according to their own showing, very bad, to try and obtain figures which would justify their making a diffusion plant, and, even if it does one-half that is claimed for it, orders would soon pour in. I will confess to one thing that we were, and still are, deficient in, and that is, employment of trained chemists in our works: it is fast being remedied, and men well trained, with a knowledge of sugar manufacturing, can now easily obtain employment with us—not boys from school and laboratory, but those who have made it a study, and will lay themselves out for original observation and research. I can only trust and hope that such improvements will be made as will enable us to fight with success against the odds of bounty-fed continental sugar, which the English Government unfairly assists under the taking garb of free trade.

USINE SUGAR.

The usine system of sugar production takes its name from the French word "usine," owing to the fact of the system having been first introduced and worked by the French in the Colonies of Martinique and Guadeloupe. The system owes its origin to the late M. Cail, head of the celebrated firm of Paris engineers, Messrs. Cail & Co. The essential feature of the system is the complete separation of the industry of cane growing from that of sugar manufacture; but the success of the system is more to be attributed to the fact that the usines which were established under the auspices of Messrs. Cail & Co. were supplied with the improved machinery which the development of the beet-sugar industry on the continent had brought about. Previous to the adoption of the usine system, the cultivation and the manufacture of the cane had been carried on generally on small estates making from 100 to 500 tons of sugar, the manufacture being of the simplest character. The canes were crushed by mills similar to those still employed, but in a rough-and ready manner, the extraction of juice being probably at least 10 per cent less than that now obtained, and the evaporation was conducted on what is known as the copper wall, *i.e.*, in open pans with a naked fire underneath. The concentrated cane juice was struck into shallow vessels called coolers, where crystallisation took place: from these coolers the sugar was dug out and placed in hogsheads, in which it remained until the greater part of the molasses was drained out; the hogsheads were then headed up and ready for shipment. There is no doubt that this process is one which fails to obtain as much sugar from the juice as can be obtained by more scientific means. At the same time, the process has much to recommend it when it is considered that a very small outlay of capital is required, and that it is so simple that there is no difficulty in working it with the ordinary uneducated black labour of the tropics.—*Colonies and India.*

Insects and Frost.—The writer of the interesting Agricultural Notes in the *Daily News* of Saturday last, referring to the weather, stated that frost was useful in keeping down insects, the larva perishing during prolonged frost. It would be useful to learn from some experienced entomologist how far that assertion is true [not true]. I am disposed to think it belongs to the category of popular errors, or, if not, needs more proof than has yet been given. The previous winter was decidedly a severe one, and we had much intense frost, and yet it will be remembered that rarely have queen or breeder wasps been more abundant than they were last spring, although most of them seem to have perished later. Then the writer specially mentions Daddy Long-legs as being more plentiful after a mild winter, and yet I never saw them so abundant as last autumn, indeed, it seemed as if the wasps had for the time been metamorphosed into these comparatively harmless insects. Is it not really the case, that whilst mild winters keep insects lively and thus exposes them to the attacks of birds, severe winters keep the larva not only quiescent, but also find it deeply buried? Has a severe frost, for instance, any destructive effect upon the eggs of insects deposited on trees or in wall crevices, or even in the soil?—and equally, does it really destroy comatose larva? Any entomological instructions to gardeners should make these matters clear. The recent frost, although at times intense, did not penetrate so deeply into the soil as in some previous years, because of the snow. With me, just now, insect larva is more in danger of destruction by drowning than by frost.—A. D.—*Gardeners' Chronicle.*

Quantity of Water per acre required to Irrigate Rice.—The *Indian Agriculturist* states:—A correspondent of one of the mofussil papers settles the question of the quantity of water required to raise a rice crop—a question to which Mr. C. Benson of the Madras Agricultural Department drew particular attention recently—in the following simple manner:—In your editorial notice of the report of the Madras Agricultural Department published in your issue of the 10th instant, you refer to "A suggestion made by Mr. Benson, Agricultural Reporter, that an elaborate series of expriments should be undertaken with the view of ascertaining the proper amount of irrigation required to raise a crop of rice." I beg to state that when I was in the Nizam's State between the years 1865-71 repairing tanks and cutting channels from rivers for the purpose of feeding these tanks, I found it necessary to ascertain first, before determining the bank sections, &c., what quantity of water the tank would be required to hold in order that it should be capable of irrigating the land under it. To enable me to obtain some correct and precise information for my own daily use, I invariably consulted the zemindar putwari and head ryot of every village I visited prior to commencing with the levelling and survey operations, and arrived at the following conclusions:—From a series of notes and observations I found that it took on an average about 72 days.

$$\left\{\frac{\text{Days}\quad \text{days}\quad \text{days}\quad \text{days}}{59 + 67 + 90 = 216} \quad \text{days.}\ 72\right\}$$

to raise one crop of rice; and that the land required as much water as would cover it all over to the depth of 1 inch, *i. e.*

$$72 \times 1 = \frac{72}{12} \; \frac{6}{3} = 2 \text{ yards,}$$

So, therefore, to irrigate one acre of land—namely, 4,840 square yards—a tank should hold—

$$4{,}840 \times 2 = 9{,}680 \text{ cubic yards of water.}$$

HOW TO MAKE POTASH.

Baron Ferd. Von Mueller, K.C.M.G., of Victoria, writes as follows how to make potash:—The wood, bark, branches, and foliage are burnt in pits sunk 3 feet or 4 feet in the ground; the incineration is continued until the pit is almost filled with ashes. Young branches and leaves are usually much richer in potash than the stem-wood, hence they should not be rejected. The ashes thus obtained are placed in tubs or casks on straw over a false bottom. Cold water, in moderate quantities, is poured over the ashes, and the first strong potash liquid removed for evaporation in flat iron vessels, while the weaker fluid is used for the lixiviation of fresh ashes. While the evaporation proceeds, fresh portions of strong liquid are added until the concentrated boiling fluid assumes a rather thick consistence. At last, with mild heat and final constant stirring, the whole is evaporated to dryness. This dried mass represents crude potash, more or less impure, according to the nature of the wood employed. A final heating in rough furnaces is needed to expel sulphur combinations, water, and empyreumatic substances; also, to decompose colouring principles. Thus pearlash is obtained. Pure carbonate of potassa in crude potash varies from 40 to 80 per cent. Experiments, so far as they were instituted in the laboratory, have given the following approximate result with respect to the contents of potash in some of our most common trees:—The woods of the casuarinas, or she-oaks, as well as that of the black or silver wattle, are somewhat richer than the wood of the British oak, but far richer than the ordinary pine woods. The stems of the Victorian blue gum and the so-called swamp tea-tree (*Melaleuca ericifolia*) yield about as much potash as European beech. The foliage of the blue gum proved particularly rich in this alkali, and as it is heavy and easily collected at the sawmills, it might be turned there to auxiliary profitable account, and, indeed, in many other spots of the ranges. In the Queensland coast country the mangrove could be made to yield potash in immense quantities, as it is richer in this alkali than almost any other native tree or shrub; and even if the mangrove were not used for the manufacture of potash, the ash being rich in this valuable fertilizer, could be easily and economically applied for manurial purposes. Of course, British woodmen are aware that it is hopeless to compete with the extensive mineral deposits in Germany whence most of the potash of commerce is now made.—*Journal of Forestry.*

THE NATIVES OF INDIA AND WILD BEASTS.

The *Journal of Forestry* contains an interesting article on the Indian Forest Survey, from which we take an extract:—The wild animals which inhabit the Indian forest afford excellent sport for those who have the time to engage in it, which the surveyors have not, for the outturn of good work of this sort is in direct proportion to the time spent on it, and arrears of surveying and mapping cannot be brought up by a stroke of genius; but to the unarmed native surveyor the presence of dangerous wild beasts in the forest in which he is called upon to work affords no attraction, and cases have occurred in which they have caused the most serious inconvenience. On one occasion a native surveyor, having seen a wild elephant, decamped and could not be persuaded to re-enter that part of the forest, while his accounts of the terrors of the locality spread among the other men, and for a long time the ground could not be surveyed. On another occasion three native surveyors having seen a tiger, climbed a rock and remained there all night. In the morning they managed to convey an appeal to the officer in charge to come to their relief, which he did, but without seeing anything of the tiger. This place was also in disfavour for some time afterwards. But a much worse case was that of the Jarhwal man-eater; this tiger had killed a very large number, some 300 or 400 it was said, of woodcutters within the area which had to be surveyed. The superintendent was aware that if he lost one of his men he would probably be obliged to abandon the work, and he took all means in his power to accomplish its destruction; but although the trail was twice followed, and the bodies of men who had been carried off were discovered, the tiger was not bagged. At last, as none of the survey party were touched, an idea gained ground among the men that the tiger bore them no ill-will, and they considered themselves perfectly safe if they could satisfy him of their identity, which they were content to do by carrying aloft in a cleft bamboo an old envelope from the superintendent's wastepaper basket! The natives present a strange mixture of bravery and cowardice; they do not hesitate to express fear when they feel it, and do not seem to think that to be afraid is anything to be ashamed of, but at the same time they frequently perform acts that appear recklessly brave. An old man of seventy, armed with a tulwar, has been seen hunting about in the tall grass for a wounded tiger which was lying concealed close by him, and he had ultimately to be forced into a position of safety on the back of an elephant. On another occasion a bear had taken up his quarters in a dense part of the forest, and had killed several bamboo-cutters who had unwittingly invaded his retreat; a man who had just been mauled by him insisted in joining a passing Englishman who sent in search of the bear, and could not be persuaded to keep behind the rifle, but advanced boldly into the beast's lair, anxious to take a leading part in the retribution which shortly overtook him. The servant of a noted sportsman in the North-Western Provinces once proposed to his master that he should walk past a dense piece of cover in which a wounded tiger was lying, in order that the animal might be induced to spring out into the open and thus afford a good shot!

THE TIMBER TREES OF CEYLON.

Under the title "*Timber Trees of Ceylon*, by Mudaliyar Mendis, with Notes on them by W. Ferguson, F.L.S.," a pamphlet of twenty-three pages has been issued from the *Ceylon Observer* press in Colombo. This little book is valuable as throwing some light not only on the botanical source of the trees, but on the character of the woods and the uses to which they are put in Ceylon. The timber trees of Ceylon are interesting in consequence of the general hardness of their woods and the fine colour of figure of many of them; but notwithstanding this, Ceylon woods, with the exception of a few such as ebony and calamander, [Surely satin wood ought to be added as far as Europe is concerned, while palmyra, halmilila, and several other Ceylon timbers are valued in India.—Ed.] are scarcely known out of their own country. Many of the species, however, are common to various parts of India. It is a fact that though most of the dependencies of the British Crown have at some time made a display of their timber resources by exhibiting large and striking slabs at some of the International exhibitions, the exhibits of Ceylon have always been of a more diminutive character. An excellent collection of Ceylon woods, however, was shown at the International Exhibition at South Kensington in 1862. It consisted of about 160 specimens each about 21 inches long, 3 inches wide, and 1 inch thick. They were all well seasoned and polished; but though well selected, and many of them finely-figured pieces, they were too narrow to give a good general idea of what the woods would be like in bulk. And here we may perhaps say a few words upon selecting and preparing woods for exhibition purposes. Dead wood should in all cases be rejected, and a fair average sample taken from properly-felled timber; the section should be cut in the case of large slabs through the centre of the tree, so as to show the sapwood as well as the heart-wood, so that the proportion of each may be seen at a glance; the bark should also be left on the edges. For small

and handy specimens where a large collection is got together, no size can be better than that adopted by the Indian Forest Department in the fine set of woods sent by them to the Paris Exhibition in 1878, a duplicate set of which is now in the Kew Museum. These measure 9 inches high by 6 inches wide and 2 inches thick: they lend themselves wonderfully well for any kind of arrangement. On a staging, for instance, they can be placed one above another without loss of space; and in the glazed cases of a museum, they suit almost any shelf; moreover, they are convenient for handling for examination. With regard to numbering, woods should always be *stamped* on the backs, and never on their faces. It often takes a considerable amount of planing to remove them. But to return to the Ceylon woods. In noticing the little work which has given rise to these remarks, a fitting opportunity seems also to occur to bring to more general notice some few of the most striking, or important out of the ninety-six different kinds mentioned in the book. [Then follow notices of our chief timbers.—ED.]

The few woods here indicated recommend themselves to notice on account of their fine colour or figure. From specimens of all of them contained in the Kew Museum, they would appear to be well worthy of a more extended application. They are referred to here as only a few instances of the general character of Cingalese woods which require to be more known to be appreciated.—*Journal of Forestry.*

MAIZE OIL.

A paper on this oil was read by Dr. C. O. Curtman before the Missouri State Pharmaceutical Association, in which we have further particulars. The oil is made largely by the Woodchande Milling Company, St. Louis. The amount of oil obtained by pressure from the embryo varies from 13 to 15 per cent. The following notes by Dr. Curtman, which we abstract from the Pharmaceutical Record, though agreeing generally with the conclusion of Mr. Shuttleworth (published in this Journal, p. 47 of current volume) differ in some respects, while fuller particulars are given on other points:—

The crude oil, as first expressed, is somewhat turbid and of a pale brownish yellow colour. It is easily rendered clear by filtration, or by letting it stand at rest for some weeks, and drawing off the clear oil on top from the impurities which have subsided.

Its average specific gravity is 0·916. The extremes, thus far observed, were 0·915 and 0·917. Maize oil has the peculiar flavour of freshly ground corn meal. This becomes fainter by age and may be removed to a considerable extent by rectification processes. Its taste is bland and of agreeable sweetness, with a bitterish after-taste, which increases somewhat with age, but may be entirely removed by purification. It does not very readily become rancid, when carefully kept, in this respect resembling benne oil. It does not dry like linseed oil. Portions left adhering to the outside of the vessel, from which it has been poured, have not become pasty nor rancid in twelve months.

In some of its general properties it stands intermediate between olive oil and oil of sweet almonds but approaches nearest to the olive oil. It contains a large proportion of olein, a compound of oleic acid and glycerine.

With Pontet's reagent (strong nitric acid in which a little mercury has been dissolved), it forms an abundance of elaidine, so as to become nearly as solid as olive oil. Treated with mercuric nitrate in the usual way, it yields a fine citrine ointment. With strong nitric acid it speedily turns a dark reddish brown, a reaction which is obtained still more rapidly and intensely by using a mixture of strong sulphuric and nitric acids. This reaction is, however, limited to a much paler colour after the oil has been rectified by treatment with sulphuric acid.

With alkaline dyes it saponifies promptly, forming a beautiful white soap, fully equal in appearance to the best Castile soap from olive oil. With aqua ammonia a liniment is formed, which remains sufficiently fluid at ordinary temperatures. Boiled with litharge the oil yields lead plaster and glycerine.

One of the most remarkable properties of the oil, by means of which it may be distinguished from similar oils, is its low congealing point. Olive oil begins to congeal and become turbid at + 10° C. (50° F.) Cotton seed oil at + 2° C. (+ 35 6 F). Oil of benne at—5° C. (+ 23° F.) Almond oil at—20° C. (—4° F.)

Maize oil is intermediate between the two last. It remains entirely clear down to—8° C (+ 17·6° F.); below that it begins to get slightly turbid, but is not, fully congealed at—10° C (+ 14° F.).

The properties above stated render it a valuable substitute for olive oil in pharmaceutical preparations. Its odour being but slight and not very penetrating, is easily overcome by essential oils, and on this account the oil may be used for toilet preparations.—*Chemist and Druggist.*

AN INTERESTING AGRICULTURAL EXPERIMENT.

Of the two explanations as to the meaning of the word "Dirt," the scientist's that it is "matter out of place" and the sharp child's that it is "mud with the wet squeezed out," the former is about to receive a practical exemplification, as far as Bombay is concerned in the proposed utilisation of the city sweepings for the manufacture of artificial manure. The invention is the idea of Dr. S. Cooke of the College of Science, Poona, who has secured a patent for his system. I have had an opportunity of inspecting the article which is put up in large or small blocks as desired. It is a grey porous substance somewhat resembling pumice-stone, but is much more friable; in fact one of its inventors claims is that it can be very easily reduced to powder and drilled into the ground with seed at the time of sowing. Dr. Cooke has a convincing proof of the efficacy of his invention in his garden. Five plots of ground of equal area have been planted with the same quantity of *nachnee*. The first plot has been left unmanured, with the result that the weeds have decidedly the upper hand. Plot 2 was dressed with wood ashes, the result not being very satisfactory. Plot 3 was fertilised by the ordinary process of rab, two experienced hill men coming especially to do the work. The result of this treatment of the soil was an average crop such as may be seen on the ordinary Hill Farm. Plot 4 was worked with partially burnt horse manure, the result being that too much heat was generated which destroyed part of the seed, leaving what did come up very good, however. Plot 5 was the patent fertiliser drilled in with the seed, and the result is simply astonishing. Whereas the average height of the plants on the other beds was about fourteen inches, and the colour of the stems varying from light to medium green, the stems and leaves in this plot were of the darkest and richest green and of a height of about two feet with magnificent heads of seed. As far as can be judged from an experimental growth under favourable conditions, the result is most conclusive, and there should be, if not "millions," at least "thousands" in the invention. As regards the manufacture on a large scale of this fertilizer, it is to be encouraged irrespective of its agricultural aspect, because it furnishes a means of solving what is becoming daily a most serious problem: namely, the disposal of street sweepings which in large cities and even in small towns in hot climates necessitates much thought and care, to render the operation of removal harmless and unnoticeable, a result not yet obtained in Bombay, where the Municipality have to grapple with the serious problem of removing the enormous quantity of nearly 400 tons daily. Eight hundred cubic yards of refuse are daily carted from Bombay, and the question is coming prominently forward, "What are we going to do with it?" At this moment Dr. Cooke comes to the front and proposes that a company be formed to take over the entire sweepings and convert them into a useful and powerful agent for good. The company, if formed, would thus stand in that are

but enviable position of Public Benefactors, while at the same time having the monopoly of a very money-making speculation. The method of manufacture and the results of the experimental crops have been seen by most of the principal Revenue and Forest officials, and both the simplicity of the former operation and the results of the latter have drawn forth the unqualified approval of the many experienced gentlemen who have visited the scene of operations. For the manufacture is required a furnace for reducing the sweepings to ashes, a kiln for obtaining lime, and a mill for roughly grinding bones.

The three materials thus obtained are then put into pits in layers of ashes, lime and bones, water is then poured into the pit, and layers of fresh material introduced as the contents sink, and in about two weeks the result is a pasty mass, consisting almost entirely of salts best adapted for replacing the productive power of poor soils. By mixing charcoal with the raw materials a fertilizer can be produced especially adapted for gardens. As a proof of the commercial success of an undertaking of this kind it is known that the sweepings of Manchester, Birmingham, and other towns in England are readily disposed of at prices varying from £4 to £6 a ton. Chemical Manure is exported in enormous quantities from Liverpool at £12 10 a ton. Taking into consideration the cheapness of the raw materials here, a company should make a large profit at R20 per ton, and above all it would be a great blessing to Bombay to have the mass of refuse innocently converted into a harmless inodorous compound instead of being a source of danger and unpleasantness to every one.—*Times of India.*

[Worthy the attention of the Colombo Municipality, the great desideratum being the removal of sweepings and sewage in a form useful and innoxious.—ED.]

NOTES ON TEA.

[By PERCY SWINBURNE, late of Sylhet, Cachar, and Assam.]

Manufacture—Withering.—The old method of withering was to spread the leaf 2 to 3 inches thick on a machan, and to turn it over several times during the night to prevent its heating too much. In wet and cold weather it was placed in small quantities at one time, on a machan, over the firing dhools, where the heat quickly softened and prepared it for rolling. But now great improvements have been made in the factory buildings and accommodation. It is generally recognised that the leaf must be thinly spread out, and the withering process most carefully conducted to turn out good tea. Withering sheds admitting air and light freely, and fitted with tier upon tier of bamboo trays, are made. Large pucka iron roofed tea houses are fitted with lofts for withering, and arrangements are made for regulating the heat and admitting or shutting out the air.

Natural withering, as generally understood, means that the leaf is placed in open or closed houses in which the draught of air may be regulated; while artificial withering includes the use of heated air, or of machinery.

A large proportion of the best tea which is sent to the market is now made from artificially withered leaf, that is to say, from leaf which has been withered by heated air. The lofts of the pucka tea houses are heated by the sun, to a temperature of over 100 degrees, and are often intolerably and suffocatingly warm. In dull and wet weather also, the temperature in these places is still considerably higher than that of the surrounding atmosphere as they are heated by Siroccos or other firing machines, the chimneys of which pass through them.

There has for a long time been a strong prejudice against artificial withering. Closed hot houses were used because the withering, under favourable circumstances, is always supposed to give the best results.

In natural withering, the faster the process the better the results, so we may conclude that perfect withering would consist in removing all superfluous water from the leaf instantaneously, without disturbing the oils, juices, &c., while sufficient heat was applied to reduce the fibre to the soft condition required for rolling.

A series of careful experiments have been made in a small house heated by smoke flues, with one maund of leaf spread on about 15 square feet to a pound. It was found still, that the faster the operation the better the result. That the greater the heat, the thinner the leaf must be spread, and the more care and nicety required.

The finest tea was made from leaf withered in 3 hours, at a temperature of 140 degrees. The tea was on several occasions carefully assorted, and true samples of the bulk were sent down to Calcutta to be valued, and the quality of the liquor as well as the appearance were pronounced excellent. The average valuations were about 14 annas, and the leaf was good, but not finer than that plucked on most estates, in Darjeeling, or Sylhet, or Cachar, being two leaves and a bud. The market at the time was depressed, and the average price of the teas of the districts named was, at that time, between 9 and 10 annas.

In 1883 the entire crop of the Kamagar Estate, Sylhet, just under 900 mds. was withered in hot-houses, heated by smoke flues, and realised 11 annas per lb. average. The houses were "kutchee" ones built of bamboo and plastered ekur. They were 14 feet high in the roof, 7 feet high walls, breadth 20 feet. Two four-feet wide, passages and 4 rows of chalnies 3 feet wide.

The pipes were 9 inches in diameter, and $\frac{1}{8}$ inch thick, and ran along both sides of the house underneath the outer row of chalnies. The heat was much greater near the furnaces than at a distance from them, and the house gets thoroughly heated for a distance of about 15 to 20 feet only from the furnace.

The heat is also uneven, and the greater it is the more difficult it becomes to equalize the withering. The leaf must be thinly spread and carefully watched. One part of the house withers much more quickly than another, and if the leaf is left for an hour only, after it has reached the right stage, much quality is lost.

These houses, defective as they are, are preferred to those of the old style.

When the men have learnt how to arrange the leaf, and work the fires, the rolling can be commenced at 5 A. M., every day, in all weathers.

The leaf does not turn red unless it is bruised in some way during the withering process, and its juices become exposed to the air. This may happen from the leaf being gathered up a second time, and removed from one place to another.

If it is once established beyond dispute that the best tea can be made from artificially withered leaf, there should be no difficulty in making a hot chamber in which the leaf could be very thinly spread out and the heat equalized and regulated, and the moisture removed.

One of the great disadvantages of open houses is that the damp cold air which checks the withering is admitted, as well as the warm air which favours it. Withered leaf absorbs moisture, and is refreshed by it—as a bouquet of faded flowers is revived by sprinkled water. But when the leaf has withered a second time, it loses its freshness, and when the flowers have again faded, they begin to give out an offensive smell; the first stages of decomposition having set in in both cases. Leaf which has once lost its volatile freshness and delicacy, never recovers it, and can never be converted into fine tea.

The fine qualities in the leaf may be chemically altered in the hot withering process, but they are not lost altogether as is proved by the quality of the tea produced by it.

In the same way, however, as the flavour of the tea is affected by different firing processes, so it is probably also affected by the degree of the heat applied in the withering, as well as by the manner in which it is applied.

Good tea can be made of leaf which is carefully withered, rolled, fermented, and finally baked out; although strong, it is peculiar, and has not the delicate flavour and smell of tea, which is roasted over charcoal in the usual way, and this again is not so

aromatic in flavour as that which is dried by the rapid hot-air draught of the "Sirocco."

It would appear that the best withering would be accomplished by strong draughts of moderately warm and quite dry air passing over the whole surface of the leaf.

If the juices can be kept uninjured, the more the leaf is withered, the better the quality of the tea. The presence of water in the rolled leaf appears to affect the fermentation injuriously. It is not accurately known at present what chemical changes take place in the various systems of manufacture, but we know that we are more or less dependent on the weather, and that the changes which take place satisfactorily one day, will not do so on another, under apparently exactly the same condition. Lightly withered leaf makes tea without strength or body, and this is probably due to the presence of too much water in the rolled leaf which causes an injurious fermentation. On the other hand, over withering, or bad withering, by which the juice have been injured or destroyed have the same effect ond produce weak pale liquored tea.—*Planters' Gazette.*

TEA, COFFEE, AND CINCHONA INSECT PESTS.

The ravages of insects on tea, coffee, and cinchona p'ants of late years have been so widespread as to threaten serious consequences to those who own large plantations. It is, however, a curious fact that few have deemed the subject of sufficient importance to devote their time and attention to an intelligent investigation of these insect pests, their ways, habits, methods of attack, propagation, &c.; and it is therefore with sincere pleasure we have perused an interesting paper on pests of the homopterous family of Coccidæ, which attack tea, cinchona, and coffee plants, read by Mr. E. T. Atkinson, C. S., at a recent meeting of the Bengal Asiatic Society. Mr. Atkinson is not unknown in this branch of science, and his paper will doubtless give rise to a proper discussion of this subject. The author stated that he sought to give such an account of this important family of insects as will induce observers to take up its study seriously. He went on to say that it comprises those insects known as scale-insects, or gall-insects, which are so hurtful to the coffee, cinchona, tea, and fruit trees generally. Nothing of value has yet been written regarding the species of this family that occur in India, with the exception of the *Carteria lucca* that furnishes the lac and lac-dye which form such valuable articles of export form Calcutta. The family is distributed amongst the sub-families *Diaspia*, *Brachyscelina*, *Lecanina* and *Coccina*, of which some hundreds of species have been described, but very few of which are recorded from India. The larval form of these insects, he said, has six legs, many jointed antennæ and a rostrum, or sucking apparatus; the adult female as a rule has neither wings, legs, nor antennæ, but only a rostrum, while the adult male has two wings, legs, and antennæ, but no rostrum, or mouth. Their forms vary from flat to spherical, many are covered with a white farinose filamentary substance, others with a felted, waxy, nacreous, and even calcareous substance. All are minute, and require much care in their manipulation and preservation. The author disclaimed all idea of purely scientific aims in this popular introduction to the study of a much neglected group of great economical importance to residents in the East. His object was to collect facts on which hereafter to base a scientific examination of the species of these insects occurring in India.

After Mr. Atkinson's paper, the President of the Society brought to the notice of the meeting letters addressed to him by Mr. Green of Punduloya in Ceylon, regarding a new pest belonging to the Homopterous family *Coccidæ*, which is now committing great ravages on the coffee plantations there, and in some cases compelling the abandonment of its cultivation.

Mr. Green writes:—"I have been led to pay some attention to the Homoptera of Ceylon, chiefly by reason of the fearful destruction caused by many of their number to agricultural products. I am now sending you under separate cover a few specimens of these insects. The parcel contains:—

"(*a*) A glass tube with coffee leaves, on the under surface of which you will find a species of *Lecanium*. This has only lately appeared in Ceylon, but has already spread in an astonishing manner, and has caused inconceivable destruction in the coffee districts. It is entirely distinct from *L. coffeea* and *L. nigrum* noticed by Mr. Neitner in his pamphlet on 'The Coffee Tree and its Enemies.' Both these species I am familiarly acquainted with, though their ravages are now very slight compared to the work of the green insect now forwarded. I have not been able to obtain the male form, though both sexes of the other two are fairly common.

"(*b*) Cinchona twigs with a species of *Coccus*, lying apparently beneath the cuticle of the bark, which is raised in the form of small blisters. This is a most extraordinary insect, and with closely allied species, which are numerous on other plants, has considerably perplexed me, especially as to the nature of the integument which covers it. In the specimens from cinchona, this would seem to be actually the cuticle of the bark, many of the incipient cracks extending right across the integument of the insect. Those now sent are all females. The male form closely resembles those in the tube containing spirits of wine. The larvæ and pupa are very similar to the species found on tea-leaves. The adult female has neither legs, antennæ, nor eyes, the only external member being a fine sucking bristle (rostrum) which proceeds from a spot near the middle of the under surface. In the young all the members are complete.

"(*c*) *Loranthus* leaves with allied species of *Coccus* also apparently lying beneath the cuticle of the leaf; but on examining the integument under the microscope with transmitted light, one finds no traces of cellular formation, nor any stomata, all of which, however, are complete in the tissues of the leaf immediately below the insect. Adhering to this integument, or forming part of it, are always one or more of the characteristic scale of the *Coccidæ*, which would seem to be the cast skins of the insect. The young larva, after fixing itself to the leaf, soon exhibits the scaly covering on its posterior half, leaving the anterior part free. The scale is then shed, remaining in its place, and the insect lies freely beneath and loses all its external members, except the sucking bristle. The integument, under a high magnifying power, appears to be composed of an irregular network of sinuous, intersecting filaments, with no trace of cellular formation.

"(*d*) A tube containing both sexes of another species, affecting the leaves of the *Loranthus*. The integument of the female is continuous with the woolly covering of the leaf. The males are minute red flies with one pair of two-veined semi-hyaline wings, which at rest are folded straight down the back, completely overlapping each other; the antennæ are very long and setaceous; anal extremity without filaments, but with a long central point. Both the upper and the under surface of the head appear to be furnished with a pair of eyes, and I can find no ocelli. The lower pair of eyes correspond to what is described by Neitner in his *Pseudococus* as 'two black knobs resembling blunted mandibles, representing the external mouth.' These two spots are present in the males of all this family, and I cannot help thinking that they have been erroneously described as mandibles, the external mouth, in my opinion, being present only as a minute spot between the anterior pair of legs, in the same position in which it is situate in the female. [Mr. Green is right in regarding these knobs as other than mandibles; they are eyes] If the head of the insect be macerated in water and examined with transmitted light, all four spots appear as colourless globules with two concentric dark rings, an appearance which would be given by the cornea of the eye."

Unfortunately most of these specimens suffered so much from damp in transit that they were useless for examination. In a subsequent letter from Mr. Green

it is stated that "the green *Lecanium* has spread at an extraordinary rate, and we have in consequence been compelled to abandon a large acreage of coffee and replant the ground with tea. This species is vastly more destructive than anything of the kind that has previously been experienced. The ravages of *L. coffeea* were nothing in comparison. It is curious that though they have been increasing so rapidly, there has been apparently no generation of male insects."

The foregoing facts are of sufficient importance to owners of plantations to induce them to devote more attention to the subject than hitherto appears to have been done, and by investigation, to hit upon remedies in view to protecting their plantations from the ravages of these insect pests.—*Indian Agriculturist.*

THE CULTIVATION OF POTATOS ON THE NILGIRIS.

The cultivation of potatos on the Hills dates from the earliest settlement of Europeans. Analogy of climate suggested its introduction to the first settlers, and experimental efforts were crowned with uniform success, for it took kindly to the soil and became in time a valuable addition to the food production of the district. In the early days of European occupation Government were disposed to assist settlers of energy and enterprise with advances of money for general farming purposes, the acclimatization of new products being one of the most important. The Kaity valley and Kulhutti were originally selected for experiments with potatos, and to this day these places retain a reputation for growing the finest tubers in the greatest abundance. Thence are derived the best potatos locally consumed and despatched to the plains. Their elevation ranges above 6,000 feet, an altitude below which this vegetable will not thrive, though we are acquainted with two experiments at 3,000 and 4,000 feet in the extreme North and South of the Nilgiris which were not quite failures. Up to within the last fifteen or twenty years the cultivation had not gone beyond the range of experiment, but each year the limits were enlarged with satisfactory results. Since then the strides have been rapid, and now it is well established among the agricultural classes, who find in it a lucrative and permanent livelihood.

The extent of land under potatos is estimated at 1,000 acres, including large areas of semi-drained swamps within the town of Ootacamund. For these swamps growers pay at the high rate of twenty or twenty-five rupees an acre, and cultivate expensively. Though remunerative crops are obtained on such lands, without much trouble the quality of the outturn is inferior. The potato when boiled is found to be wet, hard and waxy. Grown on the hill sides in the favorite localities to which we have alluded they boil dry and mealy, and possess good keeping qualities.

Two crops are raised annually, if the season is favourable, the one sown in February and lifted in July, the other sown in August and lifted in December. Although the climate of the Nilgiris is admirably adapted for sowing and reaping throughout the year and thus securing a regular succession of new potatos, the natives adhere to the periods indicated and accordingly the market fluctuates considerably, ranging very high just before crop time, and falling below remunerative prices just after, when it is glutted. Indeed so great is the scarcity in the local market at times that it pays speculators to obtain a supply from Poona and Bangalore. The imported Poona and Bangalore potatos are inferior and innutritious, the eyes are deep set, and on arrival the sprouts are well advanced.

The mode of cultivation is simple. The soil is forked up before the frost sets in, in order that the sods may be thoroughly loosened and aerated by the action of the atmosphere. A week or so before planting it is pulverized and raked over, the furrows are drawn and the seed dropped, with a handful of manure for each to rest upon. Weeding is carefully attended to, and when the plants are six inches above the ground, the first hilling takes place followed by two or three similar processes before lifting. The yield averages two hundred maunds per acre, which at 8 annas a maund pays the rent of the land, cost of cultivation and a return of from 20 to 50 per cent on the capital outlay according to the character of the season.

All field operations for potatos are manual and therefore expensive. The plough is never used either in the preparation of the soil or in process of culture, probably because the implement does not turn up the soil sufficiently deep for a root crop.

The potato disease which prevailed in Europe with such virulence between 1875 and 1878 extended to this country and temporarily extinguished the cultivation in the swamp lands in and around Ootacamund. Crop after crop was so extensively affected that the produce was not worth the cost of lifting. Growers preferred to allow it to rot in the ground, rather than incur the expense of removal. In the garden assessed lands surrounding the villages of the Hill ryots, the disease prevailed in a milder form, and growers were kept in countenance by the high prices obtained for the partial outturn. Science in England exhausted itself in trying to find a remedy for the disease which amounted almost to a national disaster. In this country not an effort was made either of prevention or of cure. The swamps were allowed to lie fallow in order that the disease-spores might die out. As good seed as could be procured was purchased and sown, but beyond this nothing was done, and the disease was allowed to run its course, and, if possible, to exterminate itself, which as might have been expected it failed to do. The season in the current year, when perhaps the largest area ever put under the tuber was sown, has been most unfavorable. The incessant wet weather that prevailed during the most vigorous period of growth developing the disease afresh in its worst form. To save the affected crops, growers lift as soon as the tubers are of moderate size though immature. They are no sooner out of the ground than disease at once sets in and a few weeks suffice to render them fit to be consigned to the manure heap. It is unfortunate for this cultivation on the Hills, that the period when the disease is known to be most active is the period of sowing and reaping. This is in July and August when the spring crop is lifted and autumn crop sown. A change in the present system of cultivation would under these circumstances offer some prospect of minimising the effect of the disease. There is also in this country, to some degree an absence of that noticeable folly in England, so potent for the propagation of disease of trying to grow potatos of abnormal size, though it is encouraging to learn that Judges at Exhibitions and Agricultural Shows, at home are, by the awards recently made marking their appreciation of quality as distinguished from mere bulk. The features now commended at potato exhibitions are beauty of form, elegance of proportion, evenness, color, and markings, clearness of skin and polish, but above all, superiority as an article of diet in the matter of nutriment. These qualities are hardly yet brought home to the mind and experience of Indian growers, because the spirit of competition in agricultural produce is absent or awakened only at such long intervals that there is no sustained impulse given to improvement and the attainment of excellence. The opportunities for bringing together specimens of produce and comparing them one with the other are few and far between. The spirit of emulation is wanting, and year after year the dead level of mediocrity maintained with change, if at all, by way of retrogression and deterioration.

The most injurious practise in this husbandry on the Hills is that of cultivating, year after year, on the same soil, without an attempt at rotation. Mismanagement in this respect is universal. More remunerative crops would undoubtedly be obtained if alternated with other garden produce or with cereals. Until the ryot takes up potato cultivation more generally this can hardly be expected. Native speculators are not the class to look to for progress. As soon as the crop is ready to lift they dispose of it, and leave the rest to the dealer who removes,

it in carts and despatches it to meet a demand, at present in its infancy, either on the Railway or in some of the towns with a considerable European population. Natives are rapidly acquiring a taste for potatos, and as soon as they are cheap enough to become an article of daily consumption in every Hindu household the cultivation will reach proportions of great magnitude. There are hundreds of square miles of arable land that the hill tribes cannot profitably cultivate with their ordinary grains, but which put under this vegetable would maintain their owners in comfort. A rich soil is not indispensable, though liberal-treatment with manure, other circumstances being favorable, would be well rewarded. The English cultivator raises from three to four times the crop that the native in this country does, but the latter is well satisfied with present results, and so long as high prices are maintained he will not be disposed to tax the soil to its utmost limit of productiveness. Natives appreciate the potato as an article of food, but its prohibitive price interferes to prevent increase of consumption. A rupee a maund places it beyond the reach of all but the well-to-do. Should the price fall to a third of this figure, at which it will yet pay the grower well, a stimulus to production will be given that will treble and quadruple the extent of land brought under contribution.—*South of India Observer.*

KAURI RESIN.

The following paper was read by Mr. Gellatly, Curator of the Edinburgh Museum of Science, on January 13, at the last meeting of the Edinburgh Botanical Society:—

The Dammara australis which yields these Kauri resin is the largest of the New Zealand trees. It is confined to the northern portion of the North Island, and grows on all soils up to the height of 1500 feet, but is said to prefer the dry and sterile clays of the hilly districts. It reaches a height varying from 100 to 140 feet—some few growing as high as 170 feet or rather more. The tree is usually bare of branches for about 50 feet from the ground. A trunk has been occasionally but rarely seen as much as 35 feet in circumference. Laslett saw two exceptionally large trees—one at Wangaroa (a little to the northward of the Bay of Islands), that measured 48 feet in circumference at three feet from the ground, and another near Mercury Bay, which was 72 feet in circumference and 80 feet to the branches. As the tree, which is of slow growth, does not add more than an inch to its diameter in six or seven years, Mr. Laslett computed the ages of these two giants to be respectively about 1,300 and 2,000 years.

The timber is so useful that it is employed in the construction of most of the houses and for nearly all the boats in the North Island. There is a little difference of opinion about its quality. Mr. Laslett says that the timber is generally sound and free from defects common to many other descriptions of wood; that it shrinks very little and stands well after seasoning. Further, that it is remarkably solid, and may be considered one of the best woods for working that the carpenter can take in hand. Some of the colonists, however, state that it has a strong tendency to shrink and contract in length as well as in breadth, and that it often does this when freshly planed, no matter how well it is seasoned. It seems, however, to be unrivalled for the masts and spars of ships, possessing the requisite dimensions, lightness, elasticity and strength; and being more durable than any other Pine. Its specific gravity averages about ·530, somewhat less than the density of the timber of Pinus sylvestris brought from the Baltic ports.

The so-called Kauri gum—really a resin—exudes spontaneously from every part of the tree, and hardens upon the surface by exposure to the air, immense masses of the resin being often seen on old trees, suspended from the stem at the forked part of the branches. It is believed that the bark, branches, stumps, roots, and even the leaves of the Kauri Pine would yield a large amount of resin under proper management. When an incision is made in the bark of the Kauri tree the resin exudes freely, so that here, in the course of a few weeks, a large mass of half-dried resin will have accumulated. This new gum takes about three months to harden properly.

All except a very small portion of the Kauri resin so largely exported from New Zealand is however, dug out of the ground in a fossil or semi-fossil state, but there is not much of it found more than 10 inches below the surface; that is, it occurs in the present soil. Occasionally it is found at a depth of 3 feet, and it is fished up in bogs or swamps, as well as dug out of dry ground. The resin is found either in small detached lumps, or in considerable quantities deposited in one whole. When dug up its surface is found to be partially decayed, and this portion requires to be scraped off. It is curious that where the buried gum is obtained there are now no remains of Kauri trees except the resin itself. Nevertheless, it is believed that forests of this Pine must have formerly grown over the areas where it is found.

The only tools used in procuring the resin are a spear and a spade. The spear is a pointed steel rod, with which the digger pierces the ground, and by this means, after he becomes sufficiently expert, he can tell whether he is touching a stone or a piece of resin. If the latter, it is dug up with his spade. Between 1,000 and 2,000 Maories are usually engaged in digging for the resin, but although from habit and local experience they are more adroit at obtaining it than the settlers, they are said not to care for the work, and only continue at it when pressed by want. Many Europeans are also engaged; these, however, are chiefly men impatient of regular occupation—vagabonds, dare-devils, or persons fond of gipsy life. I see that an American Consul, in a report to his State Department, points out with manifest glee, that amongst this nomadic class are a number of the degenerated sons of the aristocracy of Great Britain.

A few years ago an industrious man could dig out about 2 cwt. per day; now he will hardly obtain one-third of that quantity in the same time. The total annual yield is, however, not yet falling off, owing to the additional number of diggers employed. This quantity is very large for a substance of this kind, amounting to fully 5,000 tons, of which 3,000 are sent to America, and 2,000 to England. The average value of the fossil resin is now about £60 per ton. There are several qualities of it, however, varying in price from £45 to £170 according to its purity. The resin obtained from growing trees of which, as already remarked, very little has yet been exported—is not worth more than £25 per ton.

Although many specimens of Kauri resin are as beautiful as amber, the Maories, notwithstanding that they have the artistic faculty in a high degree, do not appear to have ever applied the resin in any way as an ornament. As we see by objects handed down to us, amber for this purpose must have been highly prized by the ancient Greeks, the Romans, the Vikings or Norsemen, and the early Celts. The only uses the Maories have made of Kauri resin have been to kindle fires and as a masticatory. In recent years lockets, brooches, and other small ornaments have been made of it by settlers at Auckland and other places in the North Island. They have the serious drawback of being not nearly so hard as amber ornaments.

The important uses of Kauri resin are—first, in the making of varnishes; second, in the manufacture of linoleum—a floorcloth now largely made—in which this resin is advantageously mixed with common resin and oxidised linseed-oil; and, third, in the dressing of silk fabrics. [It is also used by dentists for taking moulds or casts.—Ed.]

Unfortunately it is yearly becoming more difficult to keep up the supply of this highly useful vegetable product. The resin first appeared in any quantity as an article of export from New Zealand about the year 1850. Mr. Reynolds, of Auckland, who has been engaged in collecting it for export for twenty years, estimates that the fossil Kauri resin will be completely exhausted in twenty years hence. Probably in the meantime the discovery in quantity of some equally valuable resin in another part of the world may render

this calculation to some extent inaccurate, but according to several authorities the supply cannot last much longer.

The recent gum is not so serviceable as the fossil kind, owing to its softness, though it has a more pleasant odour when heated. But neither can a long-continued supply of the new resin be hoped for. I hear from persons acquainted with the country, and I also see by remarks in papers published in the *Transactions of the New Zealand Institute*, that the existing forests of the Kauri Pine itself will more than likely be wholly cut down in another fifty years. —*Gardeners' Chronicle.*

KINMOND AND RICHARDSON'S PATENT MULTIPLE ACTION TEA ROLLING MACHINE.

This tea rolling machine differs from all other tea rolling machines in that at each stroke or revolution of the rolling surfaces the tea leaf is presented to the rolling surfaces at a different angle, and no two points in the upper rolling surface give the same rolling action to the leaf.

The under plate which turns on its centre, has a hitching action between each stroke of the upper plate, and so presents the leaf to the surface of the upper plate at a different angle each revolution. The action of the machine is simple, but the tea leaf when being rolled is subjected to a multiple action, the consequence of which variety of action is a harder twisted leaf, and a total absence of all flat leaves.

The machine has been made very strong, and the moving parts are few and simple. Owing to the direct application of the motive power, 3 H.-P. is sufficient to work the machine, and comparing this with other tea rolling machines, a saving in motive power of about 50 per cent has been effected.

The machine should be driven at a speed of 60 revolutions per minute, at which speed it will roll 12 maunds of green leaf per hour.

The belt pulley of the machine is 2 feet 6 inches diameter.

PRICE, £100.

Packing in cases for shipment, 5 per cent extra.

The lower plate can be supplied with its surface made of end wood, at an extra price of £15.

The above is the description given of the new roller by the manufacturers. As a general rule machinery in action comes short of promise, and we venture to doubt a performance equal to 960 lb. green leaf per hour. The testimony borne by Mr. Dickson of Lebanon is that the roller took in 400 lb. and finished that quantity in 40 minutes, the roll being as good, but no better than that obtained by Jackson's excelsior. When 960 lb. of green leaf per hour are rolled with a specially hard twist at an expenditure of force equal to only 3 horse-power, we shall be glad, in the interests of tea planters to record the fact.

A NEW USE FOR WOOD.—The application of wood for stuffing beds seems, at first sight, an anomaly, nevertheless, a patent exists which moreover appears to be quite practicable, for disintegrating the wood of various kinds of Pine, so that it becomes as light and elastic as hair. The resinous properties of the wood cause it to be very healthy, and to act as a preventive against vermin. It is producible at a price far below that possible for any other material, except straw and seaweed, in quantities as low as 4s. per cwt.—*Indian Gardener.*

THE COLLECTION OF MINOR FOREST PRODUCE.—The system inaugurated last year, in the South Canara District, of establishing depots at different points for the receipt and purchase, at certain fixed rates, of minor forest produce, such as myrabolams, wax, honey, &c., collected in the forests and brought to the depot, bids fair to become in time an extensive industry, as it has already developed to a considerable extent, so much so that it has been found necessary to employ an additional establishment of clerks to keep account of the quality of produce brought in by the gatherers. Satisfactory as the undertaking promises to be from a revenue point of view, it is also found to serve as a check on forest fires, the gatherers of such produce being naturally anxious to protect from fire, as much as possible, the trees from the produce of which they earn a livelihood. Wanton damage to trees, so common, is also to a great degree prevented. The system will probably be extended in time to other districts, the Conservator being anxious to do so.—*Madras Times.*

THE GERMAN COLONIAL VEREIN AND THE BINUE RIVER.—As is well known the Deutsche Colonial-Verein is at present taking active measures in the region of the rivers Niger and Benuë. It is proposed to establish a series of observation stations in this territory, as, for instance, at Timbuctoo and in the land behind Sierra Leone. There is no intention to establish stations on the Niger, but only on the Binuë so far as it is not under English protection, that is, east from Ibi and in the land south of the Upper Benuë, which is generally called Adamana. The Deutsche Colonial-Verein is said to take its stand upon the assumption that the Upper Benuë and Adamana must one day be a German colony, even if not so in mere name. The society cannot colonise itself, but it desires to take steps to further colonisation. In the Upper Benuë and Adamana lands many raw products very important for German industries are to be found, as palm oil, palm kernels, coconuts, sesame, earthnuts, ivory, caoutchouk, potash, tobacco, coffee, cocoa, vegetable ivory, black pepper, red pepper, cubebs, ginger, many valuable spices, dye-stuffs, woods, resins, as well as minerals and other useful products, and animals. The Colonial Verein has decided to forward Flegel the sum of 15,000 Mk. by the quickest means possible. The Africanische Gesellschaft has put its steamer "Heinrich Barth" at the disposal of the Colonial Verein for use on the Benuë. Herren Handert and Staudinger are to join Flegel's party in the place of two members who have returned to Europe invalided.—*Kuhlow's German Trade Review and Exporter.*

ROYAL GARDENS, KEW.—"It is proposed to issue from time to time, as an occasional publication, notes too detailed for the annual report, on economic products and plants to which the attention of the staff of the Royal Gardens has been drawn in the course of ordinary correspondence, or which have been made the subject of particular study at Kew. It is hoped that while these notes will serve the purpose of an expeditious mode of communication to the numerous correspondents of Kew in distant parts of the Empire, they may also be of service to members of the general public interested in planting or agricultural business in India and the colonies, W. T. Thiselton Dyer, Director." Such is the announcement which precedes the first *Bulletin of Miscellaneous Information.* By way of Illustration two subjects are mentioned in this *Bulletin*—Teff, and oil of Ben. Teff is a cereal largely grown in the mountains of Abyssinia, and is the produce of a grass, Eragrostis abyssinica. In answer to inquiries the Director publishes extracts from the works of Richard and Bruce giving particulars of the nature and mode of cultivation of the plant, and also extracts from correspondence with the Foreign office, various Consuls, &c. As a result of these inquiries seed have been sent to Kew and analyses made by Professor Church, who notes that the grain contains 8·2 per cent of albuminoids (flesh-forming food), and 68·1 per cent of starch (or force-producing food. Oil of Ben appears from documents before us to be a sort of Botanical "Mrs.'Arris." "El Ben," we are told, is the Arabic or Persian name for Moringa pterygosperma, but the oil prepared from the seed of this plant in the West Indies is of no value, perhaps on account of some defect in its preparation. The *Bulletin* before us affords an indication of one phase of work done at Kew, of which the general public knows little or nothing, but which, nevertheless, is of first-rate importance. In a subsequent issue it may be found desirable to curtail the space given to mere formal official correspondence,— *Gardeners' Chronicle.*

CASTOR-OIL mixed with an equal weight of tallow or other oil, is, according to the *Chemist* and *Druggist*, an excellent dressing for leather. Besides this, neither rats, cockroaches, nor other vermin will attack leather so prepared.—*Indian Gardener.*

SLOW TREE GROWTH.—At a recent meeting of the St. Louis Academy of Science, Dr. Englemann exhibited a section of the trunk of Juniperus californica, which was not quite 4 in. in diameter, and yet showed an unmistakeable age of 127 years, each ring being on an average about one-fifth of a line wide. The largest growth in ten years had been about 4 lines, the smallest during a similar period about 1 ½ line.—*Indian Gardener.*

TREE FUNGUS IN RUSSIA.—According to the *Bulletin* of the Society of Naturalists of Moscow, the hitherto unaccountable destruction of pine forests is caused by the ravages of a species of mushroom which takes growth on the surface of the wood, and afterwards penetrates and destroys the tree. Maps are given in which the path of the destroying fungus is traced through the pine woods of Russia.—*Journal of Forestry.*

BRITAIN'S FUTURE.—England is the largest importer of wood in Europe, requiring, 280,000,000 feet per annum more than she produces. Inasmuch as neither Canada nor the United States can much longer spare large quantities, and since no European country can now produce much more than is required for home consumption, while most of them are importers, Great Britain must ere long depend on her own resources. There are extensive tracts of land in Ireland and Scotland that might be profitably devoted to forest culture. —*Mississippi Valley Lumberman.*

THE WAGES OF HUMAN LABOUR IN JAPAN are far lower than we had any conception. The figures are given in an article in the *Journal of Forestry*, shewing why superior farm implements are not used. The writer states:—Farm labour is so cheap that it is practically impossible to overbid it with labour-saving marchiney. Male field hands work twelve hours per day, have five holidays in each month, and receive their food, lodging, and wages, ranging from 10 to 15 yen (£1 14s. to £2 10s.) per annum. Female labourers work the same hours, are not entitled to holidays, and receive, besides their food and lodging, about 7 yen (£1 4s.) per annum.

TAR IN THE POULTRY HOUSE.—Poultry breeders seem to have failed to discover the value of tar. It is very useful and valuable in many ways. Some breeders tar their poultry-yard fences, in preference to whitewashing them, though we do not like to see it done, for it gives the surroundings such a gloomy, and forbidden look. It undoubtedly contributes largely to the durability of the wood, protecting it from the ravages of storm and time. It is in the poultry house, however, that the value of tar is the greatest, for it conduces greatly towards healthfulness. When that scourge of the poultry man, chicken cholera, makes its appearance, we would advise, first, a thorough cleaning of the house; next, a generous application of Carolina tar on all the joints, cracks and crevices of the inside of the building, and then plenty of fresh whitewash properly applied. The tar absorbs or drives away the taint of disease, and makes the premises wholesome. The smell is not very offensive, in fact, many people like it, and it is directly the opposite of unhealthy. To vermin, lice, etc., the smell of tar is very repulsive and but few will remain after you have tarred the cracks, etc. A friend of ours in Maryland was once troubled with chicken cholera, and by adopting the above, in connection with removing affected fowls, he soon put a stop to its ravages. A small lump of tar in the drinking water supplied to the fowls will be found beneficial, provided it is the Carolina tar, which is very different.—*Poultry World.*

BAMBOO SEEDING.—Some bamboos of the *Katang* variety (*Bambusa arundinacea, Retz.*), having flowered in Ghazipore, N. W. Provinces, Mr. Nichols, C.S., had the seed collected for distribution. I venture to advise sowing in shallow pans or in seed beds under shelter. Transplant to a nursery bed when the seedlings are about two inches high. Again transplant when about seven inches high, and keep till finally located in a place where they can be frequently watered. The Katang likes a rather sandy alluvial soil, though it will do well on 'regur,' or black cotton soil. At Jubbulpore, where they are planted mostly for ornament, the plan which seems to have succeeded best of all was to plant in a circle as shown below, each dot representing a single seedling of, say, 1½ foot high. So far as I can see, there will probably be no chance of getting more seed for some forty years. This variety is believed to have a life period of about 55 years. It often attains the height of sixty feet under favourable circumstances. In 1836 Captain Sleeman recorded in this Society's Journal (Transactions, Vol. III) the flowering and death of all the bamboos in Dehra Doon, and states that it is a characteristic of the bamboo that all the produce of the same seed will run to seed and die in the same season without reference to the season in which they may have been transplanted from original stock. Dr. Brandis seems to confirm this in his *Forest Flora*, and says isolated clumps may be met occasionally; "but, as a rule, all clumps in one district come into flower simultaneously, a few clumps flowering in the previous and some in the succeeding years." So it is probable that there will be a widespread flowering next season.—*Pioneer.*

WOOD ASHES have long been known to possess peculiarly valuable qualities as a manure. In India large tracts of land, covered with grass and brushwood, are systematically set on fire for the ashes they yield. The following, however, which we quote from one of our American exchanges on this subject, will be read with interest:—"Among the most common and most valuable of special manures, I place wood ashes, says Prof. Kedzie. The amount of ash and its relative composition vary with the kind or part of vegetable burned, but we may safely take the ash of the body of a beech tree as representing the average composition of wood ashes. One bushel of ashes represents about two-and-a-half tons of dry body wood. Wood ashes contain all the required elements of plant nutrition except nitrogen. One hundred pounds of wood ashes contains 16 pounds of potash worth 80 cents, 3½ pounds soda worth 2 cents, 67 pounds of lime and magnesia worth 8 cents, and 5¼ pounds of phosphoric acid worth 26 cents. If we had to buy in market the cheapest form the manurial materials contained in 100 pounds of ashes, the cost would be $1·16. Can you afford to throw away such valuable materials, or sell them for sixpence a bushel to the soap-boiler? No argument is needed; here is the value and there is the selling price. Draw your own conclusions." The effect of a handful of wood ashes upon a withering plant is wonderful. We have ourselves often tried the experiment of resuscitating weak, unhealthy, and yellow-looking plants with the aid of wood ashes, and always with uniform and remarkable success.—*Indian Agriculturist.* [N.B.—That the ashes from tea furnaces ought to be carefully utlized.—ED.]

THE WOOD OF THE CASUARINA.—Mr. J. Steavenson Secretary of the Madras Agri-Horticultural Society, has written to the *Journal of Forestry* as follows:—There are to the north and south of Madras thousands of acres of sand-dunes which, within the last five-and-twenty years, I and others have covered with thriving forests of *Casuarina muricata*, Roxb. The tree in favourable parts of the sands grows to a noble size, and that very rapidly. I have many 40 to 60 inches in girth at 5 feet from the ground, and tapering up probably 90 or 100 feet as straight as, and very like a larch planted in 1871. A few trees are cut for poles, shed-building, rails, and such-like uses, but hundred of acres go down in a very immature state every year for firewood. The wood is very hard, of great density and specific gravity, and bears a great strain, but is so liable to warp, perhaps from ignorance of the proper method of seasoning it, that it is very little used for other purposes. I have seen the wood take a very high polish, and some good tables and other articles of furniture made of it. It appears to me absolutely sinful to waste the well-grown trees for firewood, and it has occurred to me that there might be a market for them at home for paving blocks, even if the wood will not season to prevent warping. The logs could, I believe, be profitably put on board ship at from £1 to £2 per ton. [But why not utilize them locally for the principal streets, of Madras.—ED.]

THE SAGO PALM.

Sago is nearly pure starch, obtained from various species of Indian Palms. In the Indian Archipelago it is procured from Sagus Rumphii, Sagus lævis, and Sagus genuina; on the Coromandel coast from Phœnix farinifera; in Ceylon from Corypha umbraculifera; and in Assam from Caryota urens. These trees are cut down, and from the pith filling their stems the sago is extracted. The pith is thoroughly washed, and from the washing, when allowed to rest, the fecula or starch subsides; this is the sago flour of commerce, of which large quantities are used in the manufacture of calico. When used as food it is granulated, and known as pearl sago. Tapioca is really sago in lumps,* and was so called merely because the French, who introduced it from India named it Sagou-tapioca. About eight thousand tons of sago are annually imported.

Sagus Rumphii is a small tree, comparatively speaking, not above 30 feet high. It is a native of the Indian Archipelago, particularly of Malacca, Borneo, Sumatra, Celebes, and the Moluccas. Before the tree has arrived at maturity the stem consists of a mere shell, about 2 inches thick, with a great mass of spongy pith, becoming gradually absorbed, and ultimately the stem remains hollow. At the time when the pith is fully developed, and before it has begun to diminish, which is indicated by the superior leaves being covered with a sort of farina or white dust, the tree is felled, and the trunk cut into lengths of 6 or 7 feet long, which are split to admit of the pith being more easily removed. The pith is in the state of a coarse powder, and is mixed with water in a trough having a sieve at one end; the water, loaded with farina, passes through the sieve, and is received in convenient vessels, where it is allowed to stand till the insoluble matter has subsided. The water is then strained off, and the farina which is left may be dried into a kind of meal, or moulded into whatever shape may be desired. Sago, as it comes to this country, is prepared by forming the meal into a paste with water, and rubbing it into grains; it is produced in the greatest abundance in the Moluccas, but of the finest quality on the eastern coast of Sumatra. The Chinese of Malacca refine it, so as to give it a fine pearly lustre, and large quantities are also prepared at Singapore. It is said that a single tree will yield from 500 to 600 lb. of sago. Sago forms the principal food of the natives of the Moluccas. A decoction of sago fermented yields alcohol by distillation, and by ascescence it forms vinegar. The fruit of this Palm is the size of a hen's egg. The base of the leafstalks is covered with long fibrous filaments that serve to make cordage and sacking.—*Journal of Horticulture.*

TEA FIRING IN N. FORMOSA.

Each tea packing hong has a large firing room attached. Small hongs have 50 to 100 fires and large hongs have about 200 to 300 fires, and even more. The fire places are simply circular holes, about two feet in diameter, surrounded by brick facings. They are arranged in rows, and are not much more than eighteen inches above the floor of the room. The fire holes are apart about half a foot, and on the top of these circular holes or receptacles for live charcoal are placed the baskets containing tea. The fires are prepared in a simple way; a large pile of charcoal is lighted and allowed to burn till all the combustible matter contained therein has disappeared, and then the red hot particles are placed by the circular fire places. For several hours the fires are allowed to flare up and cast forth a flame and glow that few men can stand for any length of time. If you enter a large firing room at the time the fires are being lighted it is like going into an oven, and the return to the open air reminds you forcibly of the heated atmosphere of Montreal hotels, where inside the temperature is perhaps over 70°, and on going out of the front door suddenly find yourself in an atmosphere several degrees below zero. This is putting it very mildly, for in a room with 300 fires the heat is far more intense. It takes time for the fires to settle down, and the red hot charcoal has to be broken up with iron implements; the red heat has to penetrate to the very core of the charred branches or portions of trees, and when no smoke whatever issues from the fire holes, the firing men place on top of the embers a thick covering of ashes of paddy husk, which deadens and tempers the heat to such an extent that in the course of 12 or 15 hours from the time the blazing lumps of charcoal were placed in the fire holes it is safe to place the baskets containing tea leaves over them. The baskets are cylindrical in shape, about 2 feet in diameter and about 3 feet high; they are divided in two by a sieve partition and on top of this sieve the tea is placed. The teas brought down from the hills and tea districts have undergone the sun-drying and absorbing process, have been fired in an iron pan, have been twisted by hand after passing through the rapid frying process and on occasions are basket fired up-country. But the up-country process of preparation is insufficient to permit of the leaf being shipped away to a foreign country; it has, therefore, after you have purchased it, to be "cured" properly and finally at Twatutia. Every particle of moisture has to be extracted in the final process, previous to packing the leaf in lead-lined chests.—*Indian Tea Gazette.*

* No: it is the starch of *Cassava Manioc.*—ED.

GHAUT FORESTS OF THE NILGIRIS.

There can be no doubt that Castilloa elastica would thrive in the lower Ghaut valleys. The climate, soil, and general surroundings of the forest in which the caoutchouc tree is indigenous are exactly similar to that of the lower Ghaut range. The point, however, which nothing but experience on the spot can determine, is whether in this tract of teeming fertility and bewildering wealth of species it can so far intrude on the closely fitting vegetative economy as to conquer an independent position in the forest flora. Most probably it would require some artificial aid to maintain itself. Only to a limited extent could we afford the latter, for the same poisonous climate exists in the tracts, under discussion as in the tree's new world habitat. The region is permanently inhabited by aboriginal tribes, who sometimes settle down into villages in healthy localities; at other times retire to the most lonely and malarious portions of the belt were they seem to be dying out. They cannot be relied upon for general work, but abundant labour for a portion of the year may be procured. Villages with surplus labor exists on spurs of the Ghauts almost overhanging the low country in a cool and nonmalarious climate, two or three thousand feet above the sea. On such a spot the hut of the supervising officer could be erected and feverstricken coolies located for change of air. The whole forest region below is now pierced by easy Ghaut roads at intervals of about fifty miles and bridle-paths run up the accessible passes along which the produce of the hills is taken to the sea. In the lower Ghaut forests Castilloa elastica would find a habitat quite as suitable and unhealthy as its own in America, and with a little care and culture there is no doubt, it would yield at least twice the amount of rubber which it now produces in its normal state. Planters might do worse than turn their attention to this cultivation. In these tracts may be seen towering trees such as grow nowhere else between the two seas: ebony slowly rotting; cardamoms, gamboge, woodsoil, cinnamon oil, resins, gums, &c. going to waste and untouched. True it is difficult to work some parts of these belts; to drag heavy timber, slides would have to be constructed or elephants employed. Though the latter exist in large numbers in an unregenerate state on the spot, yet in most of the acclivities, no elephant could work on a crumbling foothold dropping down at an angle of 40°. We fail to see, however, why a portion of the evergreen forests should not be put in working order. If money for forest purposes is to continue as scarce as it has

been it should in preference be spent where it will yie'd the quickest return, *i. e.*, in a rational working of the Ghaut forests . . . Considering the inaccessibility and unhealthiness of the lower Ghaut forests, we have here a case of what is termed a 'providential adaptation of ways to means' in the fact that the locality is so well fitted to produce an article so necessary in the arts and of such a growing application as Caoutchouc. —*South of India Observer.*

RED SPIDER.

A Darjeeling correspondent writes, in the Cachar Notes, published in the *Englishman* of the 3rd instant:— "For the last fortnight we have had an almost incessant fall of rain, which, together with the cold, has brought on red spider in many gardens. However, the hot weather of the last few days may choke off this unpleasant little visitor." Now, this sentence represents the very opposite opinion to what Darjeeling tea-planters entertain on the subject. They credit the hot weather with bringing on the pest, and look hopefully to the heavy rain to clear it away. It says little for the devotion of tea planters to their business that they are still quite in the dark as to the nature and habits of the red spider, although they have for many years been suffering, and still continue to suffer, very highly from its ravages. They do not even seem to have arrived at unanimity in regard to the times and circumstances of its actual presence or absence,—primary facts which surely might be easily set at rest, and placed beyond doubt by the most ordinary care and observation. Can it be possible that the Cachar and Darjeeling men are both right, and that as regards the red spider, the atmospheric influences in these two districts produce diametrically opposite effects. It is a pity that the red spider nuisance is not properly and promptly taken up and thoroughly investigated by competent persons without further delay. Although planters themselves may not, perhaps, have the necessary leisure or scientific accomplishments, they might easily engage some one with both and at no very ruinous expenditure either, for if every planter whose property is affected subscribed even a rupee for the purpose, an ample fundwould be available. A few months ago, whilst they were probably suffering from the bad prices of last season, the tea boards and bigwigs at Home were going to have the chemistry of tea manufacture thoroughly enquired into; but the good prices this year seem to have evaporated their ardour. And so we go blundering on from year to year without understanding the first principles of an Industry, the magnitude and importance of which, though obviously great, would be immensely increased if we only understood and guided ourselves by its correct principles, as is done in every other important Industry except Tea. Red spider and fermentation are two of the most vitally important matters, regarding which information is wanted, but there are many others regarding which we are equally ignorant; and if a committee of investigation were once started, the width of their field of operations would be very great. Let me ask a simple question. I will suppose that a sample of tea having just the proper colour, strength, and flavour most approved by the brokers be sent to a tea planter, with instructions to make all his tea exactly like the sample, putting quantity entirely on one side for the occasion—is there a planter in India who could do this? And if not, who not? All trades and professions work by sample, and as we can get bread, beer, wine, food, and condiments of any and every sort made exactly to our taste, why not tea? I shall be glad, if some one who is competent to answer the question, will do so.—*Cor. Indian Daily News.*

WITHERING MACHINES: A REPLY.

To your Dehra Dun correspondent, as per *Indian Tea Gazette* of 21st July, which has just reached us. "When will a good Witherer be introduced?" he exclaims! And again—"Who will come to the front with a good Witherer"? I quite agree with all he says of the difficulties and the manifold conditions by present methods in getting fresh or wet leaf, quickly, equally, and properly withered during all kinds of weather, so that it will ferment well and equally, and on which depends the making of first-rate Tea. But, Sir, what surprises us most in our frequent intercourse with most Planters, their Agents, and Directors, is the ignorance of what is going on in the Tea industry throughout the world, and particularly of its latest economic inventions around them. Your correspondent cannot be, surely, a reader of your *Gazette* or an inquirer, otherwise he might have seen our advertisements there, and in many other papers, during more than 12 months, having an Indian circulation, that there is a Witherer in existence for which we claim, and can now prove beyond doubt, that the XL-ALL Tea Drying and Withering Machine is the *first* and *only perfect Witherer*, and, from actual results in Ceylon, withering and drying tea daily. But perhaps he is one of those thoughtful and far-seeing men who does not believe in fire heat, "*i.e.*" warm air, or hot if you choose, properly applied as a means of artificially and rapidly withering tea leaf: therefore we take an interest in him, as he speaks of a fortune certain to accrue to the inventor of such a Machine that will fulfil all the conditions, and which must necessarily apply fire-heated air. I need not mention how the prejudice against fire-heat for withering has arisen, as the haphazard system of withering over Dhols in wet or foggy weather is well known to almost every planter, and also the results obtained from it.

Some years ago I observed, by actual experiments with fire-heated air on fresh tea leaf in the country, though small, but sufficient to show when properly applied to the air and leaf together, that the after fermentation, so named, was quite equal to the best natural (tray) withering, and believing, as I do, that the after colouring of the roll is due to the oxidation of the taunin in the leaf, and not to fermentation, properly so called, I resolved to bide my time, until I could cautiously, step by step, design and carry out properly a Machine that would obviate the necessity of the tedious handling of Tea on trays, for either drying or withering, and giving greatest effect, together with simplicity, highest class workmanship, and cheapness. The XL-ALL Drier and Witherer is now complete, and together with a whole set of simple and economic Machines are now at work in Natal (XL-ALL and factory-shafting lately sent there) besides single Machines in nearly every district; also a whole set for every stage at Messrs. Jas. Brown & Co., Hatton, Dikoya, Ceylon, who have lately sent a report on the Withering and Drying by XL-ALL, together with samples of tea from the bulk and unassorted, just as it was dropped out of Machine.

Report says, actual results of first attempt, without practice, gave, as a self-acting Drier, 130 lb. dried perfectly in 20 minutes. All the samples are marked leaf *withered* (while in a wet state) and dried by XL-ALL, withering a maund each fill of Machine, in a few minutes. A note in Report states that we find that the leaf that was withered by Machine, and after rolling same by our Link and Lever Machine, *takes exactly the same time to ferment as leaf withered naturally by the ordinary means.* I now come to the report on the bulk and unassorted samples of this same tea by Messrs. Geo. White and Co. of London. "Ceylon tea, black Greyish curly, *bright infused leaf, brisk and pungent flavor*, prices up to 1-10d. per lb. in bond."

The point here in evidence of its being, as your correspondent, like many other unprejudiced and thoughtful planters ardently desire, is the character of all the 5 samples *Bright infused leaf;* there is also the verbal evidence of the taster of the Civil Service Stores, London, that he *never saw a more regular fermentation or a brighter liquor.* What does this show, but the most perfect withering (by fire heat) and more rapidly and without labor than anything else in existence. From the fact of 130 lb. dried in 20 minutes, and with practice, Messrs. Brown say, they

will be able shortly to declare better results; it shows by the character, brisk, and pungent flavor, a first-class Drying Machine. But they say as a Withering Machine alone it ought to take.

It enables planters to make first-class tea during any kind of weather, be it rain, fog, or sunshine, as air of any degree of heat can be used accordingly, and they can time the withering to the rolling, and save all chalonies, lofts, large sheds, their annual repairs, labor, and worry infinite.

It is a rapid Drying Machine one minute, and a splendid Withering Machine the next. Any degree of withering can be given to prevent frothing and loss of watery juice, particularly at the first of the Assam season; concentrates the mucilagenous matter in the leaf, and holds the roll; rolls up quicker, gives bright flowery or orange nibs, enhances the price of the tea.

I apologize for this long letter, but your correspondent's exclamation —"who will come to the front with a good Witherer," has prompted it; and as a duty to ourselves and the Tea industry, and but for that I would have remained quiescent until the promised still more surprising results, with the staff in thorough trim and practice in Ceylon, where my system of fresh leaf equalizing (making first-rate equalized Pekoe Souchong, or all the classes, without sifting or otherwise, and without broken tea and dust) is being carried out by my several inventions, and by instructions given during 12 months in our Works to a young Engineer who is now there.—Yours faithfully, JOHN GREIG, JR., For John Greig & Co.—*Indian Tea Gazette.*

[The surprising thing is that we, in Ceylon, know so little, in fact scarcely anything of what is said to be done amongst us.—ED.]

THE AUSTRALIAN BLUE GUMS

are rather inconsistently described in an article on firewood in the *South of India Observer*:—At the present selling price of grass land outside of Ootacamund, and considering the unique rapidity of the growth of the eucalyptus and the enormous proportions it attains, it is proved to demonstration that the great quantity of fuel yielded by an acre would amply recoup the outlay of a producer, even if the latter sold his wood at half the rate now charged by the Department for a thousand pounds. The Forest Department charges a seigniorage of R1-4-0 for this weight of wood delivered at the forest, and the average rate of cart hire to and from the latter is R1-8-0. Thus a cart load of wood deposited on a purchaser's premises costs R2-12-0 (more than half of which is for carriage) anything but a light price, we submit, when we take into consideration the excessive and necessary consumption of wood in this climate for domestic purposes more especially during the monsoon and frosty months. Moreover Government denies to the native town population the privilege of taking their wood out of the forests, which is conceded to villagers. A cheaper supply of fuel in a damp climate like ours to a scantily clad and badly housed native community would be of incalculable benefit indirectly. It would improve the health of the town, and lower the death rate, to say nothing of the mere comfort of domestic life. On Æsthetic and Agricultural grounds we deprecate the promiscuous cultivation of eucalyptus within the precincts of the cantonment. Viewed in the former light of the prim formal, stiff, sombre looking blue gum is anything but an embellishment to the lanscape, and when in addition, its towering height, effectually shuts out from view the pretty tasteful English dwellings which since recently adorn our Sanitarium we think any Æsthete will support our contention that the disfigurement in question should be removed or at least not permitted to be extended. Unless one strains one's sinews to clamber up Dodabet's summit it is impossible to get a view of Ooty, owing to this thick growth of eucalyptus, which envelope it on all sides, and the natural beauties of our pretty Sanitarium are effectually effaced by this giant of the Antipodes. If the cheapening of fuel should fail to demolish our urban forests, for we hold that the factors, which contribute to enhance the price of firewood are distance of the source of supply and cart hire, we should like to see a bye-law introduced prohibiting the planting of the tree within the limits of the cantonment, though such a bye law can only be justified except by a very liberal construction of the Sections of the Municipal Act. Agriculturally considered it is an indisputable fact, that eucalyptus dries up streams and springs, destroys pasture and generally impoverishes the soil and it has been observed, particularly in Australia, that grass and undergrowth perish beneath its baleful shade and no green thing grows therein. In a word the Ecuaylptus Globulus is so select in its habit that it will tolerate no rival in the vegetable world in its vicinity and thrives rankly in solitary luxuriance or exclusive community like Robinson Crusoe, Monarch of all it surveys.

OUTDOOR CULTIVATION OF THE STRAWBERRY.

There is no doubt that many Strawberry plantations are relied on annually for the crop, when it ought not to be counted on as profitable for more than two or three years. As the time will soon arrive when there will be abundance of runners, it will not be inopportune to give a few notes regarding the outdoor cultivation of the Strawberry. Many gardeners make their new Strawberry plantations in the autumn, others leave it until the spring; but we think a full crop ought to be procured the first season after planting. Therefore we will recommend the runners to be planted in their permanent quarters from the last week in July until the end of August. The sooner the runners are planted the stronger will be the plants, consequently there will be a larger crop of fruit. This system of Strawberry culture is well carried out by Mr. Douglas, Great Gearies, Ilford, and better results could not be obtained. Preparing the runners and preparing the ground for their reception ought to be attended to at about the same time, for as soon as the runners are well rooted they should be planted out.

PREPARING THE GROUND.—The ground should be well trenched to the depth of 30 inches, placing a good layer of decayed manure in the bottom of the trench, and another layer within a foot of the surface. If the subsoil is not in very good condition it must not be brought to the surface but be kept underneath. It must be well worked up with some manure. After the ground has settled down it will be ready for the prepared runners.

PREPARING THE RUNNERS.—As soon as runners are obtainable they should be layered into 60-size pots, filled with a compost of four parts loam and one part decayed manure. The loam should be well divided and the manure sifted. If it is not convenient to use small pots pieces of turf 4 inches square are good substitutes. Pinch the points off the runners before layering, as it will strengthen the remaining runners. Press the base of the runner on the surface of the soil or turf, and peg it in position. After being layered they must be kept well supplied with moisture. When well rooted sever them from the parent plants, stand them together in a sheltered place, and keep them well supplied with water. In a week they will be in good condition for planting out.

PLANTING OUT THE RUNNERS.—Two feet apart in the rows and the same between the rows is a good distance. To every plant give a good shovelful of soil, the same as was used for layering, only it may be in a slightly rougher state. Press the soil well round the roots, and form a shallow basin round them. Keep all runners removed as soon as they appear, and well water them every alternate night, or according to the weather. They will soon commence growing, when the Dutch hoe should be used frequently amongst them. As the season advances and the autumn rains come on discontinue watering.

AFTER-TREATMENT.—If the winter is likely to be severe mulch with some short dry manure. If it is likely to be an open winter do not mulch them, but use the Dutch hoe freely. After the fruit has set, and if it is dry weather, a good soaking of sewage or liquid manure should be given, afterwards well mulching them with long stable litter, which will soon become bleached and be a good protection for the fruit, otherwise

clean straw can be used. It will well repay the cultivator if time can be spared to support the fruit with Birch branches. This is the best protection from slugs, and the fruit is kept clean.

SECOND YEAR'S TREATMENT.—After the fruit is gathered and all runners taken off that are required, remove the runners that are left with the old mulching. Well hoe and clean the plantation, and give a thorough dressing of well-decayed manure. This is all the treatment they will require beyond hand-weeding and cutting off any runners which may appear until the fruiting period arrives, when the protection of the fruit must be seen to.

If a new plantation is made every year it will be much the best system, as then there will be a one-year and two-year-old plantation in full bearing; but the one-year-old plantation will produce much the finer fruit.

VARIETIES.—Most gardeners have their favourite sorts, but I give a short list for succession:—Vicomtesse Hericart de Thury, Keens' Seedling, Sir Joseph Paxton, President, Sir Charles Napier, British Queen (in some soils), Unser Fritz, Loxford Hall, Reedling, Frogmore, Late Pine, and Oxonian.—A. YOUNG.—*Journal of Horticulture.*

IN the production of Rose Blooms for Otto of Roses no less than 145 towns and villages are concerned. Under favourable circumstances 2,000 lb. of Rose leaves will yield 1 lb. of the otto, whereas at other times it will take no less than 5,000 lb. weight of leaves to produce the same quantity. The area required to grow the Rose trees to produce such innumerable quantities of flowers covers large tracts of country, and in order to save loss by evaporation after picking, small stills are erected in the open fields. It is the more necessary to have the apparatus close at hand, as all the flowers for the same reason are picked if possible before sunrise.—*Journal of Horticulture.*

WORMS ON LAWNS (*G. R.*).—There is no simpler remedy for expelling worms from lawns and borders than clear lime water. Get some lumps of lime fresh from the kiln and place them in water, stirring well, then allowing the lime to settle and the water become clear. If there is any sediment at the bottom of the vessel the water will be as strong as you can make it, and perfectly safe. About a pound of lime will suffice for ten gallons of water. It is best to apply it during mild showery weather, when the worms are near the surface. If there is no sediment at the bottom of the vessel the lime water will not be strong enough. An ounce of corrosive sublimate dissolved in a little boiling water, then mixed with forty gallons of clear water and applied through a rose, has also been found to expel worms from lawns. —*Journal of Horticulture.*

ALLEGED INSECTICIDE CHARACTER OF TOMATOES.—A curious statement, deserving the examination of botanists at home, comes from Cape Colony, where it is alleged that insects are observed to shun land on which tomatoes are grown; and the culture of the *Lycopersicon esculentum* is accordingly recommended in all cases where it is possible to grow it—under fruit trees, for instance, since the tomato will thrive in the shade of other trees, which few other plants will do—for the sake of the virtues attributed to it as a prophylactic against the inroads of insect pests. The popularity of the tomato as an esculent is sufficiently great to repay the trouble of planting on a large scale, even if its supposed virtues proved to be a myth; and any surplus supplies might easily be preserved in tins, and shipped to this country. It will be interesting to know whether the tomato has been observed to exercise any such effect on insects elsewhere—in Canada, for instance, where the fruit is so popular—or whether it is only in warmer climates, like that of the Cape, that its peculiar powers are brought into play. Much the same power was once attributed, we believe, to the common broad bean, but we are afraid this plant does not "live up to" its character.—*Colonies and India.*

EXISTENCE OF MANGANESE IN PLANTS.—Manganese is tolerably abundant in nature, large deposits of the oxide occurring in Scandinavia and elsewhere, but it is almost exclusively confined to the mineral kingdom. It is true that traces of manganese have been long known to exist in the vegetable tissues of a few plants, but whether accidental, or essential for the growth of certain species of plants, botanists could not tell. Professor Fluckiger, of Strassburg, has during the last few years brought forward additional evidence that manganese is widely distributed, as it is to be found in the ash of many plants belonging to different families, but the quantities are comparatively minute, and anything but uniform. From experiments made by Fluckiger in 1872, it transpired that manganese pervaded nearly every plant of the *zingiberaceæ*. This can be demonstrated in the case of cardamoms by fusing the ash of one seed or capsule with nitre and sodium carbonate when the distinct green re-action characteristic of manganese is observable. Recently the same investigator has shown that the genus *trapa* contains throughout many species a distinct quantity of manganese. The fruits of these plants give evidence of a liking for this metal, or at least they have peculiar susceptibility for its assimilation. From this predilection or affinity for manganese such plants are appropriately denominated *manganophagous* or more simply manganophile.—*Chemist and Druggist of Australasia.*

PLANTING EXPERIMENTS.—Mr. J. Aitken Middleton of Tinkong, wrote as to his experiments at Tipling:—"*Vanilla.*—I think I told you that I had planted it in virgin jungle with only the undergrowth cut down. It came on splendidly, but I regret to say that the squirrels took a liking to it and ate off the shoots as they came out. I have removed it to a more open space and have planted artificial shade over it, and I am glad to say it is now doing very well. Of course this transplanting has checked growth considerably, and will, I fear, cause delay in blossoming and fruiting, but I have little fear for it now. *Ceara Rubber.*—Last lot has germinated fairly well: after it is germinated it seems to have only one enemy namely, the mole-cricket. This fellow destroys them when they are 3 to 4 inches high. I had 40 plants destroyed in one night. The only tree that came to any size here (Tinkong), out of the very first lot of seed you sent me, has begun to flower. I regret to tell you, however, that during a thunderstorm some two nights ago the flowering branch was broken off. This branch I have cut in pieces and planted to see if they will grow. In March one of the trees planted at Tipling was blown down in a gale. I had it cut in pieces and planted at once, and am glad to say that all the cuttings are doing well. I should now be obliged by your giving me some information as to when, where, and how the trees ought to be tapped. *Divi-Divi.*—As I told you some time ago the tree grows very freely here. Nearly every seed you sent me has germinated. The few trees I have here have not grown much in length lately, but have thicked about the roots and have spread out on top. They seem to like the sun as all are turned towards the south and south-west. Two are specially noticeable in that way, being spread out like trained plum trees facing south-west; not a leaf on the other sides. There is no shade anywhere near them, so I cannot account for this way of growing. *Rhea.*—I regret having forgot to watch this plant at seeding time (end of April and May) as I wished to send you seed. I was busy with a lot of new machinery and building at the time, and the bungalow garden was rather neglected. I shall be very glad to send you a lot of cuttings if you wish them, and shall try and remember seed next year. *Vegetable Seeds.*—When distributing the seeds I should like you to send all "*Buists*" (American grown seed) if possible. I find they do best in Assam. For eleven years I have never had a failure with them, whereas, even the best English seeds have never been a *great* success either with self or neighbours. *Neem.*—This tree requires great care; I have been able to save three trees only, and would be glad of a few more seeds if you can spare them."—*Madras Mail.*

THE DROUGHT; NATIVE CATTLE AS DRAFT ANIMALS AND MILKERS.

Hapitigama Korale, 16th Feb. 1887.

We had a mere sprinkling of rain on the 9th and 10th; no sign of any since. The sun blazes and the wind blows, and everything is suffering more or less according to its nature; man, beast, and plant. After all we have no right to complain as it is the only weather we have to expect at this season, and though the heat and the cold, and the wind are disagreeable, I hear of no sickness out of the common, either on the estates or in the villages, and for certain kinds of work nothing could be better. Coconuts on dry gravelly ridges or sun-baked clay suffer sadly both in the loss of leaves and fruit, but we must, take the bite with the buffet and make the best of our situation.

In my own case my cattle are my greatest trouble, the herbage is utterly burned up and day by day they become more lean and wretched. With reference to your recent article on our breed of cattle, it does not appear to me that in the low-country anything would be gained by crossing the breed with anything larger or less hardy. The native breed is admirably suited to the country and the habits of the people. Left to shift for itself the Ceylonese bullock is supple and enterprising, he holds in contempt all ordinary fencing and ranges far in search of a succulent mouthful; cunning and watchful, he dashes off like the wind whenever he smells danger in his marauding expeditions. He has great strength in proportion to his size and weight, and when trained to work is patient and docile in the hands of those he knows. Indeed both his vices and his virtues suit him exactly to his lot in life, but when well fed and tended he becomes a very perfect animal and will accomplish a run of six miles in a light hackery, in three quarters of an hour. As the cows are never milked* the lacteal glands are never properly developed but get a young cow with her first calf, feed her well, and milk her dry twice a day, and she will give as good a return for the food she eats as any other breed.

Cattle keeping is not a paying business in Ceylon, either breeding or fattening, anything except milking cows, and draught bullocks' are kept at a loss. The value of an 18 months calf is R5 and if kept till it is three years old, a handsome young one may be as high as R15, but a quey of that age will not sell for more than seven or eight, and if you go to the cost and trouble of fattening a barren cow or a young bullock that proves unfit for draught the butchers will give no more than for a wild animal from the jungle. There are more or less cattle kept on most coconut estates, but I think most proprietors of experience will agree with me that they are kept without profit, if not at a loss when they pay a keeper. If the manure is conserved that is something, but manure of equal value may be bought for less than it costs. Where cattle are kept on an estate, however, there is some gain in the cost of weeding, because even rank grass is injurious to coconut trees and the cattle droppings are of some service to the soil. I pay my cattle-keeper R90 per annum and my returns, the milk and butter of the year, would be worth a like sum if there were a market, but as it is all consumed on the premises, that may be written off as balanced, then I have my bullocks for cart and hackery work and 20 cubic yards of manure worth R40 and I could sell three head annually for R30, so that I am a gainer of about R70. Mine, however, is a special case; none of my neighbours milk their cows and few of them turn their manure to good purpose, and as my chief profit is in the milk, theirs must be a loss. None but a Scotchman can make a good breakfast on milk parritch with milk, and only he who takes all the milk he can get from his cows, can make from R30 to R40 in a year from ghee prepared from his spare butter.

We, coconut planters, are fortunate in being outside the Medical Wants Ordinance and with no personal interest in railway extension. Of course, my sympathies are with my mountain brethren on both questions and were I a member of the Association, I would vote for the most violent and outspoken of the proposed notions on the medical question.

* Our Correspondent does not seem to have the fear of the "Examiner" and its Correspondents before his eyes. For asserting that the natives seldom milked their cattle, we were severely reprehended, but there is our Correspondent, with his long experience making the assertion in a stronger form.—Ed.

INTERESTING ADMINISTRATION REPORTS.

(*From Report of Assistant Government Agent Kegalle.*)

Coconuts and Plantains.—There is a considerable area under coconuts and plantains; indeed, there is a large export trade in the latter in the districts bordering on the railway, the quantity sent away from Rambukkana alone in 1885 being 561 tons. On the whole, there is an abundant supply of food for the people, and it is only in the case of the estates, and to some extent the floating bazaar population, that imported rice is used.

Cost of Production.—The cost of the production of rice is shown in the tabulated replies to the following series of questions. I have taken a pela (*i.e.*, about half an acre) as representing the extent owned by the ordinary villager:—

If hire of buffaloes and Government tax is included, the value of each day's labour comes to (from 3 to 6 cents!)

Notes.—(1) There is scarcely any sale for straw in the Four Korales and Lower Bulatgama, and only a very limited sale in the Three Korales, where a pela's production of straw can sometimes be sold for from R1·50 to R2.

Other Products.—*Tea.*—The cultivation of tea has increased on a large scale during the year. There are now over 100 estates in the District, and the out-turn during the year from them all must have been close upon a million pounds. Land is going up in value, and is being eagerly sought after by investors, and the average price has risen to £3, £4, and even £5 an acre.

There can be little doubt that the Kelani Valley is destined to become the finest tea district in the Island. The soil may not be so good as in some up-country places, but in point of climate for tea and cheapness of production it beats them all. It has a navigable river within easy distance of every estate, that only requires a little money spent on it to be suitable during a considerable portion of the year for steam traffic; it has an unlimited labour supply in the village population, who are readily taking to estate work; and it has extensive tracts of Government jungle suitable for cultivation. I annex a table of the average rainfall, and of the number of days in which rain fell during the year, that may be of interest as showing the suitability of the District in point of climate for the cultivation of tea:—

	Average of five years. Inches.	How many Days.
Kegalla	... 117 to 120	... 174
Ruanwella	... 130 to 187	... 149 to 160
Kitulgala	... 188 to 239	... 200 (about)
Yatiyantota	... 145 to 150	... 200 („)
Dehiowita	... 135 to 155	... 240 („)
Avisawella	... 125 to 168	... 164-228
Indurana	... 120 to 168	... 168-179
Rambukkana	... 72	... 175
Western Dolosbage	... 180	... 223
Panawal Korale	... 148 to 171	... 217 to 243

The lowest rainfall is at Rambukkana, but even here there are the compensating advantages of a heavy dew at nights during the dry season, and the rich loose soil of the Mahaoya valley.

Cacao.—The cultivation of cacao has not been on so large a scale as in former years. Much of that already grown is dying out. I do not think that the soil and wet climate of the Distict are particularly suited to it.

Cardamoms.—The cultivation of cardamoms has extended in every direction. The soil and climate of the Western Dolosbage range and in the Kelani Valley appear to be very well adapted to it.

CINCHONA.—There is a little cinchona still remaining in Western Dolosbage, but it will soon become, like coffee, a thing of the past.

Annatto, croton, rubber, African palm, coca erythroxylon, are being tried here and there, but these are as yet in the experimental stage only.

ARECANUTS.—The cultivation of the arecanut palm is perhaps the most important native industry in the district. The finest nuts are grown here, and they are produced in the largest quantity. It is estimated that there are over 120,000 acres in bearing of this product. The arecanut serves in place of money to the native. By its means he pays his road and paddy tax, and obtains his salt, tobacco, betel, dry fish, &c. It is therefore an index of the prosperity of the villagers, and I have made it my constant object to extend the area under its cultivation.

Experimental Gardens.—A number of experimental gardens were opened during the year at different points in the District, *i. e.*, at Kegalla and Ambuangala, and on a smaller scale at Rambukkana, Dehiowita, Pindeniya, and Ruanwella, and various products have been tried at each. We have some excellent Gansabhawa rules to compel people to plant up their gardens, and these have been put in force in every District, with the result that palms and plantains are now being extensively grown. I think myself that one of the chief objects in our experimental gardens should be to grow native products of really good kinds; and we shall, I believe, do far better work in improving what the natives have already, than in forcing them to grow new ones. Take plantains and papaws for instance. They cultivate in many cases the poorest kinds, because they cannot get at their hands the best. The native papaw is a wretched fruit, while the West Indian, which grows here even better is a delicious one, and some of the Straits plantains are as superior to the ordinary Ceylon kind as English hothouse grapes are to those of Jaffna. Cacao is the only European product that a native can grow round his house with a chance of its being remunerative, and for this we can only supply seeds, as it will seldom bear transplanting. Tea will not, I think, suit the ordinary villager, but it would be well to give him the chance of growing it, if he likes. With the exception of these two, I think, we should spend our money and energy on improving their palms, their breadfruits, yams, plantains, papaws, pepper, cardamoms, and, if possible, their cereals.

It is significant how seldom one sees young palms (except arecanuts, which are self-grown) of from two to three years old, and I myself believe that the fresh planting of these is becoming less and less and that when the old ones die or become exhausted the people will feel their loss very much. As it is, many have nothing in their gardens but a few old jack or worn-out coconut trees, and when their rice crop fails, they are often brought to the verge of starvation. We should, therefore, I think, apply our new and most useful Gansabhawa rules more in the direction of forcing them to replant their gardens and high lands, than in making them take to new and thereore distasteful products.

NEW PLOUGHS.—The new ploughs introduced by Mr. Green, the Director of Public Instruction, have been at work in this District during the year in several places. So far the results have been satisfactory. Wattagama Ratemahatmaya, of the Belia Korale, used the Sewdish plough on a field of his of three pelas. Last year the field gave ten amunams, equal to thirteen-fold; this year he cultivated half by using the Swedish plough and half by the native plough, and kept the accounts separate. Result:—By native plough thirteen-fold as before; by Swedish plough twenty-one-fold. The Otara Pattu Korála used the same plough on a field of three pelas, and the native plough on an adjoining portion of the same field of two pelas. Result:—With the native plough on the two pelas, crop six amunams, equal to twelve-fold; with Swedish plough on three pelas, crop fifteen amunams, two pelas and five kurunies, equal to twenty-one-fold, or much the same result as in Wattagama's experiment. The great objection to this plough is that it is too heavy for the buffaloes to work, but the same objection does not equally apply to Howard's new "Cingalee" plough, nineteen of which I have now at work in the District, and the result of which will be shown in this coming maha and yala crops.

MR. J. TYNDALL ON CEYLON TEA.

Your readers may care to peruse copy of a letter addressed by Mr. J. Tyndall in October last to Lord Randolph Churchill, and the reply thereto of the Private Secretary of His Lordship:—

"Thomanean, Milnathort, 5th October, 1886.—To the Right Hon'ble Lord Randolph Churchill, &c., &c., &c. My Lord,—In justice to the island of Ceylon, mention of which you make in your late comprehensive and significant speech delivered at Dartford on Saturday last, I would beg most respectfully to point out to you that in your reference to the rise in price in the value of the coffee produced in that island, and from which staple in former years the chief basis of its prosperity was derived, you made no allusion to the industry which is now rapidly becoming a more important industry—namely tea. The accession of the Conservative Government to power has had the most marked effect in the tea market. Ceylon produces a very high quality of tea, which is now forcing its way into the home market, and has especially taken hold of the Irish taste. The effect of Mr. Gladstone's Irish policy was such as to produce an utter demoralization of the tea market there. Dealers would neither give credit, nor hold stocks, and the result was a marked fall in Ceylon tea. Happily, now a rapid recovery under a more stable and firm Government is already perceptible. Having lived and labored for upwards of thirty years in Ceylon, I am naturally anxious that this new product, tea, which is bringing back prosperity to the island, should not be lost sight of by the Government even in these trying times, and I would beg to bring under your Lordship's notice that the rise of the tea industry in Ceylon is, I venture to pronounce, one of the most striking examples of the British planters' pluck; for, after being ruined by leaf-disease in coffee and again struck down by the failure of cinchona, disheartened but not dismayed, the same men have planted up the same land with tea, which, as far as human foresight will allow, now promises a great future, the export of tea having risen from nothing in 1878 to seven millions of pounds this year, and by 1890 will bring into the market 30 million of lb. per annum! Trust that your Lordship will pardon the liberty I have taken in thus bringing forward to your notice so striking an example of what certainly may be classed within the category of the satisfactory revival in trade referred to by you, I beg to subscribe myself your Lordship's Most Obedient Servant,—JOHN TYNDALL."

To the above the following reply was received:—

"Treasury Chambers, Whitehall, S. W., October 11. 1886. Dear sir,—Lord Randolph Churchill desires me to acknowledge with thanks the receipt of your letter of the 5th instant which he has read with great interest. —I am, dear Sir, yours faithfully,—FRANK D. THOMAS."—*London Cor.* Local "Times."

[The grand joke is that the accession of a Tory government, by giving peace to Ireland, (which it certainly has *not* done,) is the real cause of the great increase in the value of Ceylon tea! "Jack Tyndall" could never resist the chance of poking fun.—ED.]

COFFEE, CINCHONA, TEA, ETC., IN BADULLA.

(*Extracts from Badulla Planters' Association Annual Report.*)

COFFEE.—Your Committee are still able to state that notwithstanding the reports that coffee has more or less, in other districts, succumbed to the effects of leaf disease, bug and climatic influences, in many parts of Uva coffee is not only still vigorous and healthy, but during the current season is bearing a good crop with every promise of bearing a fairly good crop in the succeeding year. It is also a matter to be noted with regard to this product, that hitherto, coffee from this part of the island fetched a much lower price than that from other districts, but latterly the

prices obtained for Uva coffee have not only been equal to, but sometimes exceeded those obtained for coffee from the other districts. It is matter for satisfaction that the market for this product has improved so much lately.

LEAF-DISEASE BUG, &c.—It is satisfactory to note the past year has been one of comparative freedom from leaf disease, which seems to have run its course and while this is matter for thankfulness, your Committee cannot but view with concern the appearance of green bug, and it is with sincere regret and apprehension that your Committee have to report its general appearance in the district, and they would strongly urge every member of the Association to do all in his power to check this pest and would point out that while it is only here and there in small patches is the time for energetic action. Your Committee sincerely hope that our genial climate, good soil and vigorous coffee may render the attacks of this pest abortive.

CINCHONA.—Your Committee are glad to be able to report a considerable improvement in the condition of this product in the district. There is a marked decrease in canker, and Uva has proved itself to be probably better suited to the growth of this product than any other part of the island. It is to be hoped that the low prices at present ruling for bark will shortly improve. Some important information was elicited from a series of questions issued to members *re*-harvesting bark; a proposal to send a Commissioner to Java was also discussed but was not carried out. A request was made by the Dimbula Association to collect statistics of cinchona, with the probable yield for some years, but owing to the difficulty of getting reliable information on this subject this request was not acceded to.

TEA.—The growth of tea in these districts is matter for sincere congratulation, and there is no longer any doubt but that our estates are eminently suited to the growth of this product, while sales from the district in the London and local markets have been most encouraging.

COCOA AND CARDAMOMS.—These products have both proved a success in our district more particularly in Moneragalla, and are showing excellent results.

THE TEA ENTERPRISE.

AN 18 MONTHS' PRUNING, RECOMMENDED FOR CEYLON TEA —THE GREEN TEA TRADE WITH CENTRAL ASIA, PROBABLE CAUSE OF ITS DECLINE—LOCAL CONSUMPTION OF TEA IN INDIA, AND THE CHANCES OF GREATLY EXTENDING IT.

Yatiyantota.

DEAR SIR,—Having made more than one careful experiment I am now convinced that tea bushes in Ceylon will go on yielding large flushes for eighteen months (and even longer) without pruning if a light topping (that is cutting away crowsfeet, and any straggling shoots) be given in the meantime *and this latter operation scarcely interfere with the flush.*

It is absurd, therefore, to go on punishing our bushes unnecessarily by a heavy yearly pruning, especially when that is done at the expense of quality, and possibly the premature exhaustion of the plants for this constant cutting away all old wood, and forcing the roots to throw up a continual supply of new wood as well as young leaves must be very trying to the bushes in a forcing climate like Ceylon where the bushes have literally no rest.

The following is the system of pruning I would recommend Ceylon planters to adopt viz., prune half the estate in June and the remaining half in November; these halves would then be alternately pruned in November and June: for instance that pruned in June 1886 would be pruned again in November 1887, and the tea pruned in November 1886 would run to June 1888, thus the seasons for pruning would not be changed though each half would have a run of 18 months from pruning to pruning.

No set time can be given for the intermediate topping, as that would depend greatly on the style of plucking, soil and other circumstances and the Superintendent must use his own judgment as to the best time for giving this, which might be 8, 10, or 12 months after the pruning. Some patches where the soil was good, and plucking had been carefully performed might probably be left to run the full 18 months without topping with advantage, both as regards quality and quantity of leaf. True the experiments mentioned above were carried on at an elevation of only 600 feet and the plan might not, therefore, suit *all* elevation in Ceylon, but anyone doubting if it would suit his own particular totum could easily see for himself by lightly topping a piece of tea he was about to prune, and then wash the flush for the next six months.

The advantages to be gained by such a system of pruning apart from the health of the bushes are many and obvious:—

1st.—The quantity of new and inferior leaf would be much less in proportion to the good leaf.

2nd.—This leaf could be so evenly mixed with the good that no one break of tea would contain enough to materially interfere with the strength and quality of the tea, and hardly a break need be sent away without *some* new leaf in it; hence a uniform quality could be thoroughly maintained.

3rd.—The time for pruning being divided would enable us to estimate the labour force required with greater certainty, and avoid any *great* rush of leaf or any slack time. In short such a system of pruning would almost answer the purpose I had in view in recommending a portion of our leaf being turned into green tea.

Apropos of this and your foot-note to my letter of the 19th June regarding the decline of the green tea-trade with Central Asia, as I was one of the first who had a finger in the pie, I may be able to throw some light on this subject that will interest you and your readers, and, perhaps, be of use to those more directly concerned.

My own candid opinion is that the planters of Northern India have no one but themselves to blame for the decline of this very remunerative trade, in fact it was a clear case of "killing the goose," etc., etc.

We were on our last legs finding it almost impossible to sell black tea for cost of production (owing partly to the depression of trade and partly to our isolated position and heavy transport as compared with Assam and other more favoured tea district and still more to the cold climate, and consequent small yield per acre) when some wealthy Calcutta merchants made their appearance, and not only offered to buy up all our teas on the spot, but also gave us better prices than we could get for our black teas after hundreds of miles of transport, and lead-lined boxes had been added to the cost of production. But these welcome customers required us to make nothing but green tea, colour it well with soap-stone and pack in sacks which they themselves supplied.

Now when it is considered that this tea (packed in a manner in which Ceylon planters would hesitate to despatch parchment coffee) had to be conveyed over a long and tedious journey of upwards of 2,000 miles on the backs of camels, and was probably months before it reached its final distinction somewhere in the dominions of the Shah of Persia, I believe, it may well be imagined in what condition it reached the consumer's hands. But what was this to us; the Afghans would have nothing to say to our lead boxes, they were buying the tea with their eyes open and we ran no risk in making green tea as stamped agreements were drawn up at the begining of the season for the whole year's outturn. After samples had been sealed and price agreed upon, and so if they eventually lost heavily on their purchases that was their look out. You may call it short-sighted policy on our part, but the fact was we saw a way out of present difficulties and in the meantime the market for black tea might improve, at least that was my own opinion, and I don't suppose a dozen planters expected the trade to last more than two or three years, though as it went on year after year and the demand seemed to increase it really seemed as if we had established a permanent trade with Central Asia. Perhaps the people rather liked the musty flavour our teas must have had acquired by the time that reached them, never having tasted tea that was not musty

and after all the real cause of the decline may be found in the unsettled state of the country between Afghanistan and Persia, through which the tea had to pass owing to the action of Russia, and now I come to think of it I remember that our own little war with Cabul in 1878-98 nearly put a stop to the trade,the Afghans saying it was unsafe to try and pass through. This trade may, therefore, revive now that the Russian difficulty has been satisfactorily settled, but if it does I would strongly advise the planters interested to take care *of the goose*, and by sacrificing a fraction of their profits provide airtight and waterproof bags so as to insure their teas reaching the consumer's hands in good condition, and free from mildew and rot, and if they could send the tea in small air-tight packets (such as are now being sold in Ceylon) to suit the retail trade I am certain they would be gainers in the end.

Talking of small packets remind me of what a vast field for the profitable disposal of their teas the Indian planters are neglecting at their doors. If we deduct the teas consumed by the troops [and Europeans the consumption of tea in India is almost nil; yet the natives are fond of tea, and thousands of them would become habitual tea-drinkers if they could always procure it in a fresh state *and in suitable sized packets.*

At present it is only in certain large cities, that the natives can purchase tea at all, and then it is either of the coarsest description, (Bohea) in paper-packers and of course musty as souchong taken from a box that has probably lain open in the Buniah's shop for more than a month, and, which, besides being musty has become impregnated with the smell of fish and all the other various strong smelling articles with which the shop is filled. Besides these China tea (so called being sticks and bits of flat leaf) can be had in some of the principal towns in ¼ and ½ lb. packets which are retailed at the rate of one rupee per lb. If some of the managers and assistants of tea estates would only combine business with pleasure, especially those who are fond of shooting and devote some of their spare time to hawking tea about the country and introducing it into the bazaars of small native towns and outlying districts, I am convinced we should hear no more about the scare of overproduction for years to come. The people of India are capable of consuming every ounce of tea at present produced by India, and two trips which I made with the above object in view, convinced me that very little care and trouble on the part of the planters to introduce their tea would secure them a very extensive and profitable market.

As the *Observer* is a widely circulated paper, and anything appearing in its columns affecting the interests of Indian tea planters would probably find its way into the Indian papers, a short account of the two trips mentioned above and the experience gained by them (of which my subsequently leaving India prevented me reaping the benefit) might not be out of place here.

1st—Each trip occupied nearly four months,but as they were accomplished during the cold weather, when there is nothing to be done on a tea estate in India, it could hardly be considered that any time was lost, and as a good part of the journey lay through thinly populated districts swarming with game of every description. I was more than compensated for the loss of the usual cold weather leave which was usually spent on a shooting expedition, but now for the experience gained, and which may be useful to any enterprising planter who may wish to try the experiment.

(1)—I found it easy to dispose of ¼ and 1 lb. packets at a profitable rate, but 2 lb. packets could only be disposed of at a reduction in price, and 10 and 20 lb. boxes were almost unsaleable.

(2)—Rich and even middle class natives frequently bought the highest priced teas preferring to pay R2 per lb. for good B. P. to buying souchong at 12 annas or Bohea at 8 annas; this shows the great mistake planters make in thinking that natives are too poor or too stingy to buy anything but the cheapest tea, hence they usually reserve nothing, but the cheapest and worst teas for the local markets, and this is either sold loose or in rough paper packets. It is this mistaken idea of the planters that has kept back the local sale of tea in India more than anything else. They could sell their *finest teas* in the Indian bazaars for better prices than they can ever hope to get for them in London; only they must be packed to suit the trade, *i. e.*, in 1 and ½ and even ¼ lb. packets lined with lead tinfoils or other waterproof material.

(3)—Although a good quantity of tea can be sold to individual consumers the hawker has to look chiefly to small Bunnias of the native bazaars for the disposal of his tea, and with these it is often advisable to barter rather than stipulate for cash payments. As a case in point, I may mention that one of these bargained with me for 100 lb. tea at 15 annas per lb., but offered to take 600 lb. at R1 per lb., if I would take R150 cash and the balance of R450 in goods from his shop. To this I consented, and soon found myself the possessor of two guns, 100 cooly-blankets and other articles worth for more to me than R450, as I intended to take them to a district where such things are scarce and dear.

(4)—Many of these native tea-drinkers asked me for green tea, as they have a theory that green tea is less heating to the system than black tea. Some of them told me they drink tea regularly during the cold weather, but have to give it up in the hot weather as it is too heating, but if they could get green tea they would drink it all the year round. I cannot pretend to say how far this theory is founded on fact. Personally I prefer black tea to green in the hottest weather, but such being the belief of the natives of India, the planters of the North-Western Province, who cannot now sell their green tea to the Afghans, might take advantage of the native belief and drive a good trade in the plain of India, now that Asia seems closed against them.—Yours faithfully, OLD PLANTER.

THE *Society of Arts Journal* records the largest Vine in the World is one growing at Oys (Portugal), which has been in bearing since 1802. Its maximum yield was in 1864, in which year it produced a sufficient quantity of Grapes to make 750 litres (165 gals.) of wine; in 1874, 665 litres (146⅔ gals.); and in 1884, only 360 litres (79¼ gals.). It covers an area of 494 square metres (5315 square feet), and the stem at the base measures 2 metres in circumference.

EXTENSIVE TREE PLANTING IN MEXICO is now being undertaken by the Government, and a contract has been made with Mr. Oscar A. Droege to plant 2,000,000 trees in the valley of Mexico within four years. The respective numbers are—80,000 Ash, 35,000 Willows, 120,000 Poplars, 60,000 Eucalyptus Trees, 60,000 Trœnos japones, 60,000 Mountain Cypress Cedars, 60,000 Acacias, and 120,000 of miscellaneous varieties. The trees are to be in plantations of from 50,000 to 100,000 each. —*Journal of Horticulture.*

AN American paper gives the following upon Sunflowers as fuel. A correspondent having tried "turf," coal wood, and Sunflowers has settled upon the last named as the cheapest and best for treeless Dakota. He says: "I grow one acre of them every year, and have plenty of fuel for one stove the whole year round, and use some in another stove besides. I plant them in hills the same as corn (only three seeds to the hill), and cultivate same as corn. I cut them when the leader or top flower is ripe, and let them lay on the ground top for three days; in that time I cut off all the seed-heads, which are put into an open shed with a floor in it, the same as a corn-crib; the stalks are then hauled home and packed in a common shed with a good roof on. When cut in the right time the stalks when dry are as hard as oak, and make a good hot fire, while the seed-heads with seeds in make a better fire than the best hard coal. The seed being very rich in oil it will warm better and burn longer, bushel for bushel, than hard coal. The Sunflower is very hard on land. The piece of ground selected to plant on should be highly enriched with manures. In the great steppes (prairie region in the interior of Russia and in Tartary), where the winters are more severe than here in Dakota, the Sunflowers are, and have been for centuries past, the only kind of fuel used."—*Journal of Horticulture.*

THE RUBBER-TREE PLANTING INDUSTRY IN CEYLON.

The result of a considerable amount of inquiry into the present condition of the rubber industry in Ceylon has led us somewhat unwillingly to the conclusion that for a time at least, the pursuit may be considered to be in abeyance—if not altogether abandoned by the majority of the planters who were so keen about it a few years ago. There are, it is true, scattered over the island a great number of properties on which are now growing Indian rubber trees of various kinds, more especially the "Ceara" kind, and on the selected estates from which we have authentic returns we find an aggregate of 150 acres under this cultivation. But if every patch of rubber trees in the country were counted, a much greater area would be made up. Generally speaking the age of the trees under reference is from four to five years, and the growth would appear to be in nearly all cases satisfactory, say from 15 to 40 feet. From but one property is there any statement to the contrary, and here we find some five acres planted on poor soil at an elevation of only 30 feet above sea level. The growth is reported "poor and scanty." The lowness of elevation in this case has probably but little to do with the unsatisfactory growth of the tree, as is evidenced by the flourishing condition of specimens in Colombo at even less elevation than 30 feet above sea-level. The experiments that have hitherto been attempted in extracting the gum from the trees have so far resulted in disappointment. There is, however, a general concensus of opinion that the trees on which these experiments have been tried are too young to produce satisfactory results. Should such be the case it only requires time to effect a cure, and if the rubber can be grown in otherwise unprofitable portions of ground it would be well to continue cultivation with a view to paying results at some future day. There are one or two points which must be taken into consideration in noticing the experiments which have been made in tapping the young trees. As a rule the test has been so much per cooly at so much value. It must not be lost sight of that coolies unaccustomed to any particular kind of work - no matter what it may be—cannot do nearly so much in a day when new to the employment as they will after a time when they have got their hands accustomed to it. Moreover, in a new industry like that under reference, the master is no more acquainted with the proper *modus operandi* than the cooly, and is unable to task the coolies employed in the work.

The cultivation should not be condemned offhand, because the coolies employed in collecting are unable at first attempts to bring in more than ¼ to ½ lb. of rubber. Methods, no doubt, would be discovered after a time of causing the cuts or punctures in the bark to bleed more freely, in the same way as the natives induce the spathes of the jaggery (kittool) to give out a greater amount of palm juice than they would by a simple cut with a knife.

Though we cannot but take into account the exaggerated tone which pervades the whole of a letter we append which a native firm has received from Java, we may without fear of being misled take it for granted that the tapping of old trees may without harm be carried on from day to day for some months at a time, a process which, so far as we can learn, has never been attempted in Ceylon,—probably for want of some older trees on which to experiment. The result mentioned from Java of 25 lb. per three-year old tree in five months we look upon as altogether apochryphal, though it might be credible did the experience refer to large forest trees like our own *Ficus Elastica*. The fact mentioned by one writer of his collecting the rubber from the abrasions caused by blows of a heavy stick on the bark of the Ceara tree remind one of the traditions of the old Royal College boys in Colombo who used to break the bark of the protruding and tortuous roots of the common indigenous trees and wind off the rubber as it exuded from the abrasions until they got elastic balls nearly the size of those ordinarily used for cricket. It has been urged with some show of plausibility that our local Government should encourage the growth of this common wild India rubber on the otherwise profitless banks of the low-country rivers, in view of the possibility of its being able at some future date to issue licenses for the collection of the produce, or at any rate to create a value for land, which at present is altogether unproductive. One of the lessons learnt during the few years in which Ceara rubber has been established in the island, has caused an entire revolution in the make of rubber nurseries. When first introduced into the island the seeds were sold at so much a hundred—germinated seeds, or seeds with the ends filed to facilitate germination—and in spite of all precautions a very large proportion of the seeds were failures while in contradistinction to this experience the seeds o the Ceara falling naturally on the surface of the ground and left to their own sweet will, sprang up like weeds under the parent trees and became rather a nuisance than otherwise. Observation of this fact led nursery-makers to merely turn up and soften the soil, throwing the seed on the surface and just covering with dead leaves, and a sprinkling of soil sufficient to hide the seed from the direct rays of the sun. Under these conditions the seeds seldom fail to germinate quickly even after having been left for months, even years, without any special care being taken of them. Of the rubber creepers such as come under the variety *Landolphia*, we can get but little information from our planting correspondents: no results further than ascertaining the capability of a few localities for their growth have as yet been attainable, though we hope in a short time to be able to learn something more about them, especially from low, hot, moist districts. It is impossible to observe without regret the very prevalent disregard by the planters in Ceylon of what at one time, it was hoped would eventually prove a very lucrative industry, and the produce of which is becoming daily more valuable for a number of processes connected with electricity and telegraphy. The fact of the matter, no doubt, is that facility of production and resulting profits were at first so grossly exaggerated, that when actual results were ascertained by experiment on a fairly large scale, the disappointment was correspondingly great—and with rather unusual precipitancy discredit was thrown upon the whole concern, and it is no longer thought worthy of being followed up by cultivation on a large scale. However, we still hope at some future day to be able to number rubber amongst our valuable exports, though we must confess that at the present time there is not much to lend encouragement to our aspirations. We need hardly say that however pleased we may all be to welcome the enterprising—though somewhat exaggerating—gentleman from Java,

—see letter below—there is no chance of his receiving any remuneration for the time and trouble involved in a journey from Batavia to Ceylon for the purpose of teaching us the art of extracting the milk from the rubber tree.

We now proceed to reproduce some of the reports from different planting districts in the island, with which we have been favoured in answer to our enquiries, and first from Matale, we learn from the proprietor of Wiharagama estate as follows:—

Wiharagama estate has about 25 acres Ceara rubber and specimens of other varieties. Age seven to four years but principally four years old. No harvesting has been attempted as the trees for the most part are not considered old enough to tap without deterioration, and the older trees are not numerous enough to offer inducement for systematic tapping.

The Manager of Kandanuwara, in the same district, writes:—

Kandanuwara estate has nine acres or about 6,000 trees of Ceara India-rubber; growth in years equal five; in robust healthy condition and in a variety of soils. Milking was attempted in 1886 to the extent of about 20 lb and gave from ¼ to ½ lb per cooly, but my opinion is that at this early stage of its growth, whatever it may do later on, possibly nothing much greater, it does not pay to grow this variety for rubber. I am told Ceara rubber trees have been found suitable for cacao shade in Dumbara and I have planted cardamoms under them here, but have not found them by any means equal to the natural jungle shade.

We can vouch for the success of Ceara rubber shade for cacao in Dumbara, by what we saw on Pallekelly, where, we believe, Mr. Vollar has a high opinion of the tree, both for its rapid growth and favourable shade. Mr. Vollar had also made some highly successful experiments in harvesting rubber, to judge by the quantity he was able to gather off individual trees without giving much attention to the matter. The rapid growth of the Ceara tree in the Dumbara valley is very remarkable.

From Mr. Charles Gibbon of the Panwila district we have the following report, but Mr. Gibbon says valuable results should be got during the present month:—

Goonambil estate has some 15 acres of India-rubber Harvesting, tapping has been attempted on two or three occasions but the result as to quantity did not justify it being continued. The quality of rubber has been very good. Experiments will be made in January and February (which will be the best harvesting month probably,) and I will communicate them to you. Some of the trees are eight years old, but the larger proportion are half that age.

From Hantanne district, we learn that,—

Galoya estate has ten acres of Ceara trees of India rubber growth in years equal four years, but the cultivation has been abandoned and weeds allowed to grow. Some of the trees are very fine.

Farther south, we have reports as follows:—

Ambalawa, estate (in Dolosbage) has 30 to 40 acres of trees of India-rubber, growth in years equal from three to five years old; growth good. I have not tried any regular system of harvesting; have tapped several trees and found the quantity of rubber insufficient to pay cost of collecting.

Sanquhar estate, Pussellawa, has 11 acres clearing, and also about 500 trees planted here and there about the estate. The 11 acres is four years old having been planted in 1882, the other trees a year older. The trees in 11 acres are pretty regular, but have forked rather low. No harvesting has been done nor has any record been kept of any particular tree's growth.

Kanapediwatte estate, Pussellawa, has about three acres of India-rubber, three years old. No harvesting has been attempted owing to the failures of others in obtaining satisfactory results.

Our only report from the high districts, is from Mr. Mackie of Great Western, who wrote;—

We tried rubber-trees on the Rathnillokelly division of the group four years ago—elevation 4,000 to 4,200 ft.—only a few came up in the sheltered parts. Some are now 10 to 15 ft. high, but I cannot speak of them as a success. I do not know that the cultivation of this tree has been tried much above (say) Nawalapitiya on this side, at any rate I have not seen any save our own growing in this part of Dimbula.

Crossing to Uva, we learn from Mr. Hoseason that,—

Kottagodde estate has here and there trees of India-rubber, growth in four years, equal to 15 to 25 ft., but nothing has been done to them nor are they in any way cultivated, nor is any gum taken from them.

But the most complete report is that for which we are indebted to Mr. Philby of Cocoawatte estate, Lunugalla, as follows:—

Cocoawatte, 27th Nov. 1886.

To the Editor of the *Ceylon Observer*,

DEAR SIR,—I now send you a few remarks on the cultivation of rubber on above estate.

Extent.—I have 30 acres of Ceara rubber planted from three to five years old; the growth appears to be satisfactory and there is no appearance of disease.

Wintering.—The trees winter regularly every year about June and July, as all the leaves drop off and the tree looks as if it was dead, but in a very short time the young buds appear and the foliage becomes as luxuriant as ever.

Seed.—About the third year the trees begin to flower and bear heavy crops of seed, which drops on the ground when ripe and germinates readily.

Harvesting.—I have not yet arrived at any satisfactory process of extracting the rubber. I have succeeded in getting a quarter of a lb. per cooly but this will not pay. There is no doubt, that the rubber is there and the question is how to get it? Do the rubber gatherers of Brazil fell the trees before tapping them? From a tree which had been felled a fortnight or more I got two ounces of rubber in about a quarter of an hour. Passing it in the morning I knocked it about with a big stick and in the afternoon I found lumps of congealed milk where each blow had fallen and easily picked them off.

Enemies.—Pigs and porcupines are the chief enemies of the rubber tree and they are very fond of the potato-like bulbs at the end of the roots. However, they do not do much harm here and it takes a good deal to kill a rubber tree when once established.

I should very much like to know at what age it would be considered right to begin tapping and also any known process of extracting the rubber in paying quautities. I annex a table of measurements of trees from one to five years old, some are larger and some are smaller, but these figures represent a fair average of the growth on this estate.—Yours faithfully,

H. MONTAGUE PHILBY.

TABLE OF MEASUREMENTS OF RUBBER TREES.

1 Year Old.—18 feet high; 10 inches round base; 6½ inches round 6 feet from ground.

2 Years Old.—26 feet high; branched out 14 feet from ground; 22 inches round base; 14 inches round 6 feet above ground.

3 Years Old.—37 feet high; branched out 15 feet from ground; 30 inches round base; 24 inches round 6 feet from ground.

4 Years Old.—43 feet high; branched out 17 feet from ground; 42 inches round base; 25 inches round just under branches.

5 Years Old.—48 feet high; 45 inches round base; branched out 22 feet from ground; 33 inches round just under branches. H. M. P.

We are much obliged to Mr. Philby and think his trees on Cocoawatte must equal those we saw in Dumbara in size for age. As to the questions asked about Brazil and felling operations there, we shall have pleasure in sending Mr. Philby a copy of the second edition of our "Rubber Manual" now in the press, in which he will find the latest

available information from all parts of the world. Tapping and also felling and stripping are both practised in South America.

We now turn to the lowcountry of the Western Province and from Kelani Valley we have the following :—

From Manager Mahalla, Muraloya and Dambuloya. Those estates have neither acres nor trees of India-rubber. I may mention that there are two or three in Mahalla and Muraloya, but nothing is being done to them.

Pleasure Ground estate has 500 trees (? creepers) of Landolphia Kirkiei India-rubber, equal four years' growth. These are kept as show trees and are very large, the largest was somewhat destroyed in cutting thick stem for "Indian and Colonial Exhibition.' They are being kept to see if they will seed. [But why not send us measurements?—ED. C. O.]

More satisfactory is the following report of his experience at Heneratgoda and Mirigama by Mr. W. B. Lamont :—

Having reared about 100 plants of Ceara rubber up to their fifth year and having given a good deal of attention to them, I arrived through a long course of experiments at the following practical results. One half of the plants turn out useless, either from the inferior quality or small quantity of their yield; that all such trees should be eliminated as soon as their character is ascertained, and replaced by others; that no satisfactory result will follow any attempt to obtain produce before the tree is at least four years old; that no system of cutting or piercing the bark will give a satisfactory yield; that it is only in the dry season, when the tree is leafless, and the growth at a stand, that a satisfactory result can be obtained, in the way of harvesting. The plan of obtaining the rubber, that my experiments led up to, was, as soon as the leaves begin to fall, remove the outer bark in vertical strips of not more than two inches wide, and not less than four inches apart. The tender inner bark thus exposed to the sun breaks out, in something like running sores, from which the rubber slowly exudes and drips on the surface as fast as discharged. In this process, the strip of exposed bark is destroyed, but a vigorous tree working from both sides will close in on the bared part in the course of the year, if the width is not more than two inches. Ceara rubber planted at 100 trees per acre will, after the second year, require hardly any expense in cultivation, and for the harvesting I collected 30lb. last January and February, by one boy at 15 cents a day, or say, 23 cents per pound, the local value being about 80 cents. Supposing each tree equal to an average yield of one pound per annum, and allowing 30 cents for cultivation and collecting, 50 cents would remain as profit, or R50 per acre. It is well to have the plant in the island, but it is not likely to be largely planted so long as there are other products that pay better, or that are better understood, but a time may come when it will *kep a strait.*

"Fifty rupees an acre" is a return not to be despised: indeed we doubt if the average from coconuts for all cultivated plantations in the island is so good, and, therefore, there ought to be plenty of room for a systematic Ceara rubber industry in Ceylon; but what is the use of speaking of such returns as can be got here if we are to accept the statement of a Java planter (already referred to) conveyed to us by Messrs. J. P. William & Bros. as follows:—

The Editors Ceylon Observer.

Dear Sirs,—Many planters from different countries had written us from time to time enquiring as to the best mode of tapping the Ceara Rubber tree, and we are glad to place before the planting community the following letter sent us by a Ceara Rubber planter in Java, dated 30th November 1886. We shall be happy to give the name and address of the planter in question to gentlemen who may be willing to communicate with him. Newspapers please copy,—Yours obediently,

J. P. WILLIAM & BROS.
New Product Growers, Seedsmen, &c.,
7th Jan. 1887. Heneratgoda, Ceylon.

Letter referred to :—"From different papers I got the knowledge that the tapping of the Ceara Rubber tree (Manihot Glasioii) is very expensive and do not give much results. I now beg to inform you that by my manner of tapping even trees of nearly three years age by once carving, produce four till five ounces of guttah each, and this manipulation can be repeated every two days during five or six months without doing any harm to the carved tree, also supposing every tree is carved 15 days a month, about five months the production of every tree at the end of five months will be 300 ounces or 25 pounds. Besides that my manner is not expensive, and the production is of the first quality. If the different planters of the Ceara Rubber tree like to be acknowledged with my manner of tapping I am ready to go to Ceylon in order to show the manipulation if all costs of transport and staying will be paid by the planters, and a remuneration according to the number of trees of every plantation. As I do not know the planters of Ceara Rubber and their number at Ceylon I cannot apply to each of them directly, and therefore, call on your kind assistance in this affair being ready to part with you the remunerations the planters should like to give for my manner of carving and tapping the abovementioned trees. Hoping to be favoured with any answer of you."

Messrs. William Bros., had better tell their correspondent to patent his process for Ceylon and then come here and lease the Ceara rubber groves already fit for harvesting, while planting on his own account.

From the Southern Province we have two brief reports :—

Hurst-Pierpoint estate has five acres or 5,000 trees of India-rubber, equal four years old. Nothing has been done with them and no results can therefore be sent. Trees are growing on bad soil at an elevation of say 30 feet and are poor and scanty in growth.

In Udugama district Rubber cultivation has been dropped entirely. I asked some of the neighbours and no one seems to have carried on experiments since Mr. Dobree left the district, and I think he sent you the result and particulars of his experiment.

We trust the above recapitulation of the present stage of the Rubber Planting Industry in our midst will have one good effect, namely, in stirring up our planters to renewed interest in the subject, and to experiments with the trees already available.

JAVA AS A TEA COUNTRY.

Java was, and notwithstanding the very considerable ravages of leaf-disease, still is the second coffee country in the world. Before the sudden and mysterious outbreak of leaf-disease in 1869, Ceylon promised to run the great Dutch Colony rather hard for second place. As a tea country Ceylon is, already far ahead of Java, although in this enterprise, the latter had the start by a good many years. Our export of tea in the past year must have been close up to that of Java, while there can be no question that in 1887, we shall take rank as the fourth tea-producing country in the world, in the following order :—

1st China; 2nd India; 3rd Japan; 4th Ceylon; 5th Java.

From a summary of statistics of Java tea issued by Messrs. Gow, Wilson and Stanton, we observe that against our hundreds of plantations only thirty-three are shewn for all Java, a considerable proportion of which sent little or no tea into the London market. The leading estate is Mr. Kerk-

hoven's fine, model-property of Sinagar, which sent 9,526 chests and 17 boxes to London in 1886. Next comes Dramaga with 2,405 chests and 4,545 boxes. Nangoeng has opposite it 1,289 chests and 4,547 boxes, while Bagelen sent 4,711 chests and no boxes. The differences are curious. The total packages sent to London in 1886 consisted of 45,190 chests; 94 half-chests and 11,206 boxes. The contents seem to have been 3,946,000 pounds; the deliveries being 3,676,000 against 6,245,000 pounds Ceylon. The brokers seem to think that the jât of the tea grown, principally China, is responsible for the low value of Java tea, but we suspect soil, and even more than soil, manipulation must be at fault. In any case, the fact remains that, while considerable improvement in Java teas have taken place in recent years, their average price in the London market last year, was little more than two-thirds of our Ceylon average, 9¼d against 1s 1d, the figure for Java having gone down to 8¾d for the last half of the year. Whatever may be the case in Holland, and in such foreign countries as Persia, Java tea does not seem to be a favourite in England. From the circular, however, we learn, that in Ireland not merely Indian but Java tea is used, or was used to a considerable extent. The advice given to the Java planters to plant India tea has been largely anticipated, and no doubt there will be improvement in preparation and bulking, but all the evidence seems in favour of Ceylon not only keeping ahead of Java, as a tea country, but of speedily supplanting Japan as No. 3 and taking rank immediately after India. A very considerable proportion of the tea grown in China and Japan is locally consumed (although the quantity used in China has been greatly exaggerated); and we suppose some of the Java tea also is used in Java. India and Ceylon send all but fractional parts of their tea to the London market and the proportions of teas delivered in 1886 was as follows:—

China, Japan, &c. ..	142,547,000 lb.
India	68,420,000 ,,
Ceylon	6,245,000 ,,
Java	3,946,000 ,,
Total.. ..	220,880,000 lb.

We suspect that before this century is over the figures will be altered in some proportions like the following:—

India	150,000,000 lb.
China, Japan, &c. ...	75,000,000 ,,
Ceylon	50,000,000 ,,
Java	10,000,000 ,,
Total...	285,000,000 lb.

There is a very interesting coloured diagram showing the history of Java teas for the past seven years. From this we gather that Java pekoe, "tippy, with fair liquor," which began at 1s 6d and very nearly touched 1s 8d at the end of 1881, went down to 1s 4½d last year. "Pekoe medium" commencing at 1s 2d went down in 1881 below 11d; rose in 1882 to 1s 3¼d, and then, with some variations went steadily down to 9½d. "Pekoe souchong, medium to fair" was close on 1s 1d in 1880, was at 1s in 1882 and then went gradually down to 7¾d. Finally "souchong, medium to fair," commencing at 1s ended at 6½d. Except for the very highest quality the decrease has been striking, no doubt largely owing to the influence of Indian and Ceylon tea of better quality, or, at any rate, of more acceptable flavour, being obtainable at moderate prices. With special exceptions the Java teas are of poor average quality. A trial of the Australian market with those teas was such a dead failure, that we believe the experiment has never been repeated. No doubt the introduction of better jât and improved machinery will effect improvement in Java teas, but as a competitor in providing the world with tea, Ceylon seems to have little to fear from the Dutch colony. The following are the remarks of the brokers:—

Movements of Java Tea in London—in English pounds—during the past six years:—

	1881.	1882.	1883.
Imports	1,216,000	2,158,000	3,057,000
Deliveries	1,315,000	1,786,000	2,893,000
Stock	411,000	751,000	914,760
	1884.	1885.	1886.
Imports	3,586,000	3,344,000	3,946,000
Deliveries	3,709,000	3,537,000	3,676,000
Stock	875,560	676,000	944,000

Our diagram shows a marked increase in the arrivals of Java Tea in London during the second and third quarters of 1886. The above figures are interesting as showing a gradual development of the trade, the deliveries keeping pace pretty evenly with the arrivals.

The direct imports from Java to London during 1886 were the heaviest yet recorded. As large quantities have also been shipped from Java to other countries besides England, it is probable that the yield per acre during the past year shows an increase over recent seasons; it is to be hoped that growers have by this means been to some extent compensated for the low range of prices current.

The contraction in value of Java Tea, however, has not been so great as in Teas from some other places. Java Teas are consumed in so many different markets that the demand from one quarter or another will generally retard a serious and sudden decline in prices, when caused by a drop in similar grades of Teas from other countries. This cause has for some time past maintained the value of Java Pekoes at a comparatively higher range of prices than Indian growths; it has also frequently retarded,—and at a certain period checked—a decline in the value of Congous and Souchongs which might otherwise have been more pronounced.

The wide area over which Java Tea is distributed thus acts as a great and continuous safeguard.

The value of broken pekoes has been greatly interfered with by the unsettled state of affairs in Ireland, where they were at one time largely consumed, and this class of tea being taken in fewer foreign markets than whole leaf descriptions has probably suffered to as great an extent as Indian growths. Broken pekoes, however, are now becoming more used in some of the continental markets.

QUALITY.—Looking back over the past 12 months we note with some regret the poor average quality of a large proportion of the offerings; this is specially unfortunate at a time when a super-abundance of weak liquoring Teas had been arriving from other localities, and had already seriously depressed the market for the lower grades.

FUTURE PROSPECTS.—The brightest spot in the year is noticed in a few consignments which have stood out pre-eminently over the rest as being unquestionably grown from good Indian seed, and being manufactured with the greatest attention to quality, accompanied by skilled and careful manipulation. The future of the Java Tea trade must be largely influenced by the liquoring character of the Tea, and now that imports from India have so largely increased, and that there is every reason to anticipate a still greater addition to the Tea harvest in Ceylon, this matter of quality may become one of *vital* importance to proprietors of Tea Estates.

We would, therefore, again impress upon owners the advisability of planting good Indian seed, and neglecting no opportunity of utilising every appliance for efficient manufacture, and for greater economy, which the most recent scientific researches have placed within their reach.

Bulking in Java, has perhaps, shown some improvement during the past year, but still requires additional attention in many factories. The subject is of greater importance now than ever, as an additional charge has

been imposed for the performance of this operation in England.

Average Price.—The 56,490 packages of direct import sold in public auction during the year realized an average of 9¼d; the average for the 31,473 packages sold during the first six months of the year being 9¾d, and of the 25,017 packages sold during the last six months being 8¾d.

In 1885, 45,272 packages of Java Tea of direct import were printed for public auction; the equivalent in chests being 39,418. In 1886 the quantity had increased to 56,490 packages, the equivalent in chests being 48,038.

Imports and Delivering of Tea in London from 1st January to 31st December 1885 and 1886, with Stocks on 31st December in each year.

	Imports	
	1885	1886
China, &c	136,596,000	140,667,000
Indian.....	63,160,000	76,585,000
Ceylon.....	3,703,000	6,875 000
Java.....	3,344,000	3,946,000
Total...	206,803,000	228,073,000
	Deliveries	
	1885	1886
China, &c..... ..	148,338,000	142,547,000
Indian.....	65,678,000	68,420,000
Ceylon.....	3,218,000	6,245,000
Java.....	3,537,000	3,676,000
Total...	220,771,000	220,888,000
	Stock	
	1885	1886
China, &c.....	69,759,000	67,665,000
Indian.....	24,752,000	32,887,000
Ceylon.....	1,028,000	1,661,000
Java.....	676,000	944,000
Total...	96,215,000	103,157,000

THE SENSITIVE PLANT.

The singular phenomenon exhibited by this well known exotic has long been the admiration of the curious, a puzzle to the botanist, and a standing marvel in the vegetable kingdom. The plant has the property of contracting certain parts of its structure when touched, and is not only sensible to the application of force, but appears to be influenced by the surrounding elements. Sudden degrees of heat or cold, steam from boiling water, sulpher-fumes, the odour of volatile liquids, in fact anything that affects the nerves of animals, appears also to affect the sensitive plant. It is in the highest degree a nervous subject, and, like that species of the genus *homo*, is in this country a thorough hothouse habitant. The subject of our present consideration was originally introduced from Brazil, and along with other varieties possessing the same faculty in different degrees, is common to other parts of South America. The stem of the plant is cylindrical, and of a green or purplish colour, with two spines at the base of each leaf, besides a few others scattered about the branches. The leaves are pinnatified, divided into pairs, supported on long footstalks, and each pinnule is furnished with fifteen or twenty pairs of oblong, narrow, and shining leaflets. From the base of the leaf-stalks proceed the peduncles or flower-stalks, each of which supports a bunch of very small white or fresh-coloured flowers. The seed-vessels are united in packets of twelve or fifteen each, and are edged with minute spines, each husk containing three little seeds.

Dr Hook, Dufay, Duhamel, and other naturalists, have studied this plant with equal attention, and from their observations we learn that it is difficult to touch a leaf of a healthy mimosa—under which name the sensitive plant is also known—even in the most delicate manner without causing it to close. The great nerve which passes along the centre of the leaf serves as a hinge for the sides to close upon, and this they do with great exactness, the two sides exactly opposing each other. If the pressure is made with considerable force, the opposite leaf of the same pair will be affected at the same time and moved in the same manner. Upon squeezing the leaf still harder, all the leaflets on the same side close immediately, as if resenting the affront. The effect may be even carried so far that the leaf-stalk will bend to the branch from which it issues, and the whole plant collect itself as it were into a bundle.

As soon as evening approaches, the sensitive plant begins to lower its leaves, till at length they rest upon the stem. With the morning light, they gradually re-open. When the leaves have even faded and turned yellow, the plant still continues this action, and retains its sensibility when agitated by external influences. A fine rain will not disturb the mimosa at all; but should the rain fall heavily, and be accompanied by wind, the plant becomes immediately affected. When irritated and made to close by force, the time necessary for the leaves to recover their usual position varies from ten to twenty minutes, according to the season and the hour of the day.

Though heat and cold contribute greatly towards its alternate motion, yet the plant is more sluggish in its movements and less sensitive in winter than in summer. After a branch has been separated from the shrub the leaves still retain their sensibility, and will shut on being touched. If the end of the detatched branch is kept in water, the leaves will continue to act for some time.

If the sensitive plant be plunged into cold water, the leaves will close, but will afterwards re-open; and if touched in this state, will again shut themselves, as if in the open air, but not so quickly. This experiment does not seem to injure the plant. If the extremity of a leaf exposed to the rays of the sun is burned with a lens or a match, it closes instantly; and at the same moment, not only the leaflet which is opposite to it follows its example, but all that are upon the same stalk. If a drop of sulphuric acid is placed upon a leaf so as to remain stationary, the plant is not immedittely affected; but when it begins to spread, the irritation is communicated from one leaflet to another, till the whole of them on the affected stalk are closed. Although a branch of this wonderful plant be cut through three-fourths of its diameter, yet the leaves belonging to it retain the same degree of sensibility, and open and shut with their usual freedom. The vapour of boiling water affects the leaves in the same manner as if they were burned, and for several hours they appear benumbed—in fact, seldom recovering during the remainder of the day.

These are some of the principal phenomena connected with this very singular plant. No doubt, other experiments have been made; but these will serve to show how much akin is the delicate organisation of this plant to that of the animal kingdom.

Many conjectures have been formed and many theories raised to account satisfactorily for the working of this exquisite machine; but the mainspring is still hidden, and has, as far as we know, eluded the search of the naturalist. It has been supposed by some that the mimosa is endued with a power of perception which actuates all its motions, and is the connecting link between the animal and vegetable kingdoms. But at least an equally rational theory is, that its movements are purely mechanical. To enter into a discussion as to the relative merits of these and other theories would exceed the limits of this article. We can only contemplate the plant as one of those natural wonders which add to our admiration of mother Nature and her products.—*Chambers' Journal.*

THE GOVERNMENT CINCHONA IN JAVA.

The report on the Government of Java's cinchona gardens in 1885 has been translated, and published in the January number of the *Tropical Agriculturist.* Although it has been so long delayed, it is well worth reading, and planters in this country will find that Mr. Van Romunde, the Director, has answered some questions which have been troubling them during the past year. In the matter of extensions the work done has principally consisted in replanting fields from which, as we some months ago recorded, the less valuable varieties

had been extirpated. The number of trees of all ages now existing in the various plantations is estimated at 1,567,000 as against 1,960,500 in 1883. The decrease is, we are told, more apparent than real, and is due to a careful census having been taken. It must, however, be borne in mind, that vast numbers of the trees existing in the former year have been uprooted, and that a large proportion of those that have taken their place, as yet are only a year or two old. The number of plants in the nurseries at the time of the report was 1,390,000, over a million being ledgers, and the greater part of these it was intended, to put out during the first quarter of 1886, so that a notable addition has been made ere now. Amongst them 35,000 are ledgers, grafted on succirubras. Besides these there were in the graft nurseries about the same number which would have been ready to put out at the end of last year. These grafts, which form one of the most interesting features of the Java Cinchona enterprise, have all been taken from the very richest trees known to exist, the bark of which has been analysed, and given in some cases over 13 per cent of quinine. The result of these experiments has not yet had time to fully develop itself. Two unfavorable features, are however, noticed, one being the tendency to early blossoming and seeding. We believe that the Madras Director is of opinion that this is not likely to harm the trees, but Mr. Van Romunde thinks that it "must undoubtedly have an unfavorable influence on the development of the plants." Efforts have been made to check this tendency, and by manuring and constantly turning up the soil, to force the trees to form leaves, and bring about a hardy growth. The other objection to the grafting process is that the succirubra stem appears to influence the bark of the ledger graft, and it was hoped that by selecting particularly pure trees the grafts would yield nearly as good a result as ledgers. The analyses of one of the parent trees was 10·79 of quinine out of 11·53 total alkaloids, cinchonidine being entirely absent; but a strip taken from the graft at five years old showed only 3·30 of quiuine and 1·40 of cinchonidine, this being the predominant succirubra alkaloid. Other experiments, however, show that the hardness of the succirubra stem is transmitted to the ledgers; at any rate the system will be carried on for some time longer.

The only new land that was opened was a few acres for grafted plants. The gardens appear to be worked on the best principles as understood in India and Ceylon; they are kept clean weeded, and are frequently dug over, while on the older fields deep draining has been carried out, and is found to act beneficially. Close planting has been adhered to as much as possible "not only for furthering the rapid formation of humus out of the fallen leaves, and thereby improving the soil chemically, but also to attain the maximum produce at the lowest possible up-keep. The beneficial influence of close planting for the development of cinchona is particularly noticeable on the replanted fields, where at first the growth of the plants was slow, and where it became rapid as soon as the surface became shaded by the branches and masses of leaves." This statement should be made a note of by planters in this country, amongst whom it is sometimes maintained that the wider apart cinchona is planted the better for its future prospects. In addition to the census, the growth of the trees was ascertained by actual measurements, and the average height of eight year old ledgers was found to be about 14 feet with a circumference of 10 inches; this result does not strike us as praticularly good, but we think that the year's growth in the nurseries is counted, which is not the custom elsewhere. The average height of six year old grafts is given as 12 feet 6 inches with a circumference of 10 inches. The gardens were subjected to attacks from *Helopeltis Antoni* and other insects, but the damage done was insignificant; the only remedy was to collect and destroy the pests. It was supposed at one time that the formation of alkaloids was increased by topping cinchona; but Mr. Van Romunde ascertained that this is not the case, and discontinued the practice. The yield of bark from the various plantations amounted to about half a million pounds; part was obtained by rooting out inferior varieties, but it was also found necessary to cut down a number of ledgers which had been shaved in 1884. It may be remembered by some of our readers that in reviewing an account given by Mr. Brady of his visit to Java, we mentioned that while in India it had not been found profitable to shave ledgers, the Dutch planters had been able to do so with excellent results. It would now seem that this writer's statement was erroneous, or that at least the process had not been long enough in vogue when he saw the plantations to prove its efficacy or the reverse. We now learn that the bad results of the shaving in 1884 became apparent in the second quarter of 1885 on three estates, where some 10,000 trees showed such signs of decay that they had to be rooted out. But on another of the estates, with more valuable ledgers, and where the trees had only been shaved once, the result was still more unfavorable; "the trees continued to droop for a long time, and during the long-continued rains the bark began in some few instances to rot." The prices realised for the shavings appear also to have been much inferior. In concluding his remarks under this head, the Director says "if the application of the MacIvor system, by which regular strips of bark were taken from the trees, has not in the long run answered expectations, the result of shaving off the bark have been so detrimental that its continuance is not to be depended on, so that there is nothing left for us to adopt but a systematic thinning out of the plantations, with a carefully limited lopping of the trees, and finally, complete uprooting."

The drying houses were found insufficient for the large amount of bark harvested, and enquiries were made as to how they could be improved. This is a matter that interests planters in India, and it may be mentioned that Davidson's "T" Sirocco was recommended as the most suitable machine for the purpose. We have some doubts on this subject; the largest size Sirocco costiug £90 f. o. b., in Liverpool, only takes about 400 lb. of leaf. In addition to this a building would have to be erected to hold it. The estates were worked at a profit of florins 224,187 (say rupees), but of course the harvest was unusually large owing to the uprooting which took place. No account is given of the amount of cinchona grown by private individuals, but we showed some time ago that the stories told in Ceylon of the existence of an enormous acreage under cultivation were unfounded. Mr. Van Romunde says that "the demand for waste land on lease for the purpose of cinchona cultivation continues to diminish, and little or nothing is heard of new undertakings. It is true that on existing estates the cultivation continues to be extended, but confidence in cinchona culture has felt such a shock by the steady fall in prices, that capital worth naming is not to be had for new undertakings of the kind." The Director, however, thinks that this want of confidence is not well grounded, and that there is no reason to fear that prices will cease to be remunerative. The most interesting result of the analyses made during 1885 has been noted above in connection with the question of grafting. With a view to save the cost of transport, experiments were made to obtain a coarse extract of the cinchona alkaloids. Some 6 per cent bark was selected for this purpose, and by means of boiling with lime and spirits of wine, a substance called *quinium* was produced, which was found to contain about 60 per cent. of alkaloids, with very little total loss from preparation. We have yet to learn if this will prove a commercial success. To sum up the information to be derived from this very able report we may say that it would not seem as if Indian planters need have any fear of Javan bark flooding the market in the same way as the Ceylon export has. The stamp bark from the Government estates will no doubt always command better prices than can be expected from the average run of the Indian exports, but the quantity sent is not likely to be very large, as large shipments are counted now-a-days. —*Madras Mail.*

THE JUNGLE PRODUCTS OF BORNEO.

Consul-General Leys, writing on the trade, commerce, and productions of North-West Borneo, says that the chief articles of jungle produce, in which a large export trade is carried on, are gutta-percha, india-rubber, rattans, and bird's nests. Gutta-percha is the inspissated juice of tall forest trees belonging to the natural order *Sapotaceæ*. Various kinds and qualities of gutta are afforded by various sapotaceous trees, but the pure red Bornean gutta is yielded by the species *Dichopsis gutta*. Other species of the genus *Dichopsis*, however, yield guttas, which, being of inferior quality, are frequently mixed by the native collectors with the more valuable red variety. This red variety is obtained from red and rough-stemmed trees, which are generally found growing among old jungle on hill-sides to a height of from 100 to 150 feet. The following is the method employed by the natives in collecting the raw product:—On finding a tree old enough to be cut, one having a diameter of about twelve inches, they fell it, cut off the top, and ring the bark at distances of about a foot. The sap for two or three days gradually drains away, and as it does so is collected in any convenient vessels, such as leaves, coconut-shells, &c., from which receptacles it is transferred to a pot and boiled for the space of half-an-hour with a little water. The milk is boiled to prevent it from hardening on exposure to the air, as if allowed to do so it becomes comparatively valueless. It is difficult to estimate the average yield of each tree, as the quantity varies according to the size of the tree and time of the year, the flow of sap being greatest when the tree is producing most leaves; but a small tree will generally yield a quarter of a picul,i the picul being equivalent to 133 lb. avoirdupois, while the largest may yield as much as three quarters of a picul each. The value of the red gutta varies, according to its purity, from 40 dollars to 80 dollars per picul. Another species of *Dichopsis* yields an inferior gutta of a white colour. This species has a smaller growth, attaining a height of from 50 to 60 feet, and a slightly different foliage. It yields proportionately less gutta, only about twenty-six pounds per tree. India-rubber, or caoutchouc, is obtained from three varieties of rough-stemmed woody climbers or *manungans*, which attain a length of over 100 feet, and a thickness of about eight inches. The juice is obtained in much the same way as gutta, and is prepared either by boiling like gutta, or by steeping in a solution of salt. The wasteful method of collecting guttas and rubbers has naturally caused an exhaustion of the supply from the more accessible districts; the rubber trees are not, however, so thoroughly exterminated as the gutta trees, owing to the greater tendency of the former to be reproduced from suckers, from cuttings of the stem taking root accidentally, and from the fruit which, being edible, is much sought after by monkeys, birds, wild pigs, &c. Rattans, or canes, are the stems of various species of *Calami*, which are found in profusion througout the whole of North-West Borneo. Birds' nests, well-known as the edible production of the Indian swallows, are found principally in the water-worn limestone and sandstone caves that exist in considerable numbers all over the districts of North-West Borneo. Consul-General Leys says, "although highly esteemed by the Chinese as a luxury in health, and as having curative qualities in sickness, I believe that these birds' nests have no more nutritive or medicinal value than so much wholesome isinglass, which substance they strongly resemble in every way. Many very absurd theories have been mooted as to the way in which the substance forming the nest is procured by the bird. I am strongly inclined to believe that it is formed from the saliva of the birds—an opinion founded chiefly on the fact that the saliva-producing glands are, during the nesting season, always immensly enlarged, and evidently in very unusual functional activity. When it is remembered that a viscid secretion usually found covering the inside of the mouth and the throat of birds—living as the swallow does, on small insects caught while on the wing—and that the nature of their food is peculiarly fitted to supply the substance of which the nest is chemically composed, and that the nest, though strong, is very small, thin, and light, such a theory is more probable than one would suppose." It appears from the import and export returns of Borneo for the year 1882, that the value of gutta-percha and indiarubber exported during that year amounted to £62,600, of rattans £24,500, and of birds' nests £10,000.—*Journal of the Society of Arts.*

SCIENTIFIC TEA MANUFACTURE.

TO THE EDITOR OF THE "HOME AND COLONIAL MAIL."

SIR,—One of those strange coincidences has occurred, by reason of which George Eliot was prompted to suggest that we might almost infer that at certain periods new thoughts float about in the world's atmosphere and are attracted by brains favourable to their reception in countries wide apart. The idea of withering tea by means of cool dry air, and of employing comparatively cool dry air for drying tea, may not be quite so novel as some interested are inclined to believe. The practical application of the idea is, however, distinctly a novelty, and all credit is due to those now attempting to introduce it to our factories. The coincidence I have referred to consists in the fact that two methods of arriving at the same end have been launched upon as at precisely the same time, one hailing from Boston, U.S.A., and the other from Glasgow. That from Boston comes to tea planters more by accident than intent; whereas that from Glasgow has been from its first conception devoted to tea manufacture before all things.

Mr. Jennings of Boston having found that the "hot-air methods and the drying kiln have been tried and given up as failures," that they "warped timber, made the grain of leather harsh and rough, spoiled the flavour of tea (!) and the colour of coffee, turned rice yellow, and failed to save the farmers' grain" in wet seasons, determined to discover a process which should meet the requirements of dryers of all such substances. He found the solution of his problem in a "Cool Dry-air Process." The name completely explains the principle of his system.

Mr. Jennings places the materials to be dried in a chamber, through which a current of moderately warm *dry* air is passed continuously, and he claims that "the test of experience shows that air so deprived of moisture acts as an absorbent in a manner that, without such a test, would have been deemed impossible." In the first instance, the current is drawn through a small furnace, in which it is heated to about 600 degrees Fahr. At this temperature the atmosphere is said to be without trace of vapour. This, I think, must depend upon whether the air has been passed through a sufficient body of live fire to ensure decomposition of the moisture, and upon this point I have no information at present as regards Mr. Jennings's system. After being heated, the desiccated air "is cooled by a vigorous circulation of external air," which lowers the temperature to between 80 degrees and 90 degrees, and in this condition the desiccated air is propelled by fans, driven by steam, through the drying chambers. Within these chambers the temperature is that of a hot summer's day, but the air is said to be so "greedy" of moisture that everything within its penetrative influence is desiccated. I must assume, as I do not know for a fact, that the "vigorous circulation of external air" is applied without its being allowed to mix or come into absolute contact with the heated air, otherwise the latter would naturally again commence absorbing moisture from the external air, and thus entail a waste. A machine erected on this principle is working at Messrs. Smith's extensive saw-mills, Commercial Road, Pimlico, and there the practical operation of the system has shown some results which are, if as reported, equally remarkable from a scientific as from a commercial point of view. I have seen it stated that at these saw-mills a package of wool 1 lb. in weight was saturated with water; it then weighed 3½ lb., and in this condition was placed in the dryingroom, and in twenty minutes the moisture was found to be almost wholly extracted. Timber, as everybody knows, takes

years to season, and it has a perfectly surprising power of absorbing and retaining moisture. Thus 44 cwt. 2qr. of birch were subjected to the test for ninety-four hours, and then examined, when it was found to be completely "seasoned, free from checking, rents, or warping, and it had given off in the operation 10 cwt. 2 qr. 24 lb. weight of water!" Wool so treated, even tested by the microscope, "shows no evidence of any change beyond the dryness of its substance, and this appears uniform throughout," "the fibre and cells seem to be unchanged; they are as close, but no closer, than before, and there is no perceptible shrinkage of dimension. Some lengths of ash gave still more striking results. Out of 47 cwt. 3 qr. no less than 21 cwt. 1 qr. of moisture was extracted; 22 cwt. of mahogany yielded 6 cwt. of moisture in ninty-six hours, whereas to obtain the same result by ordinary exposure would have taken years to accomplish. British oak is a very stubborn wood to season. Some logs, two inches thick, were finished in nine days, which by natural drying would have required three or four years. These effects were accomplished with a current of 6,200 cubic feet per minute; and the great lesson they teach is that all the mischiefs hitherto produced by drying systems accrued from the excessive heat. In this process the temperature never exceeds blood heat; and as a consequence, delicate fibres, fabrics and chemicals are uninjured. The industrial value of this important discovery can scarcely be over-estimated. A technical journal computes that in the matter of Indian tea alone cool-air drying would probably give it such an advantage as to increase its saleable value £200,000 a year." (!) So much for Mr. Jennings's process.

Coming now to the Glasgow one, introduced by Messrs. Main and Dick, the former of the well-known firm of A. and J. Main and Co., I cannot ask you for space in this, and the further communication I propose to send you next week, to do more than compare its *principles* with those of Mr. Jennings's system, leaving a description of the application of the principles to a future occasion. Mr. Main, your readers will remember, visited India during the Calcutta Exhibition, and during his visit travelled considerably among the Tea Gardens, with a view to obtaining a practical insight into the class of iron houses most suited to the wants af Planters, and also to inspect the various appliances used in tea manufacture, in the hope of being able to improve upon one or other of these. By conversation with planters he soon learned that in the matter of withering wet leaf in bad weather there was a field practically untouched by inventors. He claims now to have succeeded in the efforts he has been strenuously making since his return to provide the long-looked for withering appliance, and, whilst engaged upon his research in this direction, to have done even more than he had orginally sought to do, inasmuch as a modification of the principle he has adopted for withering, assisted by means of a different appliance and different temperature, has shown him that he can not only wither but "dry" tea also. From start to finish Mr. Main has consulted eminent chemists and practical planters, and has spared no pains or expense in prosecuting his experiments, which have been conducted over two years. His process is based upon thoroughly scientific grounds, and worked out on scientific principles, with every regard for obtainable scientific data; and it is indeed remarkable how identical the resulting principle is with that of Mr. Jennings, although it it true the method of desiccation varies. The point of difference may be briefly stated as follows:—Mr. Jennings desiccates his air by means of heat and then cools his air again; Mr. Main desiccates his air by means of an almost everlasting absorbant, and saves both the cooling process and certain other disadvantages.

In considering this matter of rapid and effectual withering and drying, it is as well to seek the fundamental principles. To solve the problem, Mr. Jennings and Mr. Main, if asked, would probably both refer us to *desiccated air*, but when asked how best to obtain desiccated air with which to conjure, Mr. Jennings would probably reply, by means of superheating it—I have not asked him—and Mr. Main would answer, by means of an absorbent—I have asked him and eangive his reasons. Possibly Mr. Jennings might be converted to Mr. Main's opinion were the latter's arguments brought to his attention; but that is surmise. Knowing Mr. Main, and being already acquainted with his interest in this subject, in my search after "more light," I brought Mr. Jenning's process to his notice, and it will afford some insight into the thorough and extremely careful manner in which he has conducted his labours if I give the gist of some of his comments upon Mr. Jenning's process as compared with his own. He forwarded me the subjoined table which shows the amount of moisture or water-vapour in the air, per 1,000 cubic feet, at the point of saturation, at various temperatures, and he tells me that from such facts as these he was led to wonder, how a delicate substance like tea, could ever be quickly or effectively dried during the rainy season, with so much moisture in the air. Finally he came to the conclusion that the whole of the difficulties of the process lay in the presence of the excessive moisture in the air—a fact already too well known to planters—and he then felt sure that the reason why so many failures had occurred in machines constructed for drying tea, lay in the fact that moist air—hot though it undeniably was—was used. As soon as he experimented with desiccated air, astounding results were obtained. In drying (not withering) he found that when employing desiccated air a large reduction in the temperature showed more effective results as regards the time occupied, than a high temperature showed when undesiccated air was used. Thus at a temperature of 200 degree Fahr. rolled leaf was perfectly dried in fifteen minutes! To practical planters it is unnecessary for me to draw any comparison from this. Mr. Main rightly refuses to express any opinion upon the quality of tea produced at a low temperature, as he is most careful in testing every detail before committing himself to any statement as to its value; and, as he says, the question of quality cannot be properly settled exeept by actual experiment with tea-leaf, which cannot be effected in this country. At the same time, if there be anything in the views I have previously expressed in your columns, I, for one, look forward to improved tea being produced, when rapid firing at low temperatures is introduced.

Having taken up so much of your space this week I will, with your permission, continue my remarks upon the *principles* of the new process next week.—
I am, &c.,
ARTEMUS.

Table of weights of water in form of vapour capable of being held in suspension by atmospheric air at different temperatures, the same being dew point or point of greatest saturation:—

Temp. Fahr.	Weight in lb. per 1,000 cubic feet.			
70 deg.	1·197	equal, say,	1 lb. 3 oz.	
71 „	1·204	„	1 lb. 3⅓oz.	
72 „	1·275	„	1 lb. 4¼oz.	
73 „	1·314	„	1 lb. 5 oz.	
74 „	1·354	„	1 lb. 5⅜oz.	
75 „	1·397	„	1 lb. 6⅝oz.	
76 „	1·447	„	1 lb. 7⅛oz.	bare
77 „	1·487	„	1 lb. 7⅞oz.	
78 „	1·528	„	1 lb. 8⅜oz.	bare
79 „	1·574	„	1 lb. 9⅛oz.	
80 „	1·619	„	1 lb. 10 oz.	bare
81 „	1·666	„	1 lb. 10⅝oz.	
82 „	1·715	„	1 lb. 11⅓oz.	bare
83 „	1·765	„	1 lb. 12⅛oz.	bare
84 „	1·802	„	1 lb. 13 oz.	
85 „	1·868	„	1 lb. 13⅞oz.	
86 „	1·902	„	1 lb. 14½oz.	
87 „	1·982	„	1 lb. 15⅛oz.	
88 „	2·031	„	2 lb. 0¼oz.	
89 „	2·087	„	2 lb. 1¼oz.	
90 „	2·144	„	2 lb. 2 oz.	
91 „	2·205	„	2 lb 3 oz.	
92 „	2·255	„	2 lb. 4 oz.	
93 „	2·312	„	2 lb. 5 oz.	
94 „	2·370	„	2 lb. 6 oz.	
95 „	2·430	„	2 lb. 7 oz.	

PLANTING IN PERAK.

The great backbone of revenue and prosperity of the State has been tin, and this metal will probably continue for some years to be the chief attraction. Chinese have had almost a monopoly of this mining until a year or two ago, when one or two Europeans and European Oempanies came into the field. Generally speaking, as is commonly known, these companies have not been a success. They too frequently started with millstones, in the shape of large quantities of very expensive machinery, and European managers, assistants, engineers, &c., at salaries which only an El Dorado could pay, and still have something for a dividend. That money can be made at tin mining, and by Europeans, I feel convinced. The Chinaman has, of course, a great advantage in his store account, for he supplies everything to his coolies at an enormous profit to himself. Cases occur every month where a Chinaman is an apparent loser by working the tin, and his books will probably show a loss of $5,000 to $10,000 on a six months' working. In reality, however, he is a gainer probably to that extent, his store account having covered any deficiency, and likewise left him with a profit. Europeans cannot, of course, go into this system, but if they would be a little more ready to profit by the Chinaman's experience in actual mining I am convinced that much useful information could be gleaned; and most of these Chinese are ready at all times to give the intelligence. The idea seems to be to make a grand start; if they would be content with small beginnings and proceed slowly, only getting expensive machinery where such is shown to be an undoubted economy, I think there is money to be made. At present, this may be termed the only money-making concern in the country, but there is also rich agricultural land in many parts, the district for instance round Kwala Kangsa being of rich soil and suitable for the growth of many products. Arabian coffee and tea (Assam hybrid) are doing well on estates in both Perak and Sunghie Ujong, though at present the extent is not very great. Liberian coffee is also doing well in low countries. Sugar likewise, on the Shanghai Company's Gula estate on the banks of the Korean River, is doing well. About seven hundred acres are now under cultivation, and more is being got into order.—*London and China Express.*

PRODUCTION OF ALFA IN ALGERIA.

Consul General Playfair, in his last report issued at the commencement of the year, on the commerce and agriculture of Algeria, says that alfa is of great and increasing importance, both to Algeria and England, where nearly the whole of the exports are consigned, and he gives the following account of the plant taken from the report of a commission recently sent to the high plateaux by the Governor-General, to study the subject in the great upland plains where alone it is found. Alfa or halfa is a plant which is found in calcareous soil or silicious clay, but not in compact clay or pure sand, unless, at a short depth below them, silicious clay is found, or soil unimpregnated with sea salt. In the high plateaux of the south of Oran it is found in calcareous soil of the formation *cretacee superieure* (compact calcareous rock, in horizontal bands, the decomposition of which produces stones and finely powdered earth coloured dark red by the oxide of iron), and in sand mixed with clay or quaternary alluvium. The thin circular and shallow roots of the plant require air and a little moisture, thus the alfa is never found in the white sand near the *Chotts*, nor in the depressions of compact soil scattered about the high plateaux. The surface of the high plateaux in Oran may be compared to a carpet, the ground of which is alfa, picked out with innumerable ramifications of *sennara* and *artemisia*. The tuft of alfa presents at its base the appearance of a central axis around which at a short distance proceed horizontal ramifications. These spring up vertically and produce bunches of flowers, sheathed in narrow falling leaves. After the first year's growth, each ramification sends out from its base a shoot, which decends into the ground, producing a small root; other ramifications are then produced at the base of previous ones, and become rooted in their turn. The tuft thus increases from the centre to circumference, each addition being united to the central mass, but forming gradually its own root, so as to be able to live when the central part dies and disappears. It is only in the third year from the sprouting of the ramification that the flower appears to be developed. If the plant is allowed to grow unchecked, its flowers and leaves vegetate during the spring, they ripen in summer, and they commence to decompose from the points downwards, under the action of the autumnal rains, fading progressively during the winter. In proportion as the sap of spring developes new leaves, those of the previous year fall over inert and partly dried up without ceasing to adhere to the stem on which they continue to decompose during the following years. After several years the dead leaves form a thick central mass, impenetrable to the shoots at their base, and around this mass the new leaves pierce through, and the small roots continue to develop outside the circle. Alfa grows abundantly in Algeria, and a large population, both of Spaniards and Arabs, is engaged in collecting it. The workman generally twists round his hand, or round a small stick, the upper part of the leaves, which he tears out by a sudden jerk, and puts under his left arm, and this he continues to do until he has made a small sheaf which he ties up. A number of these small sheaves are made into a larger one, and these are placed upright to dry. To preserve this plant as much as possible, an ordinance of the Governor-General was published on the 13th March, 1884, prohibiting the collecting of it during a close period of about four months every year, varying according to the climatic conditions of the district where it occurs. A large quantity of the best alfa is exported to Spain, where it is mixed with the esparto grass of the country; the ordinary quality is almost all sent to England for the manufacture of paper. Of late the exportation has greatly diminished, owing partly to the competition in Spain, Morocco, and Tunis, but partly to its excessive price and the introduction of wood pulp in the paper trade. The extent over which the alfa is found in Algeria is about 4,441,000 acres, and it is estimated that upwards of 16,000,000 cwt. were collected during the year 1883.—*Journal of the Society of Arts.*

JAPANESE LABOUR IN THE SANDWICH ISLANDS.

The Planters of Hawaii are not unanimous as to the value of Japanese labour. Some appraise it very highly; others place it below that of Portuguese or Chinese. From the report presented at the Planters' Labour and Supply Association, we learn that on a majority of the estates where they were employed the Japanese had given satisfaction, though in a few cases their labour was rated very low. This is perhaps as much as could have been expected. It has been already pointed out in these coloumns that the Japanese who went to the Sandwich Islands were a very mixed lot. The first batch consisted of ex-soldiers, vagrants, needy fishermen, and, in general, persons not at all likely to settle down to steady work. Curiously enough fishermen, though capable of enduring hardship and toil of the severest description, frequently fail where persistent effort is required. Trained to a life of fitful exertion with intervals of almost absolute indolence, they find great difficulty in reconciling themselves to the monotony of unvaried labour. Even fishermen, however, would have answered the purpose of the Hawaiian planters better than ex-soldiers and vagrants who emigrated under the delusion that their sojourn in the sugar islands was to be a long spell of sun-basking, relieved by the business of eating and sleeping. It might have been foreseen that men of this class would not prove a success. But the task of selection,

difficult and invidious enough under any circumstances, was, we believe, complicated at the outset by unavoidable obstructions. The emigrants chosen later on were adapted to the duties awaiting them, and have given universal satisfaction. Accordingly we find that at the last annual meeting of the Planters' Labour and supply Association, the following resolution was adopted:—"That we heartily approve the acts of our Government and what they have accomplished since our last annual meeting in bringing and permitting labourers to come to these Islands, and that we urge upon our Government, by this resolution and otherwise, that they put forth like exertions for supplying labourers during the coming twelve months, not only in bringing in Portuguese and Japanese as heretofore, but permit the influx of free labour from all countries so far as it can be done without injury to other national interests." So far as the Japanese are concerned, despite the resolute attempts made some months ago to scare intending emigrants by fabricated or grossly exaggerated pictures of the hardships and cruelties their predecessors had undergone, we learn that when a notice inviting applications was recently issued in the prefectures of Yamaguchi and Hiroshima, no less than 1,400 applicants presented themselves during the course of the first two days. Nor is this to be wondered at. For certainly from a financial point of view, the record of the emigrants is well calculated to tempt their countrymen. The total number now in Hawaii is 1,780, of whom 845 arrived at the plantations on March 1st of this year, and 935 on August 1st. The savings of these people up to November 1st had exceeded $50,000, being an average of about $8·62 each per month, and this after paying for food, clothes, and other necessaries. They are apparently quite contented with their lot, and the nature of the letters they send to their friends in Japan may be gathered from the eagerness shown to follow their example. We learn that another batch will be sent to Hawai by the "City of Peking," on Janury 28th, and that it will consist of 650 men and 275 women. They will be accompanied by nine Japanese inspectors and interpreters, and by seven Japanese physicians, all of whom have been selected by Dr. Nagayo Sensai, Chief Director of the Sanitary Bureau. The salaries of the inspectors and interpreters vary from $150 to $33 per month, and the physicians will receive $108. These officials will also be furnished not only with passages to Honolulu, but also with return passages after three years. The Inspectors, who will be Hawaiian Government officials, are to be under the direction of Mr. Nahayama Jogô, who will be in direct communication with the Hawaiian Minister of the interior. The interpreters will also act officially in the Hawaiian courts in all cases where Japanese are concerned. —*Japan Weekly Mail.*

SERICULTURE IN INDIA.

At Calcutta, on the 18th December, there was a large gathering of ladies and gentlemen at the Dalhousie Institute, they having been invited by the Honorary Secretary to see a splendid collection of insects made by Mr. Mowis in Sikkim. The cases containing the collection had been laid out in the institute, and almost formed an exhibition of themselves, though they are intended for the Indo-Colonial Exhibition in London. Every class of insects was represented, and the gorgeous colours of some of the butterflies and beetles baffle description. Shortly after 9 o'clock, the Honorary Secretary introduced Mr. Mowis to the audience, and the lecture which followed was listened to with the utmost attention. Free from all technicalities and abounding in amusing stories out of the history of insect life, Mr. Mowis's comparisons of the different powers and faculties only to be met with in insects, made up a concise and able disquisition that kept his audience thoroughly interested. In addition to its interest as a lecture, there were facts made known of real importance and great practical value. We quote the part relating to silk and sericulture of India, and only wish we could give it *in extenso*. Describing the three great silk-producing families of moths, the lecturer said that, the first family contained all those cultivated and domesticated by men: secondly, those that are left to themselves to weave their silk in the jungle, and are called wild silk-worms; and thirdly, those silk-worms which spin a cocoon, but have no commercial value at present. In former years, he said, India had a very large silk industry, but owing to prevailing diseases of the silk-worms and years of drought, it is now scarcely one-hundredth part of what it once was. Government had made many efforts to revive it, and tried hard and incurred heavy expense to give a new impulse to this industry, but though land and labour is cheaper here than in any other part of the world, the lecturer was doubtful whether the mulberry silk will ever regain its former footing in India. It takes, we learn, three years to make a plantation fit to feed the worms to make good marketable silk, so that it is impossible to attempt any large scheme; but as the lecturer remarked, if we are unable to obtain the best silk except at a loss, get the next best that pays—and pays well. Therefore every encouragement should be given to the tusser industry in this country. Mr. Thomas Wardle has just reached this country, having been sent out by the Home Government to investigate our silk industries. He was the British delegate at the late Paris Exhibition, and has demonstrated the fact that tusser silk can now be reeled and spun, bleached, and dyed, in splendid colours, and be used in almost any material where formerly the best silks only were employed. A demand has, therefore, sprung up where there is at present but a limited supply. The tusser cocoons are found in every part of India, and the worms feed on almost every plant. They are very hardy, and little liable to disease, and if Government would only take the matter earnestly in hand, we should have a most extensive industry in the space of a very few years. This new industry would almost equal the waning cotton one, and prove much more remunerative, while giving employment to thousands of the poorer classes to whom this work would be particularly well suited, thus adding already to our revenues. Lakhs of rupees' worth of these cocoons are shipped home every year, taking up great space on board ship. These cocoons have to be reeled at home on spindles which cost £75 each, and by labourers who demand 20*s.* a week. The same result could be obtained here with labour at 5 rupees per month. The great drawback in all native-reeled silk has always been the unevenness and lumpiness of the thread, but with very little trouble, an improved reel could be introduced here, which would give all the desired evenness. The lecturer exhibited a model reel, which has been constructed by him, and which combined to a certain extent both the European and native methods, and still remained simple enough to suit unskilled labour. The cost of this reel is so low as to be within the reach of the poorest coolie of the country, and by a general adoption of such a reel or a similar one, Indian-reeled tusser silks could be laid down in the European markets at about 10*s.* per pound, and thus give 100 per cent profit on the outlay! In explaining this reel, it was shown that it reeled evenly, and distributed the silk regularly on the real, from which it can be removed by a very simple contrivance, without distributing the layers of the silk, which is very essential. It could be worked by hand or foot, and also be adapted to machinery; and any child could learn to work it in a short time. A case of sample silk was exhibited, which had been reeled on this model, and a small quantity was also reeled before the audience in the lecture hall.—*Statesman.*

PLANT-BEDS.

It is usual at this period of the year for planters of tobacco to be contemplating their arrangements for a supply of plants for the next crop. These arrangements must be concluded on, and the actual work done, between the 15th December and the 15th March. About a year ago we asked the attention of the readers of the *Planter* to the old and new

methods of managing plant-beds. The old method involved the burning of large surfaces of forest land at a heavy cost of labor and firewood, and then leaving the surfaces exposed to the ravages of the flies, which destroy the young plants. Every Spring since the settlement of America the cry, to a greater or less extent, comes up from the planter that his plants are seriously injured by the fly; and in our experience we have known the planting of crops to be entirely abandoned from this cause.

Thinking farmers have put their heads to work on this matter, and in the past four or five years they have one after another tried the plan of covering the beds with cloth, and always with success when the work was properly done. The methods pursued by different persons were, of course, in many cases different and more or less thoroughly executed. In this matter, as in all practical operations of the farm, careful execution always pays the best. The most usual method in the new plan is to *burn in the woods* about one-fourth of the surface what would be required if the beds are left uncovered, and to cover with thin and cheap cotton cloth. The bed is frequently square, or nearly so, and necessarily the cloth will *sag* in the centre unless supported in some way. It is also inconvenient for the cloth to be removed in mild weather to admit air, and moisture from dews and rains; and more than all, if not saturated with oil, or otherwise gummed over, to render it valueless for under-clothing, the first passing rogue will appropriate it. It is best, however, to use the cloth covering and take all such risks.

We wish now to suggest to our readers a plan which will save *burning* the bed, and also make the covering with cloth more convenient and efficient. Select a spot of naturally drained land—that is, a porous subsoil through which water will pass—and as near to your stables as possible, with a south or south-eastern exposure; dig a trench one foot deep, eight feet wide, and as long as may be needed, by one or more beds, to hold one-third more plants than will be required. This work should be done in a good spell of weather in January, or early in February. After the trench is dug, fill it with *fresh stable* manure to the depth of a foot after it is firmly tramped down. The haul from the forest fresh mold sufficient to cover the manure six inches, or even eight inches, deep. Rake out all roots, sticks, leaves and other coarse matter. Boards a foot in width are then placed edgewise all around the pit, supported on the inside with pegs driven into the ground, and the earth on the outside is then banked up to the top of the boards. The bed may be left open until the weather gets cold, or frosty, but before the job is completed eight-penny nails should be driven two feet apart near the top edge of the planks, and their heads left projecting about half the length of the nail, and to these are to be tied the strings which are to be attached to the cloth covering of the bed at distances on its edges corresponding with the nails. The knots in the tying should be such as can be easily unloosened when it is necessary to do so, for air or moisture to the plants. Care should be taken that the twine used for attaching the cover to the frame is well sewed on with a lap of several inches to prevent a tearing of the cloth, which would be the case if the fastening was confined to one point.

In a week or two after the bed has been completed, some of the grass seeds which may be in the mold which covers it will vegetate, and then the bed should be hand-raked to destroy this grass; a week or ten days later other seeds may vegetate, when another raking is necessary; and possibly then all seeds have felt the influence of the warmth generated by the underlying stable manure, and the tobacco seed may then be sown. Care is to be taken that the plants are not too much forced, and with this view air is to be admitted freely when necessary. If a bed so constructed does not get the required moisture from rain, it will be seen how convenient it is to water it, passing along the sides with a fine-nozzle watering-pot. If the plants should need any cleansing of spires of grass, it can be handily done from the sides without stepping on the bed; and so, when the plants are to be drawn, there is no occasion to place the foot on the bed and damage by bruising. As a substitute for the ashes which the plants get by the common method of burning, save up from house fires, dry, hard-wood ashes, and give the bed a liberal dressing, to be thoroughly raked in before the tobacco seed are sown, and the ashes will supply all the potash needed for the plants. After the plants are up they may be lightly dusted by the sweepings from the floor of the barn in which the previous crop was handled, and these dustings may be increased with the growth of the plants.

In this issue of the *Planter* will be seen an advertisement of the *U. S. Water-Proofing Fibre Company*, who claim to have the best material for covering tobacco and vegetable beds; and we see it recommended by our friend, Maj. Ragland, of Halifax, who is good authority with the tobacco planters of Virginia, and it is also much approved of by other planters of Virginia, North Carolina, and all the states where tobacco is grown.—*Southern Planter.*

THE ORGANIC ELEMENTS OF PLANTS: THE SOURCES OF CARBON.

By B. Puryear, ll.d., Professor of Chemistry in Richmond College.

All plants when perfectly deprived of moisture contain of Carbon about 50 per cent.

Oxygen	„	36	„
Hydrogen	„	6	„
Nitrogen	„	3	„
		95	

The remaining 5 per cent consists of ash (the inorganic part), which comes exclusively from the soil, and returns to the soil upon the decomposition of the plant. The amount of inorganic matter in plants is frequently less than 5 per cent, and as often more. We simply give 5 per cent as an average statement.

As the atmosphere is the primary source of all the organic elements of plants, it will be well, in considering the forms in which plants obtain their organic elements, to notice the composition of the atmosphere. 100 volumes of air contain

79·16	Nitrogen
20·80	Oxygen
·04	Carbonic Acid.
100	

The foregoing table is valuable, showing, at a glance, the relative volumes of the three gases which as a mechanical mixture constitute the atmosphere. There are always present in the atmosphere, however, in small and variable proportions, other gaseous substances, to which attention will be invited hereafter; but, for the present, it will be best to limit our attention to the three gases already mentioned, namely, nitrogen, oxygen, and carbonic acid, which exist in the atmosphere everywhere in the proportions given.

In what form and from what sources do plants obtain their carbon? Evidently, they do not get their carbon in the form of carbon. As an element, carbon does not exist in the atmosphere; and, for a reason as obvious, it cannot come as an element from the soil. Carbon is absolutely insoluble in water, and hence it cannot get into the circulation of the plant in a state of solution. Solids get into plants, but not as solids. The capillary tubes of plants are too small to allow the passage of any solid, however small. When a solid is dissolved it is no longer a solid; it is as liquid as the water, or other liquid, which has dissolved it. Potash, soda, lime, silica, all solids, are found in the ash of plants: they enter, however, not in the form of solids, but when, and only when, they have been dissolved by the water of the soil. Carbon, being entirely insoluble, cannot enter in this way. We are safe then in the conclusion that plants do not obtain their carbon, *as carbon*, either from the atmosphere or from the soil.

Dr. Priestley, the great discoverer of oxygen gas, afterwards made the equally important discovery that the leaves of plants have the power, under the influence of sunlight, of absorbing carbonic acid by their under surfaces, holding the carbon in the formation of vegetable compounds, and emitting from the upper surfaces the oxygen gas set free by the decomposition of the carbonic acid. The demonstration is so simple that anybody can repeat it. No cumbrous and complicated apparatus is required. A bell glass or candy jar and a bucket of water is all the apparatus needed for the splendid demonstration. We have our bell glass full of water, the rim dipping an inch or so beneath the surface of the water in the bucket. A blade of rapidly growing corn is bent over, and inserted into the bell glass. At once, bubbles of gas collect on the upper surface of the blade and rise through the water, displacing the water and driving it down into the bucket. In this way, we may collect, in a few minutes, enough of the gas for experiment. The gas is oxygen, for an extinguished taper containing the slightest spark, when introduced into the gas, flares up immediately. Now what has happened? To make the explanation perfectly clear, two preliminary explanations are required. (1.) Carbonic acid is a compound of carbon and oxygen, in the proportion of one atom of carbon to two atoms of oxygen. Hence it is written CO_2. (2.) Water, under ordinary pressure, absorbs its own volume of carbonic acid, so that all water contains this gas.

Under the influence of solar light, the under surface of the leaves have sucked in or absorbed the carbonic acid present in the water, the carbon has been held to form the vegetable skeleton, and the oxygen evolved from the upper leaf surfaces. And as carbonic acid contains its own volume of oxygen, the volume of oxygen evolved from the upper leaf surfaces is equal to the volume of carbonic acid absorbed by the under leaf surfaces.

We may vary the experiment as following:—Let us have a trough of water furnished with a shelf. On this shelf we place a pot containing a vigorous geranium. Let down a bell glass over the geranium pot, so that the water will be a little above the mouth of the bell glass. The air is confined. Water prevents the access of the outer air. Place the whole arrangement in the sunlight. In an hour or so, the air of the bell glass is found to be utterly destitute of carbonic acid.

There can be no mistake. Nothing is more easily detected in the atmosphere than carbonic acid (CO_2.) When lime water is exposed in an atmosphere containing carbonic acid, immediately a thin crust, resembling ice, begins to be formed on the surface of the water. This film or crust is carbonate of lime, formed by the combination of carbonic acid with lime. If touched with any acid it will effervesce, the effervescence being due to the liberation of carbonic acid.

The leaves of plants then suck in carbonic acid, decompose it, fixing the solid carbon in building up its compounds and evolving the oxygen gas. Now, the great proximate compounds of plants, as starch, sugar, gum, woody fibre, are simply carbon combined with the elements of water. All of them may be easily resolved into carbon and water. We are now prepared to understand how simply they are formed in the vegetable economy. They are all formed by the union of carbon, set free in the decomposition of carbonic acid, with the elements of water introduced from the earth by the roots of growing plants.

We consider then the carbonic acid of the atmosphere the primary source of all the carbon of plants. Plants sometimes grow under circumstances which utterly exclude any other source of supply.

If we plant a grain of wheat—the experiment has been tried—in pulverized silica, and keep it properly moistened with rain water, it will swell and sprout and germinate. A true stalk is formed, which grows enough to contain three times as much carbon as the planted grain. Whence this excess of carbon? Evidently and necessarily the carbonic acid of the atmosphere, for there was no carbon in any form in the artificial soil which grew the plant. We witness the same thing, on a larger scale, when clay, containing no carbon in any form, is dug up from great depths, and exposed to the atmosphere. Seeds are dropped upon the clay; they germinate and grow to a greater or less extent. The carbon obtained by vegetation growing under such circumstances must come exclusively from the atmosphere, for the soil contains none.

Let us consider how plants grow upon a purely mineral foundation. Consider an acre of granite. Granite is composed of three minerals: quartz, feldspar, and mica, and none of these minerals contain carbon. Seeds dropped by birds or wafted by the winds are deposited upon this acre of granite. Under the necessary conditions of warmth, moisture, and access of air they germinate, and develop into scant and stinted vegetation, which contains, say, three times as much carbon as the seeds which produced it. The atmosphere by its carbonic acid necessarily furnished the whole of this excess of carbon. But the vegetation of the second year will be more vigorous and heavy for two reasons. First, the roots have penetrated somewhat into the hard granite in search of food, and to a small extent have comminuted it, and this comminution will be still greater from the freezes of the coming winter. As the roots decay, water will fill up the little channels they made in the rock, and in freezing will expand and so split and peel off the surface of the granite. The vegetation of the first year will be mixed with this reduced and disintegrated granite, and now the process of soil formation begins. The crop of the second year will be more vigorous, having the advantage of pulverized mineral matter, from which it will more easily and abundantly obtain its mineral constituents, and the advantage also of rotting vegetation, which yields carbonic acid, to say nothing of the other products of its decomposition. Carbonic acid being freely absorbable by water is carried by the sap, as it ascends to the leaf where it is decomposed under the influence of sunlight, just the same as if it had been observed directly by the under surfaces of the leaf. The crop therefore gets a part of its carbon in the form of carbonic acid directly from the atmosphere by the agency of its leaves, and the remainder in the same form from the soil by the agency of the roots. But it is obvious that the carbon obtained by the second crop from the soil was obtained by the first crop from the atmosphere, so that the primary and original source of all the carbon of the plants is the atmosphere. By exact parity of reasoning we will be able, even when a century has elapsed, and a true soil has been formed on the underlying granite, to trace back all the carbon of each succeeding crop to the carbonic acid of the atmosphere as its primary source, though with each successive year, the amount obtained from the soil has been increasing, from the admixture with it of the dead vegetation of preceding years. Our conclusion then is that plants, as they grow under ordinary circumstances, obtain their carbon partly from the atmosphere and partly from the soil, but that the carbonic acid of the atmosphere is the primary and original source of supply.

The exhaustive experiments of Boussingault, conducted through a series of seven years, show that plants, as they ordinarily grow obtain $\frac{2}{3}$ of their carbon directly from the atmosphere, and $\frac{1}{3}$ from the soil. This experiment, perhaps unsuited for our pages is very simple, is easily understood, and irresistibly carries the foregoing conclusion.

If it be objected that the amount of carbonic acid in the atmosphere seems too small to furnish to all plants growing on the globe $\frac{2}{3}$ of their carbon, the objection will vanish as soon as we calculate the absolute weight of the carbonic acid of the entire atmosphere. The amount of carbonic acid in the atmosphere is exceedingly small; the amount of carbonic acid in the atmosphere is enormously large. A word explains the seeming contradiction; relatively small, absolutely large.

One hundred gallons of air contain 4-100 of a gallon of carbonic acid. One gallon of air then contains 1-2500 of a gallon of carbonic acid. But as carbonic acid is one and a half times as heavy as air, we

find the relative amount by weight of carbonic acid in the atmosphere by multiplying 1·2500 by 3·2 which gives three five-thousandths. We can now easily calculate the amount of carbonic acid in the atmosphere over an acre of land. An acre contains 6,272,640 square inches, and the weight of the atmosphere on a square inch is 15 lb. The product of 6,272,640 by 15 is 94,089,600, which expresses the weight in pounds of the atmosphere over an acre, and three five-thousandths of this product is 56,453 pounds or 28 tons, and this expresses the weight of the carbonic acid in the atmosphere resting upon an acre. But three-elevenths of the weight of carbonic acid is carbon, and three-elevenths of 27 tons is seven and seven-elevenths tons, the amount of carbon in the form of carbonic acid in the atmosphere of an acre's surface.

Now, the yield of an acre in dry vegetable matter may be put down at one and one-half tons, half of which (three-fourths of a ton) is carbon. An acre then demands per annum three-fourths of a ton of carbon and two-thirds of this, or one-half ton, must come from the atmosphere. The amount of carbon in the form of carbonic acid in the atmosphere of an acre is seven and seven-elevenths, say seven and one-half tons; the demand upon the atmosphere of an acre in vigorous vegetation is one-half ton. The supply is fifteen times the demand; and this would be the relative supply and demand if every acre of the earth's surface supported vegetation. But three-fourths of the earth's surface, and more, is covered with water, and vast areas are barren sands and burning deserts. Perhaps we shall not be very far from the truth, if we say that only one-hundredth part of the earth's surface supports vegetation. If this be so, then the supply of carbon is 1,500 times the annual demand.—*American Farmer.*

The British colonies include the richest and largest forests in the World, extending over millions of square acres. In India alone about 60,000 square miles are afforested, and the forests of Canada, Australia, New Zealand, and Cape Colony are second to none in size and the variety and value of their productions. The acreage under timber in France, Germany, and Great Britain is small and constantly decreasing. Of the 20,000,000 square acres of Scotland only about 700,000 to 800,000 acres are woodland.—*Journal of Horticulture.*

A Dressing for Peach and Nectarine Trees.—I have used the following composition for many years: it destroys all insects, mildew, and disease, &c., without injury to the birds in any way :—2 lb. of tobacco-powder, 1 lb. of flowers of sulpher, 1 oz. of nux vomica powder, 2 lb. of clay, ½ lb. of soft soap, with sufficient boiling water to make it the thickness of paint; well mix and stir up before using, then paint the Vines and trees all over.—Wm. Smythe, Basing Park, Alton, Hants.—*Gardeners' Chronicle.*

Wine-growing in Italy.—Italy, with an area of 296,322 square kilometres, and a population of 27½ millions, has 1,879,109 hectares (4,641,400acres) of vineyards, which produce annually 27,108,574 hectolitres (596,344,628 gallons) of wine, which, calculated at an average price of 25 lire per hectolitre (nearly 11 l. per gallon), would amount in value to 677,664,350 lire, or £27,106,574 sterling. In Europe, Italy ranks third in importance as a winegrowing country, following immediately after France and Spain.—*Journal of the Society of Arts.*

Cultivation of Flax in Russia.—The *Central Blatt fur Textile Industrie* reports that the complaints of the inferior quality and defective yield of Russian flax within the last few years, have led buyers in other countries to represent to their various Governments the advisability of stimulating domestic flax culture by means of subsidies. The sale of Russian flax has been to some extent prejudiced in foreign countries by the importations of Indian and Italian flax. Efforts are now being made, however, in Russia to place this important branch of national industry upon a better footing, by organised measures for promoting the improvement of the quality, and the general development of flax culture.—*Journal of the Society of Arts.*

The Select Committee of the House of Commons, appointed on the motion of Sir John Lubbock to inquire into the desirability of establishing a Forest School in England, recently took the evidence of Mr. W. G. Pedder, Revenue Secretary of the India Office, who stated that a Forestal Department was authorised in Bombay in 1846. About that time the revenue of the Indian forests was £40,080. Since then it had risen to a gross revenue of nearly £1,000,000, and a nett revenue of over £400,000, and that, he considered, was undoubtedly due to the increased education of forest officials. Instructors were obtained from France and Germany, but latterly chiefly from France, because it was found that the woodlands of England and Scotland were not so well managed as to enable the managers to give instruction.—*Journal of Horticulture.*

Earthworms—Mildew.—Earthworms in the pots are another troublesome pest, especially where the extra precaution has not been taken to grow the plants on boards or tiles throughout the summer. These disturb the roots and cause the flowers to be thin and weak. A good nob of fresh unslacked lime put into a two-gallon watering can and left to settle will make sufficient lime water for a good number of plants, which is the best thing to use to kill the worms in the pots. Mildew will appear more especially on high-fed plants. The best remedy is sulphur, which should be dusted over at the first sign of it. Some varieties seem more susceptible to this than others. Val d'Andorre of the Japanese, and Triomphe du Nord, and also Dick Turpin amongst the Pompons, are the only varieties that have given me any trouble this season.—*Journal of Horticulture.*

Sub-Tropical plants in Small Gardens.—These, of course, are named as best sites, but the owner of a small villa garden, who—as a matter of course—has no choice of sites, need not despair. If he only has shelter, he may, if so inclined, have a first-rate sub-tropical bed. Say, for instance, he has a large circular bed, and wishes it planted effectively after the sub-tropical fashion; here is the arrangement. In the middle plant a large clump of the hardy bamboo (*Bambusa Metake*), or else of New Zealand flax (*Phormium tenax*); then three plants, equal in size, of seedling *Acacia lophantha*; and next six plants of *Grevillea robusta*; the outer row of all being twelve plants of variegated abutilon; the edging to be the hardy variegated plantain lily (*Funkia ovata variegata*). All these plants can be bought at the prices usually paid for common geraniums, and are therefore within the reach of all. The bed can be filled out either with flowering or foliage plants; considering the position, we should advice the former, the kinds to be either geraniums or fuchsias, or both in mixture. Should foliage plants be preferred, variegated thyme, golden feather pyrethrum, or any of the mossy selection of sedums would be appropriate.—*Cassell's Popular Gardening.*

Acclimatisation of Chinese Plants in India.—We are informed that Monsieur Reynaud, Professor of Agrimony at Pondicherry, has raised some strong healthy plants from the seed of the Chinese "milk plant" (*de soya*). It is a native of Japan *Teou Tou*, The Chinese use it largely, expressing the milk, which is used in its liquid state, and is also manufactured into cheese; it has not yet however, found favour among Europeans, the flavour being unpleasant. The Chinese bamboo, Katang, has also been raised from seeds by M. Reynaud; this particular bamboo grows to an enormous size, and is valuable for a variety of purposes; all kinds of utensils are made of it—casks, tubs, buckets, troughs, &c. The Angola beans (*Cytisus Cazan*) sown a short time ago are thriving satisfactorily, and a good gathering is expected. They are by far the best beans for *haricot* and many other French dishes; a great recommendation is their easy digesting qualities and pleasant taste. The plant continues to bear for seven years, and is greatly prized in the Antilles for its economical usefulness; it requires little or no tending.—*Planters' Gazette.*

QUININE BARK.

6, MINCING LANE, LONDON, 31ST JAN. 1887.

GENTLEMEN,—At the commencement of the past year prices for both bark and sulphate of quinine had fallen to a point low beyond all previous precedent.

They were, however, nevertheless, doomed to suffer a still further and heavy fall in the course of the year. The fall cannot be put at less than 25 per cent on bark, and 20 per cent on quinine. This unparalleled depression has, on the one hand, been accompanied by a very extended consumption of quinine: and, on the other hand, the extremely unremunerative price of bark has not, so far, had the effect of at all diminishing our supply. On the contrary our receipts from Ceylon —at present the main source of our supply—were again larger than ever last year.

JANUARY.—The new year opened as the old one closed, with a quiet market at previous very moderate prices—4½d a 5d per unit—business limited.

FEBRUARY was without any improvement either in demand or value.

March witnessed a little more animation; volume of business somewhat large; previous prices firmly maintained.

April saw much the same condition of things. No diminution in the quantity of business accomplished, and, although with some little fluctuations, no quotable alteration in terms.

May was a bad month; the supply of Ceylon became very heavy; the demand fell off very much, and prices went down to 4d a 4½ d per unit.

June opened very heavily for South American Bark; but business to some extent was done in Ceylon upon previous terms.

July was a most unfavourable month for Importers, especially of the South American varieties, which were entirely neglected; rates for Ceylon also ruling decidedly in favour of the buyer.

August was without recovery in value; business to a tolerable extent accomplished.

September proved the worst month of the year, the unit having fallen to 3d; demand very slow.

October was, if anything, rather better in general tone, but without any quotable advance in currency. A fair amount of transactions.

November was decidedly better all round; manufacturers apparently operating with more confidence. Large business done, and prices quite ½d a 1d per unit higher.

December passed without any noticeable change: and so ended a year most discouraging to all concerned in the cultivation of and trade in Bark! As regards the supplies of last year, it will be observed that from Ceylon there has been again a considerable increase; the total receipts having reached 15,365,000 lb.

Against	11,678,360	„	in	1884-5
Against	11,500,000	„	in	1883-4
Against	7,000,000	„	in	1882-3
Against	3,100 000	„	in	1881-2
Against	1,200,000	„	in	1880-1

The supplies of Java Bark shew some, though not material, increase upon the receipts of the previous season.

In 1882	to	1883	they were	735,381 lb.
1883	to	1884	„	989,158 „
1884	to	1885	„	1,321,569 „
1885	to	1886	„	1,771,420 „

There has been some little augmentation of our supplies from South America; but it may nevertheless be assumed that, except in the case of Calisaya, actual cutting has altogether ceased, prices being so utterly unremunerative.

The following are the imports of the last six years:—

	South American.	Ceylon and India.	Total.
1881	pkgs. 99,970	15,390	115,360
1882	„ 95,940	21,630	117,570
1883	„ 53,780	31,330	85,110
1884	„ 21,075	37,300	58,375
1885	„ 5,290	50,410	55,700
1886	„ 10,500	59,700	70,200

Last year, contrary to the two preceding years, our deliveries fell just a little short of our receipts. The official dock and wharf returns of bark actually warehoused between the 1st January and the 31st December render the following:—

	landed pkgs.	delivered.		
1884	59,287	78,532	19,245	more dlvd. than imptd.
1885	55,343	74,094	18,751	do. do. do.
1886	70,195	68,986	1,209	less dlvd. than imported

The said docks and wharves return the stock of all sorts of medicinal bark, at the end of each of the last three years, as follows:—

1884	... ...	80,500	packages.
1885	... ...	62,117	„
1886	... (stock corrected)...	62,350	„

We commenced the past year with a steady market at the following prices for fine qualities, viz.:—

Calisaya Quill ...	(say 5 per cent. Bark)	2s 0d per lb.
New Granadian		2s 6d „ *
Soft Columbian		1s 6d „
Cuprea		1s 2d „
Carthagena		1s 3d „ †
Ceylon		0s 4½d a 0s 5d „ ‡

* Quite nominal, no supply. † Quite nominal, no supply. ‡ Per unit.

We closed the year at the following disastrously low quotations for fine qualities:—

Calisaya Quill ...	(say 5 per cent. Bark)	1s 6d per lb.
New Granadian		— „ *
Soft Columbian...		1s 2d „
Cuprea		0s 10d „
Carthagena		0s 11d „ †
Ceylon		0s 3½d „ ‡

* No quotation in the continued absence of supply. † Practically no supply. ‡ Per unit.

SULPHATE OF QUININE.—Low as were the prices at which we commenced the year, they continued to fall with scarcely any interruption for ten months: and although there was some little recovery in November and December, they closed at an average decline of 8d per oz. for the year. German Quinine has fluctuated more than that of any other country; speculation in that manufacture being the most rife. The consumption of Sulphate of Quinine must have been very large, especially in America.

Fluctuations were as follows:—

English—Highest—3s 2d per oz. in bulk.
Lowest 2s 4d per oz. in bulk

French—Highest—3s 0d per oz. in bulk.
Lowest 2s 2d per oz. in bulk.

German—Highest—2s 10d per oz. in bulk.
Lowest 1s 11d per oz. in bulk.

Italian—Highest—2s 9d per oz. in bulk.
Lowest 2s 0d per oz. in bulk.

The following table shews the fluctuations for the month—in bulk: 2d per oz. more in bottles:—

	English. per oz.	French. per oz.	German. per oz.	Italian. per oz.
January...	3 2	3	2 9 to 2 10	2 9
February	3 1	2 10 to 2 11	2 8 to 2 9	2 9
March ...	3 1 to 3	2 10	2 8 to 2 9	2 9
April ...	3	2 10	2 8 to 2 9	2 9
May ...	2 10	2 8	2 7½ to 2 6	2 7
June ...	2 10	2 8	2 5 to 2 3	2 4 to 2 3
July ...	2 10 to 2 8	2 8 to 2 4	2 3 to 2	2 3 to 2 1
August ...	2 8 to 2 6	2 3 to 2 4	2 1 to 2	2 1
September	2 1	2 2	2	2
October ...	2 4	2 2	1 11 to 2	2
November	2 4 to 2 6	2 2 to 2 4	2 1 to 2 3	2 2 to 2 3
December	2 6	2 3	2 3	2 3

	1886.	1885.	1884.	1883.	1882.	1881.	1880.	1879.	1878.	1877.	1876.
IMPORTS OF BARK.											
Calisaya, serons and bales ..	4,000	against 2,600	2,600	2,770	6,310	7,020	6,580	9,190	7,835	6,800	3,440
Soft varieties, Columbian, Cartha-											
gena, &c... .. }	6,500	do } 53,100	55,760	82,340	111,250	108,340	71,670	49,480	37,415	24,520	17,295
Hard varieties, New Granadian,											
Cuprea, Pitayo, &c.. ..	59,700	do }									
Ceylon and East Indian ..											
DELIVERIES.											
Calisaya, serons and bales ..	4,350	do	2,070	6,170	4,310	6,720	4,005	8,585	7,865	6,305	5,065
Soft varieties ,, ..											
Hard varieties and East Indian	64,650	do	77,400	60,770	80,160	97,620	60,285	44,965	35,910	20,860	32,085
and Ceylon, serons and bales ..											
STOCK AT END OF YEAR.											
Calisaya, serons and bales ..	2,600	do	3,089	3,630	3,100	6,500	4,500	4,200	1,625	1,025	1,060	565
Soft varieties ,, ..											
Hard varieties and Ceylon and	59,700	do	56,700	75,730	97,370	65,800	31,700	23,970	12,580	8,065	6,560	2,900
East Indian, serons and bales ..											
PRICE OF											
* Yellow Calisaya, 31st De-	1s 5d	do	2s 0d	2s 6d	3s 9d	5s 4d	6s 6d	7s 6d	8s 0d	5s 6d	6s0d	
cember, per lb.											
Sulphate Quinine, 31st December	2s 8d	do	3s 4d	4s 8d	8s 0d	8s 6d	10s0d	11s 0d	11s0d	10s 6d	11s 0d	
in bots. per oz.											

* New terms for 1882 to 1886, equal to about 6d per lb. more than old terms.

Our imports for the past seven years were thus made up—

	1886.	1885.	1884.	1883.	1882.
Calisaya	4,000	2,600	2,600	2,770	6 310
Soft Columbian New Granadian and Hard Pitayo ...	6,500	2,690	16,960	49,830*	84,150
Carthagena	nil	nil	1,510	1,180	5,470
Ceylon† and East Indian	59,700	50,410	37,300	31,330	21,630

	1881.	1880.	
Calisaya ...	7,020	6,580	serons and cases
Soft Colombian... New Granadian and Hard Pitayo ...	87,200	44,500	,, and bales.

* These totals for 1885, 1884, 1883. 1882 and 1881 also include Cuprea, the imports of which were, in 1885, about 440 packages against in 1884 about 11,600 packages against in 1883 about 40,000 packages against, in 1882, about 67,000 packages. and in 1881, about 60,000 packages.

Carthagena ... ... 5,720 6,480 „ „
Ceylon* & East Indian... 15,400 20,690 packages.

The receipts in America have become very unimportant. In the following table the quantities for 1885-86 are without rejections, *i. e.*, bark worthless for the manufacture of Sulphate of Quinine.

	1886.	1885.	1884.	1883.	1882.	1881.
Packages...	2,700	3,900	8,150	11,250	28,000	31,400
	1880.	1879.	1878.	1877.	1876.	1875
Packages	32,800	46,700	41,000	23,400	32,400	35,150

Stocks at the end of the year without rejections

	1886.	1885.	1884.	1883.
Packages ...	930	1,500	2,600	6,200

Imports into France continue to be very small; they were, last year, of all sorts,

	About pkgs.	
	2,272	
Against in 1885...	2,417	
do 1884...	9 270	
do 1883...39,660		
do 1882...10,680	Calisaya, & about pkgs. 28.977*	Columbian, New Granadian, &c.
do 1881...	9.915 ,,	16.550 ,,
do 1880 ..	8,590 ,,	11.580 ,,
do 1879...	8,030 ,,	7.960 ,,
do 1878...	7,120 ,,	4 829 ,,
& do 1877..	4.800 ,,	3 100 ,,

* Of these imports about 12,000 were Cuprea.

The stocks in France on the 31st December were as follows:

1886.	1885.	1884.	1883.	1882.	1881.	1880
pkgs.	pkgs.	pkgs.	pkgs.	pkgs.	pkgs.	pkgs
7,403	8,567	11,200	18,280	15,780	8,040	8,400

Your obedient servants,
LEWIS & PEAT,
Brokers.

TEA IN LONDON.

(*Special telegram for the "Observer"*)

This morning we received the following details in a telegram which was despatched from London yesterday at 3-35 p.m.:—

The quantity of Ceylon tea offered during the week was 2,741 packages, of which 2,199 sold at an average of thirteen pence. The tone of the market is duller.

To the above we add the following, for which we are indebted to a leading merchant:—

"I regret to say a telegram from London reports the tea market not so good; that quality is falling off, and that prices are down 1½d a lb.

"Probably teas are getting home from bushes pruned towards the end of last year."

Our correspondent may possibly be correct as to the cause of the falling off, but mere season, apart from pruning it would seem to affect the quality of tea, as was shewn in the quotations made by Mr. Cochran in his paper on Coca leaves and their alkaloids.

On turning to the paper referred to by Mr Cochran, we find that it is stated in the *Journal of the Chemical Society*, with reference to a paper on the Composition of Tea-leaves, by O. Kellner (*Landw. Versuchs-Stat.*, 1886, 370—380). "—The chief interest in this research lies in the fact that it is almost the only case in which an evergreen plant has been systematically examined throughout the year."

Then come the purely technical details of the drying and chemical treatment so as to obtain the proportions of theine, tannic acid, &c. We quote the conclusion of the paragraph:—

"The fluctuation in the percentage of water is less than that observed in leaves of deciduous trees; the percentage of ash lies between that found in the needles of pines and in ordinary leaves. It will be

* The imports from Ceylon in 1886 as in 1885 and 1884 contain many very large packages.

noticed that the non-albumonoid nitrogen is almost wholly absent during the later stages of growth, being found as theine. Connecting this with the fact that albumin has increased, and that no theine is found in the seeds, the author believes that positive proof is afforded that the alkaloid, like glutamine and asparagine, is a decomposition product of albumin, and is capable of again forming albumin.

"As regards the ash, we have here a regular increase, whilst in deciduous trees is found both diminution and increase."

Tables are given showing the constituents of the leaves gathered at different seasons of the year, from which we gather that the precentages in dry leaves vary largely at different dates. For instance, theine gave in May 2·85 and 2·80, going down steadily to 1 30 and 1·00 in November. Tannin, on the other hand, which showed only 9·67 and 8·3 in May rose to 11·34 and 12·16 in November. The amount of ash rose from 4·69 in May to 5·11 in September, going down to 5·00 in November. "Ethereal Extract," on which, probably, the aroma of tea chiefly depends, varied so enormously as from 6·42 in May to 2·19 in November. —The water in *fresh* leaves, went down from 76·83 in May to 59·43 in November. "Old leaves" (fresh) gave 60·03 of water, in May against 76·83 in young leaves (flush, of course). Theine in the old leaves was only 0·84 and tannin 11·11. Ash gave 5·14 and ethereal extract 14·18.

In 100 parts of ash, excluding carbonic acid, potash showed 49·06 in May, going gradually down to 17·31 in November. Lime, on the other hand, rose from 11·95 in May to 30·37 in November, Magnesia likewise rose from 8·69 in May to 17·99 in November. Soda went up from 1·07 in May to 2·76 in November. Peroxide of iron rose from 3·80 in May to 11·37 in November. On the other hand phosphoric acid sunk from 15·63 in May to 10·70 in November. Sulphuric acid varied only from 3·75 in May to 4·02 in November. Oxide of manganese, silica and chlorine, we need not quote. It is striking to note that the ash of old leaves in May gave only 14·20 potash against 49·06 in young; lime in old leaves was nearly double; magnesia more than double; peroxide of iron much more than double, but phosphoric acid only 10·64 against 16·67; sulphuric acid being 4·41 against 3·75.

It thus appears that in the two important constituents of potash and phosphoric acid, young leaves (of which we make tea) are far in advance of old leaves while the latter contain a far larger proportion of lime.

But the changes in the constituents of the young leaves from the hot summer month of May down to the winter month of November (the experiments having been, we presume, conducted in India), are the most interesting results. Of course the extremes of heat and cold in Ceylon are but slight as compared with India; but still they must be operative, and we cannot doubt that much of the tea now selling at low prices in London was most injuriously affected by the bitterly cold winds which swept over Ceylon in December.

LIFE IN NEW ZEALAND.

(By an ex-Ceylon Colonist)

South Riverton, 1st Jan. 1887.

This is a quiet spot in the very South of New Zealand where I have come from Invercargill to spend a holiday. I have now been pretty well all over the country and am quite a different man in health to what I was latterly in Ceylon. The question as to what one should eat and drink never troubles one here, the food being good and wholesome and stimulants not being required. No flannel belts now! You will be expecting an account of the country and my difficulty is where to begin. So for the moment I shall try to imagine myself in Ceylon and then write to you about the things a Ceylon man would like to know about.

CLIMATE.—For health the climate of New Zealand is very good. For comfort it is not so admirable, as taken all round it is much windier than the Old Country and in some places—notably the Canterbury Plains, hot winds come occasionally. It can be very dusty too in dry weather. There are great varieties of climate from wet Southland and Otago to dry Hawkes Bay in the North Island. Upon the whole it is warmer than the British Isles.

SOIL is generally of a light clayey appearance, and a stranger is astonished to see some of it yield 20 tons of potatoes to the acre, and 75 bushels of oats to the acre. But it varies very much in fertility. Hawkes Bay, the Canterbury Plains, the Taeri Plains near Dunedin and some of the Southland Province, are considered the crack districts, but there are many other places of smaller extent that can cope with them. There is plenty land yet to be taken up as good as any now in cultivation. The South Island has been most opened up, owing to the Maori troubles in the north, and were I coming here to farm I think I should select a spot in the North Island. Land can be got there now that will by-and-bye carry 10 sheep to the acre.

SCENERY.—The mountains and bays of the west coast in the South Island are magnificent, but as few people go there they are lost to view. There are some views of bold scenery about Dunedin, and lovely places of a quieter kind at Auckland, but altogether the inhabited parts of New Zealand are somewhat tame. As the country gets older, and English trees grow up it will look better. The bush has the same appearance all over the islands and it is so vast and dense that no pretty peeps of waterfalls and glades can be obtained as in Ceylon.

PLANTS &c.—Despite the great variety of plants there is monotony to the eye owing to the predominance of the Tea* tree so called, the fern, and in the South Island the Tussack grass. At the Bluff in Southland there is tea tree and fern, and at the north of the North Island there is tea tree and fern. The stunted-looking palm called the cabbage tree grows all over New Zealand, but in the north there are several other palms and the celebrated Kauri pine which does not grow in the south. If a railway is anywhere made through the densest bush, clover and English thistles at once spring up on its sides. I was astonished to discover in thick bush the homely old Musk which has found here a congenial home. Docks and sorrel abound, perhaps owing to careless farming.

FRUIT-GROWING IN KENT.—In consequence of the ruinously low prices obtained for last season's fruit crop, a large number of growers in Kent have grubbed their orchards. This has been done even in cases where the crop of 1886 was the most prolific on record, the growers stating that it would not be worth their while to grow fruit and sell it at the prices of last season, which, in hundreds of instances, did not pay the cost of picking and carriage.—*St. James's Budget.*

* Properly Ti.—ED.

CEYLON UPCOUNTRY PLANTING REPORT.

COFFEE CROPS IN THE KANDYAN DISTRICT—THE NEW TEA ROLLER OF KINMOND AND RICHARDSON—KANDY AGRI-HORTICULTURAL SHOW—SUCCESSFUL FLOATING OF A LOW COUNTRY TEA COMPANY—TEA CLEARINGS BURNT OFF ON SUNDAYS—CARDAMOM PLANTING—CHEAP LABOUR.

28th Feb. 1887.

In all the Kandyan districts and especially in Dumbara there has been a fine blossom on the coffee. It has been very magnificent in Dumbara, as much as eight cwt. an acre said to have been out. The rain which followed a few days later must have given it every chance to set, and although a set blossom in that part is not by any means a harbinger of a sure crop, still it is so far on the way. There is more blossom still to come, so that the trees will have enough to do to carry it.

The new roller of Kinmond and Richardson is doing gook work, I learned. One who has seen it at work speaks of it as "a stylish machine," being "neatly made, nicely fitted and very compact." He adds: "We put in 300lb. of leaf for a roll, although it will take up to 450lb. and the work was splendidly done. The leaf was well withered and the machine had every chance of showing what it could do, and I must say it proved to us all present that it was able to do good work."

At the Agri-Horticultural Show which is to be held in Kandy if each maker would forward a specimen roller there would be a fine opportunity for the public seeing the different machines, and especially if they were in motion, which ought to be arranged. A reward for the best tea rolled on the spot might well find a place in the prize list, and what would hinder the firing off of the samples in one of the driers which might be on exhibition? An opportunity would then be given of comparing the merits of the different makers, such as otherwise would be impossible. The made teas might also be judged. I incline to think, that for planters at any rate this part of the exhibition, if carried out, would be as popular as any and not without value in an educational light.

One of the lowcountry tea Companies—which was held to be bound to come to grief from the number of V. A.'s which had shares—is doing very well and full of much promise. It is said that they expect to declare a dividend of 20 per cent next year! Happy shareholders! If this fine return does come how these V. A.'s will open their eyes? As to the croakers who saw in the accumulated wisdom of the V. A.'s a source of danger which might wreck any enterprise, even the most promising, they may safely be left to come to a better state of mind, and recognize somehow that the Company has been mercifully preserved.

It is strange how such things at times come about. I know a tea clearing which was burnt off on a Sunday, the Sinhalese contractor deeming that a lucky day—and which immediately became the subject of prophecy. With a fine sense of justice, it was sure by those who took up their parable that the effect of this supposed breach of the fourth commandment, would bring with it disaster, not on the Sinhalese sinner nor on the European manager, but on the innocent proprietors in England, who had no say in the matter. The clearing would never thrive, it was said, and from its earliest date it inherited a curse. But like threatened men, who live long, cursed estates don't do badly, and the clearing in question can today be favourably compared with any I know. I am very glad it is so: otherwise one's sense of what is right would have been confused past all hope.

In a quiet way in different districts there is land being prepared for the planting of cardamoms during the next S.-W. monsoon. Those who pretend to know say "Now's the time," and hold out prospects of a good return.

Group of coolies are on the move, and kanganies seek employment for them at moderate advances. Many estates have men at the Coast recruiting and more are going. This is really the way to solve the labour difficulty, and not go on buying up gangs here at enhanced rates.

PEPPERCORN.

PEARL.

Pearl.—A peculiar product of certain marine and fresh water molluscs or shell fish. Most of the molluscous animals which are aquatic and reside in shells are provided with a fluid secretion with which they line their shells, and give to the otherwise harsh granular material, of which the shell is formed, a beautifully smooth surface, which prevents any unpleasant friction upon the extremely tender body of the animal. This secretion is evidently laid in extremely thin semi-transparent films, which, in consequence of such an arrangement, have generally a beautiful irridescence, and form in some species a sufficient thickness to be cut into useful and ornamental articles. The material itself in its hardened condition is called nacre by zoologists, and by dealers Mother-of-Pearl. Besides the pearly lining of the shells, detached and generally spherical or rounded portions of the nacre are often found on opening the shells, and there is great reason to suppose these are the result of accidental causes, such as the intrusion of a grain of sand or other substance, which, by irritating the tender body of the animal, obliges it in self-defence to cover the cause of offence, which it has is no power to remove; and as the secretion goes on regularly to supply the growth and wear of the shell, the included body constantly gets its share, and thereby continues to increase in size until it becomes a pearl. The Chinese avail themselves of the knowledge of this fact to compel one species of fresh-water mussel, Unio Hyria, to produce pearls. In order to do this, they keep the Unios in tanks, and insert between the sheil and the mantle of the animal either small leaden shot or little spherical pieces of mother-of-pearl. These are sure to receive regular coatings of the nacreous secretion; and after a time look like pearls formed under ordiuary circumstances. These curious people also practise another trick upon these animals; they insert small images of the Buddha stamped out of metal, which soon become coated with the pearl secretion, and are cemented by it to the shells; to those ignorant of its origin, the phenomenon is a supernatural testimony to the truth of Buddhism. Examples of these curiosities are to be found in many of our museums.

A plan of making pearls was suggested to the Swedish Government by Linnœus. It consisted in boring a small hole through the shell of the river mussel, and inserting a grain of sand, so as to afford a nucleus for a pearl. The plan at first succeeded sufficiently well to prove its practicability, and he was rewarded by a sum of money (£450) but it failed as a profitable speculation, and was abandoned.

The exact nature of the secretion has never been satisfactorily determined; it is, however, ascertained that it is deposited in thin films; which overlie each other irregularly, and to this peculiar disposition of the plates, the beautiful irridescence of common pearls is attributed. This formation was a great puzzle to the ancients, amongst whom they were highly prized. Dioscorides and Pliny mention the belief that they were drops of dew or rain which fell into the shells when opened by the animals, and were then altered by some power of the animal into pearls. This opinion which, obtained all over the east, is thus charmingly alluded to by Moore:—

"And precious the tear as that rain from the sky,
Which turns into pearls as it falls in the sea."

The most famous pearls are those from the east: the coast of Ceylon, or Taprobane as it was called by the Greeks, having from the earliest times been the chief locality for pearl fishing. They are, however, obtained now of nearly the same quality in other parts of the world, as Panama in South America, St. Magarita in the West Indies, the Coromandel Coast, the shores of the Sulu Islands, the Bahrim Islands, and the islands of Karak and Corgs in the Persian Gulf. The pearls of the Bahrim fishery are said to be even finer than those of Ceylon, and they form an important part of the trade of Bassora. These, and indeed all the foreign pearls used in jewellery, are produced by the pearl oyster. The shells of the molluscs which yield the Ceylon, Indian and Persian ones, are sometimes as much as a foot in diameter, and are usually about nine inches. Those of the New World, although the shells are smaller and thicker, are believed to be the same species. The chief locality of the Ceylon pearl fishery is a bank about 20 miles long, 10 or 12 miles from shore, opposite to the villages of Condatchy and Arippo on the northern coast. The season of the fishery lasts about three months, commencing at the beginning of February, and is carried on under Government regulations. The boats employed are open, and vary in size from 10 to 15 tons burden; they put out at night, usually at 10 o'clock, on a signal gun being fired from the fort of Arippo, and make for the Government guard vessel, which is moored on the bank, and serves the double purpose of a guard and a lighter-ship. The divers are under the direction of a manager, who is called the Adapanaar, and they are chiefly Tamils and Moors from India. For each diver there is provided a diving stone, weighing about 30 pounds, which is fastened to the end of a rope long enough to reach the bottom, and having a loop made for the man's foot; and in addition to this, a large network basket, in which to place the pearl oysters as he collects them. These are hung over the sides of the boat; and the diver placing his foot in the loop attached to the stone, liberates the coils of the rope, and with his net basket rapidly decends to the bottom.

To each boat there is usually allotted a crew of 13 men and 10 divers, 5 of whom are descending whilst the others are resting. This work is done very rapidly; for, notwithstanding the stories to the contrary, the best divers cannot remain longer than 80 seconds below, and few are able to exceed 60. The greatest depth they descend is 13 fathoms. When the diver gives the signal by pulling the rope, he is quickly hauled up with his net and its contents. Accidents rarely happen; and as the men are very superstitious, their safety is attributed to the incantations of their shark-charmers, performed at the commencement of the fishing. Sir E. Tennent, however, attributes the rarity of accidents from sharks, usually so abundant in tropical seas, to the bustle and to the excitement of the waters during the fishery frightening away the dreaded creatures. The divers are sometimes paid fixed wages: others agree for one-fourth of the produce. When a boat-load of oysters has been obtained, it returns to shore, and the cargo, sometimes amounting to 20,000 or 30,000 is landed and piled on the shore to die and putrefy, in order that the pearls may be easily found. The heaps are formed in small walled compartments, the wall surrounding each being about one or two feet in height. Several of these compartments surround a small central enclosure, in which is a bath, and they slope towards this bath, and are each connected with it by a small channel, so that any pearls washed out from the putrefying mass by the rain may be carried into the bath. When the animals in the shell are sufficiently decomposed, the washing commences, and great care is taken to watch for the loose pearls, which are always by far the most valuable; the shells are then examined, and if any attached pearls are seen, they are handed over to the clippers, who, with pinchers or hammer, skilfully remove them. Such pearls are used only for setting; whilst the former, being usually quite round, are drilled and strung and can be used for beads, &c. The workmen who are employed to drill the pearls, also round the irregular ones, and polish them with great skill. The method of holding the pearls during these operations is very curious; they make a number of holes of small depth in a piece of dry wood, and into these they fit the pearls, so that they are only partly below the surface of the wood, which they then place in water. As it soaks up the water and swells, the pearls become tightly fixed, and are then perforated, &c. These operations are all carried on, on the spot.

For many miles along the Condatchy shore, the accumulation of shells is enormous, and averages at least four feet in thickness. This is not to be wondered at, when it is remembered that this fishery has been in active operation for at least 2,000 years. The place itself is exceedingly barren and dreary, and, except during the fishing season, is almost deserted; but at that time it presents an exceeding animated spectacle; thousands of people of various countries and castes, are here drawn together, some for the fishery, others to buy pearls, and others to feed the multitude. They chiefly reside in tents so that it appears a vast encampment.

The pearls vary much in size; those as large as a pea, and of good colour and form, are the best, except unusually large specimens, which rarely occur, the most extraordinary one known being the pearl owned by the late Mr. Hope, which measured two inches in length, and four in circumference, and weighed 1,800 grains. The smaller ones are sorted into sizes, the very smallest being called seed-pearls. A considerable quantity of these last are sent to China, where they are said to be calcined, and use in Chinese pharmacy. Amongst the Romans the pearl was a great favorite, and enormous prices were paid for fine ones. One author gives the value of a string of pearls at 1,000,000 sesterees, or about £8,000 sterling. The single pearl which Cleopatra is said to have dissolved and swallowed was valued at £80,729, and one of the same value was cut into two pieces for earrings for the statue of Venus in the Pantheon at Rome. Coming to latter times, we read of a pearl, in Queen Elizabeth's reign, belonging to Sir Thomas Gresham, which was valued at £15,000 and which he is said to have treated after the fashion of Cleopatra; for he powdered it and drank it in a glass of wine to the health of the Queen, in order to astonish the ambassador of Spain, with whom he had laid a wager that he would give a more costly dinner than could the Spaniards.

During the occupation of Britain by the Romans this country became famous for its pearls, which were found in the fresh water mussel of our rivers. Generally the pearls of these molluscs are small, badly coloured, and often valueless; but occasionally they occur of such beauty as to rival those of the pearl oyster. Some years ago, in the Scotch rivers, the search for pearls was prosecuted vigorously, especially by a merchant named Unger, of Edinburgh, who had brought Scotch pearls into great repute. He collected specimens ranging, as was stated, from £5 to £90 each and formed a necklace said to be worth £350. In Scotch pearls of the highest quality, there is a pleasing pinkish tint, which is very permanent. The fishing for pearl mussels is by no means so dangerous or troublesome as for pearl oysters; usually they are found in the beds of streams, shallow enough to wade in, and so clear that they can see the bottom. If too deep to remove with the hand, they are easily captured by putting a stick between their gaping shells, which instantly close upon it, and can be drawn out with it. So profitable did this pursuit become, that a great many persons engaged in it.

Very fine river pearls, known on the continent as Bohemian pearls, are found in the rivers Moldan and Wottawa. There is also a fresh-water pearl fishery in Bavaria, where the river Iltz yields at times very fine specimens. Even the most inferior pearls can only be properly polished with pearl dust, and the inferior pearls are powdered for the purpose of polishing and rounding the finer ones.

False pearls are very admirable imitations, made by blowing very thin beads or bulbs of glass, and pouring into them a mixture of liquid ammonia, and the white matter from the scales of the Bleak and sometimes of the Roach and Dace. The proper way to prepare the

pearl-matter is first to remove the scale of the lower part of the fish; these must then be very carefully washed, after which they are put to soak in water, when the pearly film falls off and forms a sediment at the bottom of the vessel, which is removed and placed in liquid ammonia for future use. This pearl mixture, when of the best quality, is very costly, being as much as £4 or £5 per ounce. For use, it is diluted with ammonia, and injected into the glass beads, so as to thinly coat them inside; afterwards the better kinds have melted white wax poured in, which renders them more durable. The French and Germans produce in this way imitations of the finest oriental pearls of such beauty, that the most practised eye can hardly detect the difference. The bleak is procured in considerable quantities for this purpose from the Thames and other rivers in England.

The invention of artificial pearls is due to a Frenchman, named Jaquin, in the time of Catherine d'Medici, and the manufacture is now chiefly carried on in the department of the Seine, where great improvements have lately been made, especially in the art of giving the irregular forms of large pearls to the glass-bulbs, and thus increasing the resemblance, and in removing the glassy appearance caused by the exterior glass coating, by exposing it for a short period to the action of the vapour of hydrofluoric acid. Mucilage of fine gum-arabic is also used instead of wax, which increases the translucency, gives greater weight, and is not liable to melt with the heat of the wearer's body—a defect to which those filled with wax are very liable.

Roman pearls differ from other artificial pearls, by having the coating of pearly matter on the outside, to which it is attached by an adhesive substance. The art of making these was derived from the Chinese.

Mother-of-Pearl, the shells of the large bivalve mollusc, *Meleagrina margarifera*, which also produces the precious pearls.* These shells are collected in vast numbers in the tropical seas, chiefly on the coast of Ceylon, Manila, Cuba, Panama, and the South Sea Islands. Those from Panama are small and thick, and are known in commerce as "bullock" shells; those from Manila are finest in quality, often as much as a foot in diameter, round and flat. There are two varieties—the white or silver lipped and the black lipped. So enormous is the trade in these shells, that the imports of this country alone amounted to 3,000 tons per annum, the value of which is nearly £100,000. Although large quantities of these shells are consumed in inlaying fancy wood-work, papier-mache and in making knife-handles and other small ornamental objects, by far the greater portion is required for making buttons, chiefly in Birmingham.—*The British North Borneo Herald.*

To the Editor of the "British North Borneo Herald."

Sir,—Without wishing any criticism to be implied on the Early Notices of North Borneo and Sulu from Chinese Sources which were printed in your issue of the 1st instant, I should like to remark that I was especially struck by the weight of the pearl mentioned in the following passage:—"In the year 1421 (A.D. is supposed to be understood) the mother of the Eastern King (King of Sulu) sent to Court a brother of her late husband, called Paduka Suli; he presented as tribute a large pearl weighing more than *seven taels*." Now seven Chinese taels are equal 4,137 2/5 grains Troy, which if valued at the present valuation of pearls, presuming the pearl in question to have been of the first quality, would give the grand sum of £41,374. In the estimation of the Chinese it may have possessed a still higher value, seeing the fabulous prices they sometimes put on pearls. That which Julius Cæsar presented to the mother of Marcus Brutus was valued at £48,417 10s; and the one which Cleopatra, in her desire to expend in one feast a larger sum than Mark Anthony had done in his most sumptuous feasts, swallowed with a draught of vinegar; cost about £30,729 35s 4d. The pearl obtained by Philip II of Spain in 1587 from the island of Margarita off the Columbian Coast which weighed 250 carats or 800 grains was valued at $150,000.

To those celebrated pearls just noted must now be added (if credence is to be placed in the Early Notices of Borneo and Sulu from Chinese Sources) the above remarkable one presented by a Queen of Sulu to the Hông-Te of the Kingdom.—Yours, &c. Chin-Chu.

* This is a curious error. Mother-o'-pearl is procured chiefly from large shells of quite a different species.—Ed.

NOTES AND QUERIES.

Green Tea.—"C" is right in saying that more green tea is sold in this country than in Europe. The reason for its popularity here is, no doubt, as a recent English writer has observed, in a great measure due to our intercourse with Japan, where green tea alone is manufactured. In the making of tea, as in everything which this curious people do, the Japanese have a way of their own. It would startle an Assam planter to see them in picking time squatting down before the trees and stripping the branches of the leaves, instead of scientifically selecting only the young, undeveloped leaf, the first leaf below that, and half the second, from which would be evolved respectively "Broken Tips" or "Orange Pekoe," "Pekoe" and "Souchong." Any one accustomed to the elaborate machines for "rolling" and "firing" the leaves which are in use on European plantations might be amused at the Japanese method, where the workers roll and squeeze and twist the leaves in their hands on parchment stretched over a charcoal fire. Very fine teas are, nevertheless, manufactured by the Japanese, and in the celebrated district of Uji rumour tells of tea worth $16 per pound, though it is not definitely stated whether that price has ever actually been paid for it. Moreover, in the case of teas intended for export, only so much work is done upon them as will enable them to be sent to the "tea-firing godown" of Yokohama, where they are worked up for the market before being shipped. As is now well known, the difference between green tea and black lies in the fact that in the former fermentation has been arrested by "firing," the color of the leaf being in this way partially preserved and fixed; with the latter, by a much longer process, fermentation up to a certain point is permitted, and the leaves are not "fired" until they have become oxidized by exposure to the air. In Japan the leaves, after being picked and "whithered" by a short exposure, are fired in the way described above sufficiently to stop fermentation, and in this partially-cured state are sent to the European tea merchants, by whom they are again "fired." In the "godowns" of Yokohama hundreds of women can be seen at work turning the leaves over and over and round and round in large basins built over a charcoal fire. The coloring or "painting" is also done at this period by means of a spoonful of indigo and powdered soapstone put into each basin, and thus disseminated through its contents. But in Japan tea is not grown for export only, but is the chief article of home consumption; and these domestic teas as procured in the country are probably the only samples of unadulterated green tea which foreigners are likely to meet with. They produce a beverage which is refreshing, quite harmless, and which, notwithstanding the way in which it is prepared, can, after only a short residence in the country, be readily distinguished from hot water.—*American Cultivator.*

A new "everlasting" Wood Pavement has been brought out in France. The wood blocks are boiled in a solution of sulphate of copper, sulphate of zinc and chloride of sodium, mixed with a heavy mineral oil, linseed oil and tallow. The blocks are afterward compressed to about one-tenth their original volume. In this state they are said to practically defy wear and tear.—*Journal of Forestry.* [Our Municipal Councillors ought to "put their heads together" in order to supply wooden pavement to some of the principal streets of Colombo.—Ed.]

Fifteen years ago, the net forest revenue of British India was £50,000. Now it is £100,000. Forest culture has brought about the change.—*Journal of Forestry.*

FRATER'S PATENT DUPLEX TEA ROLLER.

Writing from Aberdeen under date 1st February, Mr. Frater says :—"I am sending you by this mail a set of three photos of my Tea Roller, made at home. The first consignment was shipped about a month ago to Messrs. Brown, Rae & Co., Hatton, and a second lot is being pushed rapidly on. No. 1 card shows the machine with gear to drive by belts; No. 2 showing the machine without driving gear; No. 3 showing the machine open. This last photo shows the entire principle of the machine, which (as, of course, you know) is 3 discs, the centre one going the opposite way to that of the two outer. The machine should really be called the 'Duplex' Tea Roller. You will see from the photos that the design is thoroughly substantial throughout. The cylinder is of cast-iron, lined with brass, and the discs the same. On the faces of the latter are fixed teakwood battens. The pressure is applied to the leaf by means of a worm screw and quadrant lever fixed to outer discs. The machines now being sent out are a great improvement on those of the same made in Ceylon. I have bestowed a great deal of thought on them, and, having the advantage of fine machinery here for their manufacture, I hope to have a share of Ceylon's demand. . . . Ceylon tea is rapidly getting into favour in the north here, and is well advertised in the newspapers and shop-windows. China tea will soon have no place at all !"—The photographs referred to are now for inspection at our office.

THE PLANTING "MOLESWORTH*."

"The Planter's Note-book" which is intended for the pocket of the tropical planter is a start in the right direction. The model on which the lines are laid, of this new venture of the *Observer* Press, and from which it takes part of its name—'The Planting Molesworth"—is so good. and so likely to lead to good, that I am reminded of the Scotch proverb, "He'll shoot higher that shoots at the moon, than he that shoots at the midden, e'en though he may miss the mark"

For a first, or even a second or third edition of a "Planting Molesworth" to attain to the excellence of the famous original, although not a hopeless aim, is certainly a high end: and it is manifestly clear that the publishers, Messrs. A. M. & J. Ferguson, intend to put "their best foot foremost," and do all in their power to make "The Planter's Note-book" a grand success, when they have taken the engineering "Molesworth" as their model, and invited comparison by adopting its name.

The planters will have to remember, however, that ere this—the latest heir of a noble name—can resemble even in part the high qualities of its eminent predecessor, their help will be needed; for the practical information which must be supplied to bring this desirable likeness out, is to be found, not so much at [illegible] office of the compilers, as in the field and fact[illegible], and among the every-day work of an estate. [illegible]lready it is pleasing to see, that suggestions are appearing in the *Observer* columns, by selecting and adopting the best of which the value of the next edition of the "Planting Molesworth" will be materially increased.

As to the present edition, the title-page gives a fair idea of the comprehensiveness of the public catered for. It runs as follows:—"The Planters' Note-book with every-day information for the tea planter, and also for planters of coffee, cinchona, cacao, rubber, cardamoms, coconuts, cinnamon &c., with useful hints on machinery, buildings, &c., also manuscript note-book for field and factory or store." And in the 52 pages of letter-press with which the "note-book" opens, the grower of any of the above products will find in a highly-condensed form, figures and facts to refresh the memory of the old hand, or to guide the ways of the beginner. As an example take: "Cardamoms 100 lb. green—about 24 lb. dry.

Per Day:

A cooly can cut about 12 lb. Malabar
" pick " 18 " Mysore
" clip " 5 " Dry Malabar

Average cost of production 35 to 40 cents per lb. Frieght and home charges 3d to 4d per lb. Chests could contain 100 lb. nett."

Now this information useful as far as it goes is not all which might be given under the heading of cardamoms. The cost of planting and curing, and the best methods of carrying out the latter, not to mention aught else might well have been added.

Indeed the leading fault of this first edition is its want of plan. Why was the cost of work in planting cacao given, and similar information in regard to cardamoms withheld? Why are we told how to cure coffee, and not a word given about the manner of curing tea? In compiling a book of this kind there ought to have been prepared first of all a carefully drawn up series of questions on the points where the culture of all Eastern products touch, and then after that queries on the special ones. By this means there would have been less chance of such omissions as I have referred to. This was more especially called for as "The Planting Molesworth" aims at supplying a general want in the East, a tropical planter's *vade mecum*, in fact.

The information under the heading of "tea" is very full and of an exceedingly varied character. You can learn all about tea seed, the average task of a cooly at the different works in a tea garden, the cost of opening, detailed price of curing: facts and figure regarding choolas, hoop iron, bins, firewood, tea-boxes, tea lead, solder, nails &c., &c. But comprehensive as the list is there is much a-wanting, and which ought to find a place in a future edition. There should for example be a series of tea-house notes, regarding the manipulation and curing, and also guides to tea-tasting.

It is a very easy matter, however, to go on suggesting, and in works of this kind one is apt to overlook and undervalue the really useful and comprehensive nature of the information which is already supplied. But I have no desire to do this, for I feel sure that to all planters experienced or inexperienced alike, "The Planter's Notebook" will commend itself, by its own inherent worth. It will afterwards become more and more precious, as the blank pages get filled with "tips" and "wrinkles" supplied by neighbours or worked out and discovered by the individual writer. As it is, the practical knowledge which has been compressed into the 52 pages of letter-press, would if written out in long-hand have more than filled the whole note-book had it all been available, and anyone who had been in possession of such a note-book would have been inclined to look upon it as invaluable. Such a source of information could only have been in the hands of the experienced, whereas a beginner can now leap as it were into the wisdom of the tried, and save himself a world of worry by a reference to the notes in "The Planting Molesworth."

In the preface the publishers "apologize for the rather rough appearance of the blank paper and binding as arranged by native workmen," but although we live in a refined age, and even wish one's attention drawn to these defects, I feel inclined to say "no

* Tropical Planters' Note-book, published by A. M. & J. Ferguson, Colombo, 1887.

need for any apology." There is, however, a want of a pencil, or a place to hold one, which is somewhat noticeable. I don't know that there is any need to add more on this new venture. The publishers seem to have somewhat lacked confidence in it when the introductory note was being drawn up, for they say "In now issuing the little work we are conscious of many imperfections—to be remedied *perhaps* in a second edition should such be called for." I have a great deal more faith in its future than that; for, although to Mr. R. B. Arthur of Dikoya has been awarded the honour of suggesting the work, I incline to dispute his right as it has been a pet project of mine for a long time, and early in May last year I suggested in your own columns that in the series of planting manuals issued by the *Observer* press there was an unoccupied niche for "a Planting Molesworth." "He kens his ain groats amang other folks' kail" you will be inclined to say after this little bit of purely personal matter. PEPPERCORN.

[To "Peppercorn" certainly belongs the suggestion of the title "Planting *Molesworth*", and we are sorry to find we omitted to make acknowledgement for this and aid generally.—ED.]

GRASS UNDER TREES.—When difficulty is experienced in keeping grass green under trees in open woods, particularly pine woods where the shade is continuous the year round, sow a little nitrate of soda occasionally throughout the growing season when the weather is moist. This will bring a fine crop of verdure pleasing to the eye and agreeable to cattle.—*Journal of Forestry.* [A hint for owners of coconut plantations?—ED.]

LIQUID MANURE.—To prepare a strong liquid manure, fill a tub with water, into which throw fresh cow manure, pigeon's or fowl's manure, guano, bone-dust, &c., either one or more of these matters may be used. The vessel should not be covered, but the air should have free access to the liquid. It should also be stirred up from time to time. As soon as fermentation sets in, it is ready for use. It should be poured through a sieve into the watering can, and applied to the plants in the morning or evening. It is advisable to dilute this with water if it should be too concentrated, as then it is injurious. Experience and observation of its effects will soon teach whether it is too strong or not. —*Rural Australian.*

PADDY CULTIVATION IN THE GALLE DISTRICT.—Some time ago we mentioned that Mr. William Jansz obtained some seed paddy from Batticaloa with the object of improving the cultivation of the grain in the Southern Province. The result of his experiment has just been communicated to us. In November last one bushel was sown in a field at Halpatotte near Baddegamma, under the supervision of Mr. L. Christie, the Superintendent of Gordon tea estate. The land selected was not very advantageous. A crop had been taken from it scarcely six weeks before, and there was no time for it to be fallow. In addition to this, there were other adverse circumstances. A portion of the crop was destroyed by cattle, and the seed which had been sent from Batticaloa had got mixed, as when a portion of the paddy had ripened, it was observed that a second and more luxuriant crop was coming up. It was decided not to cut the first crop with the view of preserving the second, with the result that the former, as also a third crop, were wasted, showing that three kinds of seed maturing in three periods had got intermixed. The second crop yielded 11½ bushels to one bushel, while not one of the neighbouring fields sown with ordinary grain gave half the quantity. Mr. Jansz is now assured that but for the adverse circumstances above referred to, he would have obtained 25 to 30 bushels to the bushel. The experiment was closely watched by the Sinhalese agriculturists of the neighbourhood, who were very doubtful of its success and did not therefore care to try it on their own account. They have now spontaneously come forward in praise of the new cultivation, as several letters addressed to Mr. Jansz in Sinhalese will show. We may add that the paddy thus grown has no beard like the ordinary Sinhalese paddy. It closely resembles the grain imported from Rangoon and Chittagong, and its increased cultivation will, no doubt, tend to benefit a large section of the native population in the South. Mr. Elliott, the experienced Government Agent of this Province, was the first to recognize the utility and encourage the adoption of Mr. Jansz's scheme. He at once ordered a supply of the seed to be distributed amongst some of the District Mudaliyars, and the result of the trials made by them will, no doubt, be reported in due course. In the present instance Mr. Jansz was careful to avoid high manuring, only the ordinary methods of cultivating the grain were adopted.

PREPARATION OF PARCHMENT COFFEE IN EUROPE. —We quote as follows from the *Singapore Free Press*:—38, Mincing Lane, E. C., 13th Nov. 1886.—Dear Sir,—Referring to the conversation I have had the pleasure of having with you a few days ago, there are two bonded wharves in London where suitable machinery has been put up for peeling and sizing coffee in parchment, viz., "Red Lion Wharf" and "Metropolitan Wharf." I have had several opportunities of seeing coffee worked at both places, and have no hesitation in saying that both do their work exceedingly well. In addition to the experiments I mentioned to you, where E. Indian coffee has realized 4s to 5s per cwt. nett more, when prepared in London, Costa Rica, New Grenada, and Guatemala, from 8s to 12s per cwt more, I have had a parcel of Liberian imported in parchment from Johore treated at Red Lion Wharf and the result has been a pale yellowish coffee much better looking than the ordinary dull brown and greenish Liberian and I have sold the same in public auction at 57s 6d for the large size and 52s 6d for the bulk, instead of 49s to 50s the price of ordinary Liberian. I would not, however, recommend sending Liberian in parchment to be worked in London, as the parchment is very coarse and heavy and there must be a much greater loss from the weight of the parchment, than with the Ceylon Liberian, for instance. For plantation coffee, such as is exhibited from the Perak Experimental Hills, some of which appears to have suffered from damp or in preparation, I cannot help thinking that it would be of great advantage to send the parchment to London. I assume, of course, that the coffee has been picked at the right time, that it has been pulped at once and carefully, and that the clean parchment has been properly dried; those conditions are absolutely necessary, and, if they are observed, I have little doubt that the parchment will have been found to have preserved the colour and quality of the berry in a remarkable manner, and that the result will prove to be very satisfactory to the planter. The extra freight to be paid on the parchment may perhaps be 1s per cwt. whilst the coffee will probably realise 6s or more in excess of what it would have done otherwise. I may add that the whole of the plantation Java crop (from 250 to 300,000 bags) comes now to Holland regularly in parchment; some of our Dutch friends have tried London lately with a few parcels of parchment and have expressed themselves as highly pleased with the way their coffee has been treated. Should you wish to see the working of coffee, I shall be happy to arrange to take you to one of the wharves on any day which may suit you. I should have been glad to have sent you a copy of one of my reports on coffee, but the report belongs to the Royal Commissioners and the Society of Arts, and, until it has been published by them, I am precluded from making any use of it. I remain &c., H. PASTEUR,

F. A. Swettenham, Esq.

Correspondence.

To the Editor of the "Ceylon Observer"

ELECTRICITY FOR TEA MACHINERY.

SIR,—With reference to Mr. Grigg's letter of October 25th upon the above subject, I should like to give with your permission, some practical information concerning the transmission of power by means of electricity. It is a most interesting question and when thoroughly understood, will, I have no doubt, be of the greatest importance to employers of machine-power within reasonable distance of water-power.

Until recently, one of the chief stumbling blocks to the employment of electricity was the difficulty of obtaining a cheap and efficient electric motor for converting the electric current into mechanical power; this has now been entirely overcome and motors can easily be obtained having an efficiency of at least 80 per cent and higher according to their power. The dynamo for generating the electricity has also been considerably improved especially as regards regulation, and, therefore, this part of the question may be dismissed as having been practically solved.

The remaining question now is that occasioned by the wires conveying the electric current, this unfortunately is the prohibitive factor where power has to be conveyed over great distances. Of course where waterpower is used, this loss does not matter so much if there is an abundance, as the working cost is in no way increased, though the first cost is owing to a larger generating machine being required. It is impossible to give a fixed rule for determining the loss of power per mile in the conductors, because this is dependent upon their size and, therefore, cost. It is a question for the employer of the power to decide according to the circumstances of the case, weather he increases the first cost of the conductors and therefore decreases the loss of power or the converse.

Now as regards the first cost, I will give some figures showing the approximate cost of an electrical plant (in London packed) for transmitting 10 horsepower 1, 2, 3 and 4 miles. The plant includes the generating dynamo, motor and necessary length of copper conducting wire:—

Distance in miles.	Loss in the conductors.	Approx. power required at generator.	Cost of conductor.	Cost of plant including conductors.	Weight of motor.
	Per cent.	H. P.	£	£	lb.
1	15	16	32	320	550
2	30	18	64	350	
3	30	18	158	435	
4	40	20	200	480	

Added to this must be added the loss in the motor say 15 per cent and also that of the generating dynamo say 10 per cent.

The figures given in the column of "loss in conductors" may be very considerably reduced by using currents of much greater tension, but as these become dangerous I have not thought it worth while to go into that part of the question, seeing that what is required is a practical solution of the problem for employers of motive power not having any special knowledge of electricity.

Among the important advantages that electricity offers as a motive power is that the current can be used for lighting any buildings on the estate when not used for the machinery. As an example the above would work 10 arc lamps of 2,000 candle-power each or 90 incandescent lamps of 20 candle-power each, and finally store the electricity in accumulators when not required either for lighting or power.

The maintenance of the plant when once erected would be very small indeed. I do not think that the damp climate would affect the dynamos as suggested by Mr. Griggs as the wires are made of copper and covered with insulating material.

Apologizing for the length of the letter,—Yours &c.,

F. GEERE HOWARD, Electrical Engineer.

36 Cleveland Street, London W.

ABRUS PRECATORIOUS.

Minuwangoda, 21st Feb. 1887.

SIR,—While perusing the current number of the *T. A.* today, I came across that the seeds of the *Abrus Precatorious* are an official drug recently introduced to Ceylon and America.

The *Abrus Precatorious* called *olinda* in Sinhalese is a creeper which I have seen growing abundantly in the low-country. The leaves have a peculiar sweet taste and the seeds are scarlet with black spots. The seed of this may be collected if there is any market value. Kindly, Mr. Editor, see whether there is any market value for it, if so, it will become a good minor industry for the poor interior goyas—and perhaps it may be cultivated to a large extent with profit.—Yours faithfully,

W. A. D. S.

The *American Grocer* says, that a French savant claims to have discovered in cotton-tree seed a nutritious matter, presenting some most remarkable features in its composition. An analysis of the seed of Cotton trees, of which several varieties are cultivated in Bolivia, shows that this is the richest of all known grains in nitrogenous substances. He is convinced that Cotton-tree seed will make a flour destined to take an important place as a food for man.

AN American paper has apparently become very philosophical, and puts forward the following remarkable observation:—"A life devoted to the extermination of cockroaches is nobler spent than a life devoted to the gathering of Orchids." This will perhaps prove an alarming discovery to some similarly thoughtful readers, but we do not anticipate that many will be induced thereby to undertake the "nobler" employment.—*Journal of Horticulture.*

NOVEL METHOD OF POULTRY RAISING.—A French correspondent of the *Phenix Agriculturist* gives the following novel methods with poultry in one of the departments of France. He says:— The farmers in the department of the Tarn raise large quantities of fowls which they sell at considerable profit in the neighboring towns. Their hens are carefully chosen with special reference to their laying qualities, for long before artificial hatching was generally practiced, these managing people had found a way to hatch chickens without hens. One turkey hen can cover thirty eggs and can be made to hatch three sets of eggs the same season. But if she can hatch three sets of eggs she cannot raise three sets of chickens at the same time. To obviate this difficulty a fat capon is shut in a basket with four or five little chickens, the baskets covered with a cloth and placed in a dark spot from twenty-four to forty-eight hours, according to the tractability of the capon. When turned out with his chickens and others added, for he can take care of twenty-five, he is a better nurse and provider than the hen herself. He is larger and covers them better, is stronger and better able to defend them against birds of prey and other enemies. —*Southern Planter.*

SCIENTIFIC NOTES.—The deepest boring yet made is at the village of Sc ladebach, Prussia. It has been made by the Government to test for the presence of coal and was bored with diamond drills. Its depth is 4500 feet, its breadth at the bottom two inches, and at the top 11 inches. It has occupied 3½ years to bore, and cost a little over £10000. The temperature at the bottom is 118° Fah.—*Southern Planter.*

SUBSTITUTES FOR BOXWOOD.—Sir Villiers Lister calls attent on to the following passage in Mr H Romilly s "We tern Pacific and New Gui ea" (Mu ray , p. 136. "The Trisbands.....are exceedi gly rich islands, and produce various sorts of woo i not met wi h elsewh re, unless perhaps it be on the mainland of New Guinea. There is an extremely hard white-wood which I have never seen except from the Trisbands. It looks a most like ivory when polished, and should be of service for cabinet-making."—*Journal of the Society of Arts.*

FENCE POSTS.—A writer in *The Maine Farmer* thus expresses himse'f in regard to setting fence posts:—It has commonly been stated that posts set top end in the ground would last longer th n when set with the butt end down. We recently had occasion to remove a fence which had been set eighteen years, and to our surprise the posts set top down were still sound and strong, while many of those set the reverse were rotted entirely off. We have before found evidences of the greater durability of posts set in this way. If general experience corroborates our own, it is a matter well worthy of wide attention.—*Indian Gardener.*

THE PLANTING MOLESWORTH.—This, the latest addition to the long list of useful publications issued by Messrs. A. M. & J. Ferguson f r the tropical plant r, is not the least valuable. Whether to the old experienced planter or to the tyro, the planting Molesworth will be very handy owing to the many useful tables it contains, and to its size permitting of insertion in the pocket and ready reference. Whether for factory or field work, the little volume will afford all young planters more instruction than years of practice, and every Superintendent would do well to provide his Assistant or Conductor with a copy of this handy and useful compilation. As is to be expected, the bulk of the "Notes" relate to tea. We leave the criticism of the figures to those most competent to deal with them—pra tical tea planters. All tea planters are not necessarily engineers, although many engineers are tea planters, and the "Memoranda for the economical working of Machinery" will be specially useful for those, and their name is Legion, who have to work machinery, the deterioration of which is generally due more to ignorance in working it than to inevitable wear and tear. There are a few hints on coffee, which will not be found to be new to those actually engaged in the culture of the old king. We believe there are at present no new hands on coffee plantations, tea estates absorbing all the new arrivals. Cinchona, cocoa, cardamoms, castor oil, coconuts and cinnamon receive as scant attention as coffee. Strange, that with the exception of tea, all the principal products of the Island, like its name and its capital, begin with a C. We have not the space to comment critically on all this useful little book contains; but we may remark that cinnamon must be giving little or no returns to those engaged in its cultivation, for, according to the information supplied by an "old Planter," the yield of an acre is a bale of 100 lb., which at present market rates=R28. The cost of weeding an acre per annum is R10. Pruning R6. The cost of cutting and peeling is not given, but averages, with Cangany's wages, about R16 per bale, total R32, shewing a loss of R4 per acre, without taking into consideration the cost of supervision, transport, buildings &c., and yet many are still engaged in its cultivation, and make a profit out of it too! How is this managed? Those whose cinnamon fetches R28 per bale do not cultivate it, and gradual extinction of these places is going on, while those who cultivate their estates and pay particular attention to manufacture, manage to nett something more than R28 for a bale of their cinnamon; but the profit, if any, is cut very fine now-a-days.—Local "Examiner."

PRODUCTION OF CREAM OF TARTAR AT MESSINA.—According to the annual report of the Chamber of Commerce of Messina, it will be seen that a marked increase in the exports of cream of tartar from that port has taken place during the last three years, being as follows:—1883, 3,500,000 kilogs.; 1884, 4,155,671 kilogs.; 1885, 5,721,597 kilogs.—*Journal of the Society of Arts.*

EXPORTATION OF FOWLS FROM ITALY.—Formerly the greater part of the fowls sent to Marseilles was furnished by Gascony and Languedoc; now Italy supplies the greatest number, and chiefly Lombardy. Italian fowls also are sent to Spain. Every Friday a specially constructed live poultry truck arrives at the Marseilles railway station. It is of similar dimensions to an ordinary covered goods truck, and contains about 3,000 fowls in 108 hencoops. The truck consists of nine tiers of cages, twelve to each tier, and each capable of holding thirty fowls. Being well ventilated and kept scrupulously clean, and supplied with an abundance of fresh water and millet-seed, the fowls from Milan and even Venice, arrive at Marseilles in the best possible condition of health, and large numbers are likewise forwarded to Spain —*Journal of the Society of Arts.*

THERE has been a coffee famine in Rangoon in the past few weeks, occasioned, it is supposed, by the large quantities sent upcountry for the troops. Anyhow, says a correspondent, the price for several days rose from one rupee per viss (3⅓ lb.) to R2·4 and R2·8 per viss. And yet excellent coffee grows in the vicinity of the town, and the climate of most of the Lower Burma stations seems excellently adapted for the production of any quantity. It is strange that in a large city like this, with so many stores where every description of English and Indian supplies can generally be got, they allow themselves to run out of an article in such general use with all classes of the community. Yet such has been the case in Rangoon with coffee.—*Madras Times.*

USES OF HOPS.—The hop is not only known as an ingredient in beer-brewing. Its tender tops serve the Belgians for asparagus, an infusion of its flowers yields a well-known yellow dye for wool, its stalks yield a flax that in Sweden is woven into cloth, and a bag of hops is often used in medicine to allay inflammation. The strong bitter odour of the ripened bloom has a strangely exhilarating effect in cases of despondency, and the dried hop itself has curious sleep-beguiling properties occasionally taken advantage of in critical cases. When the Prince of Wales was so seriously ill at Sandringham, a pillow of hops was used for him to sleep on. When his great grandfather George III. lay sick almost to death in 1787, a hop pillow was also used. And in each case the recovery is claimed as a triumph for the *Humlus lupulus.*—*Leisure Hour.*

THE FLORA OF AUSTRALIA.—Baron F. Von Müller, K. C. M. G., has just completed and issued under the auspices of the Victorian Government a second supplement to his Systematic Census of Australian Plants. From the information now published it appears that while the known plants of Australia and Tasmania are about 9,000, they occur in the following proportions in the respective colonies: Western Australia, 3,455; Queesland, 3,457; New South Wales, 3,154; Northern Australia, 1,829; Victoria, 1,820; South Australia, 1,816, and Tasmania, 1,016. The progress of Botanical discovery in Australia within the last quarter of a century has been very marked, says the *Colonies and India*, and the Colonies are mainly indebted to Baron Von Müller for this result. At the beginning of the century (1805) Robert Brown, who may be styled the father of Australian Botany, returned to England with between 3,000 and 4,000 species of plants, and these in subsequent years he described in his "Prodromus Flora Novæ Hollandiæ et Insulæ Van Diemen." Since Brown's work no systematic addition was made to his labours until Baron F. Von Müller, considering that the time had arrived for the publication of a general flora of Australia, prepared in conjunction with Bentham, the seven volumes of the "Flora Australiensis."—*Indian Gardener.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, February 3rd, 1887.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS.
BEES' WAX, White, per cwt.	Slightly softish to good hard bright ...	£6 a £7 5s
Yellow ...	Do. drossy & dark ditto...	£4 10s a £6
CINCHONA BARK—Crown per lb.	Renewed	1s a 3s
	Medium to fine Quill ...	1s 1d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill ...	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s 1d
per lb. and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine ...	1s 6d a 2s 2d
	Brownish ...	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 4d
Long Ceylon	Middling to good... ...	8d a 1s 4d
CINNAMON, per lb. 1sts	Ord. to fine pale quill ...	7½d a 1s 8d
2nds	,, ,, ,, ,, ...	7d a 1s 5d
3rds	,, ,, ,, ,, ...	6½d a 1s 1d
4ths	Woody and hard	5½d a 11d
Chips ...	Fair to fine plant... ...	2½d a 7d
COCOA, Ceylon, per cwt...	Bold to good bold ...	78s a 81s
...	Medium ..	70s a 76s
	Triage to ordinary ...	50s a 65s
COFFEE Ceylon Plantation	Bold to fine bold colory...	95s a 103s
per cwt.	Middling to fine mid. ...	82s a 92s
	Low mid. and Low grown	79s a 82s
	Smalls	74s a 78s
,, Native	Good ordinary	65s a 72s
Liberian ...	Small to bold	58s a 61s
East Indian ...	Bold to fine bold... ...	95s a 110s
	Medium to fine	80s a 90s
	Small	73s
Native [per ton	Good to fine ordinary ...	65s a 72s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£5 a £17
FIBRE, Brush, per ton	Ord. to fine long straight	£10 a £35
Stuffing ...	Coarse to fine	£8 a £17
YARN, Ceylon, per ton	Ordinary to superior ...	£12 a £30
Cochin ...	Ordinary to fine	£11 a £32
Do [cwt	Roping fair to good ...	£13 a £15
COLOMBO ROOT, sifted ℔	Middling wormy to fine...	10s a 28s
CROTON SEEDS, sifted ...	Fair to fine fresh... ...	10s a 25s
GINGER, Cochin, Cut	Good to fine bold... ...	63s a 84s
per cwt. ,,	Small and medium ...	32s 6d a 55s
Rough	Fair to good bold... ...	30s a 45s
,, ...	Small	22s 6d a 25s
GUM ARABIC, Madras...	Dark to good pale ...	20s a 80s
NUX VOMICA, per cwt. ...	Fair to fine bold fresh ...	7s a 11s
	Small ordinary and fair...	3s a 6s
MYRABOLANES, pale, per cwt.	Good to fine picked ...	6s a 8s 6d
	Common to middling ...	5s a 6s 3d
	Fair Coast...	5s 6d a 6s
Pickings	Burnt and defective ...	3s 3d a 4s
OIL, CINNAMON, per oz...	Good to fine heavy ...	1s a 3s
CITRONELLE ,,	Bright & good flavour ...	1d a 1d
LEMON GRASS ,,	,, ,, ,, ,, ...	1¾d a 1¾d
ORCHELLA WEED [℔ lb.	Mid. to fine, not woody...	40s a 55s
PEPPER, Malabar blk, sifted	Fair to bold heavy	7¾d a 8d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White ...	,, ,, ,, ...	10d a 2s 6d
PLUMBAGO, Lump, ℔ cwt.	Fair to fine bright bold...	9s a 14s
	Middling to good small...	7s a 10s
Chips ...	Slight foul to fine bright	3s 9d a 10s
Dust ...	Ordinary to fine bright ...	3s a 9s
RED WOOD, per ton.	Fair and fine bold ...	£4 10s a £5
SAPAN WOOD ,,	Middling coated to good	£6 a £7
SANDAL WOOD, logs ,,	Fair to good flavor ...	£20 a £44
Do. chips ...	Inferior to fine	£5 10s a £16
SENNA, Tinnevelli, per lb.	Good to fine bold green...	8d a 1s
	Fair middling medium...	5d a 7d
	Common dark and small	2¾d a 4½d
TURMERIC, Madras, ℔ cwt	Finger fair to fine bold	9s 6d a 10s
Do. ...	Mixed middling [bright	8s 6d a 9s
Do. ...	Bulbs whole	7s 6d a 8s 6d
Cochin ...	Do split	6s 3d a 7s
VANILLOES, Mauritius &		
per lb. Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 29s
2nds	Foxy & reddish 5 a 8 ,,	10s a 16s
3rds	Lean & dry to middling under 6 inches ...	7s a 12s
4th	Low, foxy, inferior and [pickings	1s a 8d

FROM BOMBAY AND ZANZIBAR.		
ALOES, Socotrine and	Good and fine dry ...	£6 10s a £8 10s
per cwt. Hepatic...	Common and good ...	£4 a £7 10s
CHILLIES, Zanzibar ...	Good to fine bright ...	33s a 34s
per cwt	Ordinary and middling...	30s a 32s

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTTIAONS
CLOVES, Zanzibar and Penba, per lb.	Good and fine bright ...	11¾d a 12½d
	Common dull to fair ...	8¾d a 11½d
,, Stems...	,, fresh ...	2½d a 2¾d
COCULUS INDICUS ...	Fair ...	12s 6d
GALLS, Bussorah, blue & Turkey ℔ cwt.	Fair to fine dark blue ...	59s a 65s
[cwt.	Good white and green...	48s a 51s 6d
GUM AMMONIACUM per	Blocky to fine clean ...	15s a 34s
ANIMI, washed, ℔ cwt.	Picked fine pale in sorts,	£13 10/ a £14 10/
	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto ...	£4 10s a £7
	amber and dark bold ...	£7 10s
scraped...	Medium & bold sorts ...	£5 a £8
ARABIC, E.I. & Aden ...	Sorts	65s a £5 12s 6d
per cwt. Ghatti ...	Fair to fine pale ...	38s a 85s
Amrad cha	Good and fine pale ...	90s a £7
	Reddish clean ...	34s a 68s
ASSAFŒTIDA, per	Clean fair to fine ...	35s a 40s
cwt.	Slightly stony and foul ...	25s a 30s
KINO, per cwt.	Fair to fine bright ...	35s a 40s
MYRRH, picked ,,	Fair to fine pale ...	£6 a £7 10s
Aden sorts	Middling to good ...	70s a 97s 6d
OLIBANUM, drop	Fair to fine white ...	45s a 55s
per cwt. ,,	Reddish to middling ...	32s a 44s
pickings...	Middling to good pale ...	12s a 17s
siftings ...	Slightly foul to fine ...	10s a 13s 6d
INDIARUBBER Mozambique, red hard		2s 4½d a 2s 6½d
per lb. Ball & sausage, white softish		2s a 2s 3d
	unripe root ...	10d a 1s 2½d
	liver ...	1s 10½d a 2s 0½d

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz.	Nearly water white ...	3½ a 4¼d
2nds ,, ...	Fair and good pale ...	2⅝d a 3d
3rds ,, ...	Brown and brownish ...	2¼d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine ...	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon ...	Fair to good clean ...	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 6½d
	Fair to good black ...	1s 11d a 2s 2d
SAFFLOWER ...	Good to fine pinky ...	£4 10s a £5 10s
	Middling to fair ...	£3 5s a £4 2s 6d
	Inferior and pickings ...	£1 a £1 10s
TAMARINDS ...	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior ...	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt. ...	Fair dry to fine bright ...	23s a 28s
,, ...	Common & middling soft	8s a 22s
Natal ...	Fair to fine ...	25s a 30s
ARROWROOT Natal per lb	Middling to fine ...	3d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ℔ cwt.	Good, pure, & dry white	60s a 64s
Japan ...	,, ,, pink	
GAMBIER, Cubes, cwt. ...	Ordinary to fine free ...	32s a 32s 6d
	Pressed ...	29s a 30s
Block [per lb.	Good ...	21s 6d a 21s 9d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra...	Barky to fair [sar	6d a 2s 3d
Reboiled...	Common to fine clean ...	1d a 1s 4d
White Borneo ...	Good to fine clean ...	11d a 1s 3d
	Inferior and barky ...	1d a 8d
NUTMEGS, large, per lb...	61's a 80's, garbled ...	2s 7d a 3s 9d
Medium ...	33's a 95's ...	2s 3d a 2s 6d
Small ...	100's a 160's ...	1s 4d a 2s 2d
MACE, per lb. ...	Pale reddish to pale ...	2s 3d a 3s
	Ordinary to red ...	1s 10d a 2s
	Chips ...	1s 5d a 1s 6d
RHUBARB, Sun dried, per lb.	Good to fine sound ...	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried ...	Good to fine ...	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, ℔ cwt.	Fair to fine ...	11s a 14s 6d
medium ...	,, ,, ,, ...	11s 6d a 13s
small ...	,, ,, ,, ...	10s a 12
Flour [per lb.	Good pinky to white ...	8s 3d a 9s 3d
TAPIOCA, Penang Flake	Fair to fine ...	2⅜d a 2¾d
Singapore ...	,, ,, ...	2¼d a 2¾d
Flour ...	,, ,, ...	12s 6d a 17s 6d
Pearl ...	Bullets, per cwt. ...	20s a 27s
	Medium ,, ...	21s 6d a 22s 6d
	Seed ,, ...	22s a 22s 6d

COCONUT CULTIVATION AND IRRIGATION.

We have received through Mr. W. H. Wright some particulars of a very interesting experiment made by Mr. Akbar in irrigating coconut-palms on an extensive scale. Mr. Akbar is proprietor of the Siramgapata and Tuisava estates, covering 614 acres in the Katukenda division of the Negombo district, Alutkuru-korale. His average yearly crop has been from 900,000 to 1,000,000 nuts. On this property he has expended about £1,000 in machinery, chiefly powerful force-pumps, with some 15,000 feet of cast-iron piping, 4 inches diameter, besides 12,000 feet of other spouting. The property being some 150 feet above the Maha-oya, which forms its boundary, the water of the river is pumped up and distributed in channels among the coconut-palms, with a result which, after personal inspection, has astonished so old a cultivator and planter as Mr. Wright is himself. During the first day's work some 20 acres of very dry land were irrigated, and the effect on the drooping palm-trees was almost immediate and very striking. The coconut-palm is a very thirsty plant, and has the faculty of very quickly appropriating liquid brought within its reach, so that, on this occasion, it seemed to drink up the irrigating water at once. Mr. Wright has no doubt that the experiment will prove a thorough financial success in giving bigger crops of nuts, steadily, season by season, while maintaining the trees in full vigour.

Mr. Akbar also shows an example of capacity and enterprise, we learn, by manufacturing his own oil and coir, while, we suppose, he is the first Ceylonese to lead the way with an experiment on an extensive scale, such as above-described, in irrigating coconut land with river water, drawn and distributed by force-pumps.

As regards coconut cultivation generally, Mr. W. H. Wright is now experimenting on his own account in the Mirigama valley, and he is likely to show what can be done through manuring and high cultivation. Although a comparatively dry region, Mr. Wright says, the palms flourish in the good deep soil, sending their tap-roots far down. By judicious clearing of his land, leaving the large trees for shade for a year or two, by making large holes and burning *debris* to ashes therein, he is also able to plant his coconuts at almost any time of the year with satisfactory results. As to what may be done by manuring, Mr. Wright has already proved in his garden at "Wilhelmsruhe," Turret Road, where by careful planting, good soil and manuring, he has succeeded *in bringing coconut-palms into bearing, in three years!* Six to eight years have been considered the minimum hitherto under the most favourable circumstances, and, of course, an exceptional garden experiment cannot be taken to regulate a plantation. But it is evident that, granted good soil and careful planting with the means and opportunity for manuring, there is no reason why coconuts should not begin to repay in crops after five and six years. This, in fact, is the term given by Mr. D. Morris for bringing coconut plantations into bearing on the littoral of the West Indian islands, where, Mr. Morris says, there is great scope for the extension of the cultivation with the prospect of a clear return of £5 or £6 per acre per annum. In the favourite Madampe district, in Ceylon, where coconuts are being widely planted, seven to eight years is the term allowed for trees to come into bearing, and, meantime, a European gentleman who has gone in for coconut cultivation there, gets a fair return by cultivating plantains between his young coconuts.

TEA SEASONS IN INDIA AND CEYLON.

Although here in Ceylon, within 7° of the equator, we have no winter such as the Darjiling and Assam tea planters experience in 20° farther north; yet, as our readers are aware, there are two periods of the year, when, over a large portion of Ceylon growth is checked, and flushing,—though it never entirely ceases,—is considerably diminished. One of such periods extends from January to March and is distinguished, especially in the hill country by cold temperature at night and in the mornings and by north-east winds which are occasionally parching. Such winds have been especially prevalent from December of last year until now. This period is, so far, our winter,—from about the middle of December to the end of March,—although when rain falls freely, as it sometimes does in January, tea is harvested in quantity in this season. Then a second check to the luxuriant growth of tea occurs, on places exposed to the full force of the South-West monsoon, in the months of June and July. The rain alone, which falls so copiously in those two months would promote, rather than check growth, but for the fact that it is attended by chilling winds and obscuring cloud. Some hold the opinion that pruning ought to be performed in those months,—months in which our neighbours in India pluck their heaviest crops of leaf.

Looking over the series of valuable tables which Mr. Sumner Hogarth has placed at our disposal, we find that in the large proportion of Indian tea districts, December, January and February are blank months, while March and April do not count for much. The tea harvest extends from May to November, the bulk being gathered in the five months, June to October. In the richest bearing district, Luckimpur, the bulk is really gathered in three months, July to September; 40 per cent of the whole being on some estates gathered in August and September. We have often remarked how tolerant tea is of heavy rain, how it rejoices in moisture and now we find that the tea harvest is synchronous with the rainy season and not only so, but as a very general rule the quantity of tea gathered is, month by month, in proportion to the rain which falls. August is, we believe, the hottest month in Assam and it is one of the rainiest. The absence of strong cold wind is doubtless the great reason for overflowing crop in the rainy months. There is the inconvenience that the conditions most favourable for growth should be the least favourable for withering, and no doubt this is the reason why artificial heat is so much resorted to and good "withering" machines so much desiderated. In most parts of the tea districts of India some seventy per cent or more of the rainfall occurs in the four months, June to September, and about a similar proportion of the crop is harvested in those months. As was the case formerly with our coffee planters who had a rush of work in crop time and then a lull, so it seems to be with the tea planters of India. For the five months, June to October, they must often be driven to their wits' end to secure the harvest, while December to April are comparatively, holidays. Here in Cey-

lon there is no absolute cessation of growth and consequently no intermission of work. Only twice a year, in most years, will there be less to do—in the dry North-East and the wet South-West months,—and the question may be raised, whether both planters and plants might not be benefited were "flush" allowed to pass into "bangy leaf" during one month of each monsoon.

In a future issue we shall compare Ceylon figures with Indian, on this interesting subject.

WONDERFUL DISCOVERIES: INDIARUBBER IN WOUNDS.

The medical journals for the past ten years have given accounts of wonderful discoveries in surgical science, and of their application in practice—the filling of large, deep wounds with sponge, and the organization and assimilation of the latter; skin-grafting, bone-grafting, and the successful adjustment and regrowth of fingers. Recently two other wonderful discoveries have been reported. One is the organization of rubber within the animal tissues; the other, the organization of blood-clots, their formation into new tissue, and the application of them to the surer and better healing of surgical wounds. As to the first, it appears that Professor Vanlair, of France, had, in a certain case, inserted a drainage-tube, of ordinary gray vulcanized rubber, one and one-fourth inches in length and one-fifth in diameter, and that this, at the end of seven months, seemed to have undergone partial absorption. But, on examining it with a microscope, it was found that the substance of the rubber had become truly organized; that the lower end of the tube had become fully assimilated to the surrounding tissue, and had wholly lost its original form; that the part of the tube next above this had lost its original shapeless appearance, and had acquired a complex structure, showing fine connecting tissue fibres with cells of various forms between them, and very numerous capillary blood-vessels.

Says the *Medical Record*:—"That Indiarubber can thus become organized is the more remarkable when we consider that it is a pure vegetable exudation, devoid of all structure, and seemingly more calculated to act as a foreign body and so prevent the union of the wounded surfaces, than to undergo organization to and become thus and integral part of the animal tissue."—*Companion.*

COFFEE IN THE STRAITS.

A French newspaper, the *Univers Commercial*, thus sets forth the advantages of Johore and Singapore, for coffee growing:—Judging from the latest and most trustworthy advices in coffee estates in all lands where the article is grown, there prevails a disease which, according to many is nothing more or less than the blight which seizes upon the vine plant. It bears the name of *Hemileia Vestatrix*. Ceylon, where formerly coffee was largely cultivated, grows now but little. The plantations in British India are in danger of going the same way. Those in Java are also imperiled, and the Brazilian ones fare no better. We must draw attention to the circumstance that it is only the Arabian variety which becomes stricken in this fashion. But another kind, called Liberian, brought from the west coast of Africa, which, in the fertile soil of Brazil, reaches sometimes the height of forty feet, does withstand the disease, at least so it is reported. Mr. L. E. Chassereau one of the most experienced planters in the East Indies writes as follows regarding this subject: Now that coffee growing has in general fallen off in consequence of this disease, which has gained a firm foothold in all lands producing that article, it would be worth while to set up a company for starting large plantations of Liberian Coffee in the island of Singapore and in the State of Johore. These plantations are expected to take up 3,000 hectares (about 7,500 acres.) An undertaking like this may be successfully set on foot in the abovementioned countries where coolie labour never falls short of the demand. The climate of Singapore and that of the whole Malay Peninsula, as well as the composition of the soil, are admirably adapted to the coffee tree. In time of drought Arabian coffee trees lie under a serious disadvantage owing to their roots not going down deep enough. The roots of the Liberian variety, on the contrary, strike out so vigorously that they easily find their way to a great depth in search of the moisture they need. A plantation taking in 1,000 hectares would require a capital of about 900,000 francs. It is undoubtedly pretty well known that the production of coffee which begins when the tree attains its third year of of growth, reaches its utmost limit in the sixth year. But, so says Mr. L. E. Chasseriau, a plantation of the above mentioned acreage at that period represents a value amounting to a couple of millions of francs. The island of Singapore is one of the healthiest spots on the globe. The larger of the plantations could be utilised as a nursery of young planters who, in two or three years, would lay in a stock of experience and knowledge sufficient to admit of their setting up for themselves in this difficult line of business. These young planters would do well in that case to betake themselves to Cochin China, Cambodia, Annam, and Tonquin. In these countries both climate and temperature are highly suitable for the coffee plant. France, which has extensive colonies in that quarter of the world, might materially profit by this advice from Mr. L. E. Chasseriau. In Tonquin and the other countries named, coffee might flourish free from leaf disease.

TEA IN FIJI.—The reports for tea from the plantations still continue very encouraging, and the reports of exports upon the product could not well be more favourable. One sample of flowery orange pekoe is marked as worth from 7s to 8s per lb. in London.—*Cor., Sydney Morning Herald*, Jan. 4th.

J. K. ARMSBY ON COFFEE.—The following characteristic paragraph is from the *American Grocer*: Mr. J. K. Armsby has been looking into the coffee question. This is what he finds:—

Coffees are just humping themselves; you could not keep them down with a pile-driver. Arbuckle, who has been on the bear side and has been trying to sit on our boys who have been on the other side, has paid for his mistake and has confessed his sins, and is now singing just as high notes in the coffee chorus as anybody. They think that the market is going up because the crop is short, but while the stock is short now, yet the crop was reported a large one, and that is what fooled Arbuckle. He couldn't tell what had become of the coffee, but the writer has found out. Al. Whyland knew all the time, but he kept the thing quiet, but last week he sent a can of his Momaja coffee, and the secret was out. The blarmed stuff is so good that everybody takes three cups instead of one, and are drinking it three times a day. Nobody wants tea—everybody wants Momaja. Look at the tea market, and then at coffee! What makes the difference? Momaja. Oh, Whyland is a twister! If he has a customer come in that is a little hard bitted he gives him a dose of Natrolithic Water to take the old brown taste out of his mouth and then gives him a cup of Momaja, and the fellow wants to buy everything in sight.

PREPARATION OF HIDES IN SOUTH AMERICA.

A Buenos Ayres newspaper calls the attention of stock breeders to the fact that the hides of cattle in many cases lose a great part of their value on account of the careless way in which they are stripped from the slaughtered animal. Calf skins and sheep pelts are often reduced one-half in value by being gashed and improperly stretched. When a hide is stripped off, it should be stretched at once and pegged out to dry, with the flesh side upward. If it is rolled up, thrown into a heap, and left to dry in that shape, it is so mean looking that a buyer will only offer half its real value. A few hints as to taking off a hide will be useful. The skin is slit from the chin down the brisket in a straight line to the tail; it is then cut round each hoof, the hind legs are slit behind over the gambrel, but the front ones are slit up in front over the knees. This leaves the skin in a good shape for finishing the leather. The head and legs are first carefully skinned, taking care to avoid cutting the skin. The skin is then easily drawn off, by taking hold of it firmly and pulling it steadily. It is then spread out evenly on a floor, and sprinkled with fine salt. If there is but one, it is best to take it out as soon as the salt has taken, and dry at once in a cool shady place. If there are more than one, then they are laid upon each other, and salted freely, and afterwards thoroughly dried. If the skins are to be kept, they should be closely watched for moths or grubs.—*Journal of the Society of Arts.*

WILD MANGOES.

(BY C. MARIES.)

The *jungli âm*, which is the original stock of all our fine mangoes, is not often met with in its native habitat, and less frequently in fruit. I have just received a few fine specimens of several varieties of jungli mangoes. From the fruits, it appears they vary quite as much as our cultivated ones; and as to shape, they are the exact counterpart in miniature of many of our best varieties. My specimens came from the Kangra valley, and were collected by a gentleman much interested in the fruit. I once saw the true *jungli* mango in the Dooars, and again afterwards growing at an elevation of about 2,000 feet in Sikkim. It is very unlike the cultivated sort, having generally a straight trunk, whitish, smooth bark, and thin leaves, forming a fine, round-headed tree. The fruit rarely weighs 2 oz.; often only 1 oz. The common country mango called "Beju" or "Desi," in Tirhoot, is really an inferior kind of cultivated mango, and not the proper wild mango of the forests.

Wild mangoes are found from India through Malay to Manillâ and some of the Pacific islands, and it is not really known if there is more than one species. The wild and cultivated sorts are so widely different in shape of fruit, that they could almost be called distinct species, but every intermediate connecting stage may be found to bring them under one head. The flowers of the wild and cultivated mango are exactly the same in structure, except that in the wild one there are often more stamens fertile.

It may not be known to most people that generally in a mango flower there is only one stamen out of the lot fertile; this one is curved round just over the pistil in a peculiar way, to facilitate the fertilization. The so called "nak," or nose of the mango, is the place the pistil adhered to in the flower. All this can be plainly seen with a moderately powerful reading glass or lens when the mangoes are in flower.

PROTECTING MANGO FRUIT.

A very good way to protect mangoes from the attacks of birds and insects is, get a lot of very finely-woven, round bamboo baskets made, say 4 inches wide at top, 5 inches at the bottom, and as long as may be required for the fruit; see that there is not room for a fly to get in through the basket-work. Then put the mango inside as it hangs on the tree, push a long thin peg through the top of the basket by the side of the stalk of the fruit on one side, and another similar peg on the other side, and the mango will hold the basket up itself; then tie a little calico over the top of the basket, taking care not to tie the mango stalk, and also to completely shut up the top of the basket. The mango stalk must be quite free, because when the fruit is ripe, or nearly so, it will fall of its own accord, and will be found to be just fit to gather. If a net be suspended under the tree, then all danger of bruising the fruit will be avoided. Then shake the tree to gather only the ripe ones. These should be kept on a "machan" for a few days till quite ripe, as all mangoes improve by keeping a little, and should never be eaten perfectly fresh from the tree.—*Indian Agriculturist.*

LICHENS INJURIOUS TO FRUIT TREES.

The following from the American *Gardeners' Monthly* has a bearing on the treatment of tea bushes infested with lichens. Rubbing off the foreign growth is no doubt expensive, but it certainly must be beneficial:—A New Jersey correspondent says: "Will you please give me the name of the inclosed moss, which I find growing in company with unlimited quantities of lichen on a lot of old cedars on the river bank in front of my cottage. As these trees, knarled and twisted as they are, are very necessary to me, I have amused myself for a week past, scraping the lichen off.

"I know that the lichen is not regarded among botanists as a true parasite but as an epiphyte. But I am satisfied from my own observations the past week, that the lichen is almost as deadly in its embraces as the mistletoe or the fabled Upas tree itself—though possibly longer about it.

"Small limbs, twigs, and sometimes the entire tree, if fairly girdled with the lichen, are dead in most cases or dying. The lichen has a strong affinity for moisture and very retentive thereof—trees on the river bank, more or less damp from exhalations from the river, have much lichen upon them—while the same tree (cedars) a hundred yards back have little or none.

"On lifting a piece of lichen from the tree I find the spot beneath invariably damp or even wet and the bark discolored, and generally more or less rotten or doted, penetrating in some cases to the wood. 'Tis, in my opinion, this wetting process that destroys the twig, limb or tree. But whether the lichen does it with 'malice prepense,' as a lawyer would put it, I am not botanist enough to determine.

"Will you please enlighten me on this point, for I am not a little interested in the lichen."

[The old gardeners—whose practice was often better than their reasonings—always insisted on the advantages of scraping lichens from the bark of fruit trees. But modern gardeners teach that if fruit trees are properly cared for they will throw off lichens themselves. In other words, the existence of lichens is a sign of bad health. Scraping the bark or any other thing that "injures or closes the pores," as these good people say, is regarded as an evil. We have, however, seen so much good result from slitting the bark of hide-bound trees,—lime washing those covered by lichen or moss,—and soap cleaning trees that were even in fair health, that, though our natural tendencies are with scientific progress, we are compelled to admit that the practice is good, and therefore to believe that mosses and lichens may have, as our correspondent believes, some injurious tendency, quite aside from the general belief that they feed wholly on dead bark or other meterial.—ED. G. M.]

HOW TO CLEAN A BOOK WITHOUT INJURY.

An adept in the art of washing or cleansing dirty books sends to the *Publishers' Circular* a few plain directions to be followed by those who wish to cleanse their soiled volumes. The amateur book cleanser had better begin to practise on some worthless volume until he acquires the necessary skill. All traces of lime, acid, etc. used in the cleaning process must be removed from the book, else in time it may be entirely destroyed.

The first thing to be done in a book that wants washing is to cut the stitches and separate the work into sheets. Then a glance may be taken for the separation of those leaves or sheets which have stains of ink or oil. The dirty leaves are now placed in a bath composed of a quarter of a pound of chloride of lime and the same quantity of soda to about a quart of water. These are left to soak until the paper has regained its proper tint. The pages are now lifted out tenderly into a second bath of cold, if possible running water, where they are left at least six hours. This removes all traces of lime. The paper, when thoroughly dried by exposure, must be dipped into a third bath of size and water, and again laid out to dry. This restores the consistency of the paper. Pressure between printers' glazed boards will then restore smoothness to the leaves.

The toning of the washed leaves in accordance with the rest of the book is a delicate process, which requires some experience. Some shag tobacco steeped in hot water will usually give the necessary coloring matter, and a bath in this liquid, the necessary tone.

The process described above may do for water stains; but if the pages are dirtied by grease, oil, coffee, candle drippings, or ink, different treatment will be required. Dilute spirit of salt with five times its bulk of water, and let the oil-stained pages lie in the liquid for four minutes, not longer, then remove and wash, as before, in cold water. To remove ink, a solution of oxalic, citric, or tartaric acid should be used, but care must be taken in the washing and sizing. If the grease is a spot in the middle of a page, place between two sheets of blotting paper or cover it with powdered French chalk (the blotting paper is preferable), and pass a hot iron over the place. This will melt the grease, which is immediately soaked up by the chalk or paper.

For dirty finger marks, the following is recommended:—Cover the mark with a piece of clean, yellow soap for two or three hours, then wash with a sponge and hot water, and dip the page in weak acid and water. Give another bath of hot water and then thoroughly cleanse with cold water.

To remove ink stains: Dip the page in a strong solution of oxalic acid, then in a solution of one part hydrochloric acid and six parts of water, after which bathe in cold water and allow to dry slowly. Vellum covers which require cleaning may be made almost equal to new by washing with weak salts of lemon; or, if not much soiled, warm soap and water. Grease may be removed from the covers of bound books by scraping a little pipe clay, French chalk or magnesia over the place, and then ironing with an iron not too hot, else it will discolor the leather.—*Chambers' Journal.*

SUGAR-REFINING BY ELECTRICITY.

In the March *Sugar Cane*, page 116, we called attention to a Company which had just been started in New York for refining sugar by electricity; and we also gave a report, taken from a contemporary, of some sugars which had arrived in this country, and which, it was stated, had been refined by this process. We gave the account as a curiosity—no more believing it, than if we had been told that some one had arrived in Liverpool that morning having left New York the previous day in a balloon.

Experiments with this new process have continued to be made, with results, as reported, which are simply astounding.

Within the last few days we have seen Mr. Robertson, of Liverpool, who is interested in this company, and represents it in England. No one, we think, can converse with this gentleman, without being persuaded that he most thoroughly believes in this invention, and that it really does what is reported of it.

He told us that a gentleman in New York, in order to test the matter, had 3 cwt. of raw sugar taken to the inventor's room, for the purpose of being refined; he satisfied himself that there was no other sugar in the room except that which he had brought with him, and that there was no way by which the sugar could be replaced, except through the door, which he had securely fastened and sealed upon leaving. Within two hours he re-entered the room—during his absence the raw sugar had been passed through the machine by the inventor, and converted into refined sugar, the weight returned being within 1 per cent of the saccharine contents of the raw sugar.

An experiment upon a much larger scale has within the past three weeks been made under conditions set forth in Mr. Robertson's Circular, dated July 17, which we give at page 439, together with the report of the five gentlemen who were selected to certify to its genuineness; we notice that two out of the five gentlemen are the president and vice-president of the company. Assuming, as we do, that all is perfectly square, we think the company would have done better to have obtained the services of five well-known gentlemen who were perfectly disinterested.

The quantity of raw sugar to be refined was 80 bags—producing 40 barrels of refined sugar of "12 different sizes, from the finest granulated up to about the size of a small bird's egg;" the time occupied in the process was seven hours. These gentlemen did not witness the operation itself, but they conclude their report as follows:—"We have no reason whatever to doubt that the aforesaid refined sugar was produced by the said (Professor) Friend by his said process on the said 14th July from the aforesaid raw sugar."

The conclusion that one is driven to, with this information before us, is, that it is either a great fact or it is a great fraud. The company are about starting some works to refine, by this process, 500 tons per day. We shall therefore know in a little while which of these conclusions is the correct one.

If it is a fact, it means that we are on the eve of a revolution in sugar refining, without a parallel in its history; it means that planters in all parts of the world can, if they choose, and have the capital, refine their own sugars on the spot. It opens up besides, a market for refined sugar with millions of people in India, who, from religious belief, are now debarred from its use on account of the animal charcoal employed in refining under the old system.

The particulars of the invention may be stated to be as follows:—

"The process is an electro-chemical one which is worked by a machine, automatic in its action to a very great extent. Boiling and animal charcoal are entirely dispensed with. No syrups nor soft sugars of different grades are produced, the entire product being hard sugars in whatever forms of sizes which may be desirable to produce, that is, from finest powdered up to and including cut and pressed loaf. One valuable feature in this mode of manufacture is, that all the saccharine matter in raw sugar, whether crystallisable or uncrystallisable, under the old system of boiling and filtering, is by this system rendered into hard sugar, with a small fraction of a loss,—less than one per cent of the whole quantity. The cost of refining by this process is 2s. 4d. per ton (2d. per cwt.), and the time occupied not more than four hours."

By the favour of Mr. Robertson we have been furnished with samples of sugar refined by this process, and which are at our office, 57, Market-street, Manchester, for inspection.—*Sugar Cane.*

SUGARCANE CULTIVATION IN INDIA.

[The natives of Ceylon might take profitable hints from this article.—ED.]

The following extract from a letter received from Mr. Burrows, of Behea, has been courteously placed at our disposal by the Director of Agriculture, Bengal, and we publish it, as it will be found very useful at the present time:—

The usual Indian method of cane culture may be called *broadcast* as opposed to *planting*, as the term is understood by European and American planters. The difference in results may be approximately obtained by asking any ryot the difference in produce between *cheetwa* and *roap dhan* (broadcast and planted.)

The root of the sugarcane is a small collection of thin fibres or rootlets, there is no tap root. On these

depend the health and vigour of the plant with its long succulent stem and succession of long broad leaves; it should, therefore, be placed in the best possible condition to enable it effectually to meet the heavy demand on it.

By the native method the root is on or near the surface of the ground. The field gets 12 or 14 surface ploughings giving a seed bed only four or five inches deep. The little manure (if any is given) is scattered irregularly over the surface, a plough goes round the field in a continually decreasing circle, and the cuttings are dropped into the shallow track so made. There may be a little manure where they fall, or there may not be any. The cuttings are covered with about three inches of earth by a piece of wood drawn over the surface, a man or two standing on it, each supporting himself by holding the tail of the bullock in front of him. This surface covering soon dries; the surface is then loosened a little by the hoe, the roots being carefully avoided. A little manure may now be placed round each plant by hand, and water is let on till the field is sumberged or water-logged, thus sealing up the roots from air in plastic clay or loam compressed by the downward course of the water, and hardening as it dries. As the hoe avoids the roots, the compression of the soil around them increases just where it should be most friable. The hoeing is repeated about three times, followed by a *melwanee* watering, that is, till the ground is water-logged each time. When the plants reach a certain height, and the leaves begin to shade the field, hoeing is stopped, and as they grow, being close together with no regularity, a thick jungle is the result excluding sun and free circulation of air. Considering the nature of the plant and the work its root has to do, this treatment of it is most irrational

In Mauritius, West Indies, and other places where cane cultivation is under European supervision, the cuttings or seedlings are laid at least nine inches under the surface of the ground, either in carefully-made rectangular oblong holes in rows three and-a-half or four feet apart, or in continuous channels or furrows made by hoe; or double mould board plough, the bottom being flat, and eight or nine inches wide, that is, wide enough to receive three cuttings placed some distance from each other. A field planted in this way will take as many cuttings as are usually put in by the native method. The space between the rows need not be ploughed, only cleaned of weeds by hoe, these are left on the ground, and are covered by the earth from the channels or holes.

Previous to planting the cuttings, manure in proper quantity is spread over the bottom of the channels and mixed with a little earth. On, or in this, the cuttings are laid end to end either in single, double, or triple rows as the width of the bottom may allow, and covered by hand with about three inches of earth. The "hole" system is used in Mauritius, the ground is hilly and undulating, rain is frequent, and each hole retains what may fall into it. In India where irrigation is necessary, the channel or deep furrow method is best. After some days the surface of the soil in the bottom of the channels is loosened by hand. This may be done by women or children, whereas the hoeing of the ryot's field has to be done by men. If water is now necessary, a little is allowed to flow from one end of the channel to the other, and then shut off. As the plants rise, more earth is filled in around them with a little manure where it may be needed; the loosening of the surface, watering and filling in is repeated till the channel is filled; after which, as the plants grow, the earth is drawn from the spaces between the rows and heaped round the roots till a ridge is formed at least nine inches high over the original surface. Subsequent irrigation is given in the hollows between the ridges, the water not being allowed to reach the top of the ridges by four or five inches, which are thus left friable, and open for the action of the air and expansion of the roots.

Our ryots have for years seen and acknowledge the considerable economy of labour, water, and manure in this method as compared with their own. They have also seen the common *mongoo* cane in the district so improved that they had to be assured it was nothing else, yet none of them have had the enterprise to adopt it, though several among them have been at work on the cane fields of the West Indies and Mauritius, and know the method and its results.

Cane culture should be more of the nature of garden than field cultivation, and if done with a reasonable consideration of the nature and necessities of the plant, a third of the land, now yearly devoted to cane, could be put under other crops with no falling off in the weight of sugar produced.

The industry, as a whole, and in its details, from the preparation of the land till the crude produce is ready for the market, is in a very backward and wasteful condition; there is no reason except the inertia of the ryot why this should be so. This might be overcome, and a better rut opened out by some sustained effort on the part of Government, probably a graduated set of prizes for the best cane fields cultivated with reference to the nature and requirements of the plant. We know by experience they understand what this means when explained to them terms with which they are familiar. —*Indian Agriculturist.*

SOURCES OF SALTPETRE.

BY C. G. WARNFORD LOCK.

Whilst every miner is attracted by mineral veins which promise to yield metals, the majority overlook a class of earthy products which, nevertheless, possess considerable commercial value. Foremost amongst these is saltpetre, or potassium nitrate. The following notes on this useful salt have been collected by the writer at various times, and in various localities, and will probably be interesting to many readers of the *Journal*, as accessible information on the subject is not abundant, and some of the deposits alluded to, seem worthy of better development. The generally accepted conditions necessary for the formation of saltpetre are (1) the presence of decaying organic matter, whose decomposition affords a supply of nitrogen; (2) access of atmosperic air to oxidise the nitrogen into nitric acid; (3) sufficient potash in an available form (such as wood ashes or decomposed felspathic rocks) for the nitric acid to combine with as fast as it is liberated. Given these conditions, the formation of the salt will take place in very varied situations, being most commonly observed in countries where a tropical climate favours the decomposition of organic matters.

With this introduction, we may proceed to indicate the chief localities of production.

India.—Some saltpetre is obtained from the slimy mud deposited by the River Ganges during the flood season. Analysis of a nitrous earth from Tirhut, in Bengal, gave 8·3 per cent of potassium nitrate, and 3·7 of calcium nitrate, or 12 per cent of total nitrates. The soil around old buildings in the Punjaub is very productive of nitre, which appears as an efflorescence, not to be confounded with the sodium sulphate crust occurring on the *reh*, or barren lands. The deposit is scraped up as often as it is renewed, and submitted to simple treatment for the separation of the nitre from the accompanying dirt by the agency of water and filtration. A small spade is used in collecting the earth, which is taken off to a depth of one or two inches, and piled in heaps two to four feet high, where it is left without taking harm till an opportunity arises for transporting it to a spot where water and fuel are available. In the upper part of the Punjaub, the extraction process is conducted in a series of wide-mouthed earthen pots, with an aperture in the base, supported on earthenware stands, so as to admit of placing cups beneath the pots. On the bottom of each pot is spread a bed of straw, covered with a layer of wood ashes; above this, the nitrous earth is added till it reaches nearly to the top of the pot. Then water is applied till all soluble salts contained in the earth have been dissolved and carried in solutions into the cups below. The straw bed acts mechanically as a filter to hold back insoluble matters; the wood ashes act chemically, affording potash in an available form, so that any calcium

nitrate present may be converted into potassium nitrate, the nitric acid in the calcium nitrate exchanging bases with the carbonic acid united to the potash in the wood ashes. The very weak nitrous solution thus obtained is used instead of fresh water for washing through the contents of another series of pots, and thus becomes gradually charged with saltpetre to the extent of 2 or 3 per cent. The next process is the removal of the water and crystallisation of the salt. This is conducted in elliptical iron dishes, measuring one or two feet across and six to nine inches deep, heated from beneath; as evaporation proceeds, fresh liquor is added, during a period of twelve to eighteen hours. The scum which rises is skimmed off, and at a certain point of concentration the crude potassium nitrate, with accompanying saline impurities, is abundantly precipitated. This product in some districts is termed *dhouah*, and contains 45 to 70 per cent of potassium nitrate. The small pans used in the Upper Punjaub give 8 to 16 lb. of crude nitre per shift of thirty to thirty-six hours. Over 4,000 pans are kept working in the Punjaub, paying an annual tax of two rupees. In addition, there are over a dozen large shallow basins, called *agar*, where sun-heat is utilised for evaporation; these pay eight rupees yearly.

In the different districts, slight modifications of the process described above are in vogue. Thus, in Mooltan, the liquor, after twenty to twenty-four hours boiling, is often run into a vat to cool for a night, and next morning the crystals are raked out and washed in a woollen cloth, being then tied up in it, and exposed to the sun till the moisture has been dissipated. Sometimes the filter is made on the ground in an inclined situation being formed with mud walls lined with stiff clay on three sides, the remaining sides being left open for escape of the liquid, but provided with reeds or closely-woven grass mats, with or without a bamboo false bottom; the liquid passes into a reservoir made of pucka masonry. In Guzerat, the nitrous solution is passed through a cloth filter; it is evaporated to about one-fourth its bulk, and on cooling affords an impure crystalline product (*dhouah*) worth about three rupees per maund (say, 8s. per cwt.). When re-dissolved, filtered, and re-crystallised, forming *kalmee*, it is worth eight rupees per maund. The following table of the average cost per ton of Indian saltpetre is instructive:—

	£	s.	d.
Prime cost of crude material at the factory	4	2	0
Salaries, bags, packing, &c.	1	14	2
Freights and expenses from factory to Bombay	5	17	3
Interest on outlay at 9 per cent	0	13	8
Government license	0	2	7
Insurance at 7 per cent	0	17	1
	13	6	9
Profit per ton	1	0.	3

Selling price at a brisk demand at Bombay £14 7 0

Indian exports of saltpetre reach something like 25,000 tons annually, with a value of over half a million sterling.

Ceylon.—The nitrates of potash and lime are of frequent occurrence in Ceylon. Some thirty places might be enumerated where saltpetre is produced and has been prepared for market. The formation of the mineral is apparently confined to caves in dolomitic rocks, the felspar in which contributes the potash base. The caves are generally remote from inhabited places, being situated in desolate and not easily accessible regions. Future explorations in the interior will probably add to the number already known. While some of the caves are the resort of vast numbers of bats, whose dung accumulates in them, others are quite untenanted.

An analysis of the most productive nitre rock near Doombera, in an unfrequented cave, showed 2·4 per cent potassium nitrate, and 0·7 per cent of magnesium nitrate. The nitre earth from the great cave in Lower Ouva, near Wellaway, yields 3·5 per cent of calcium nitrate, and 3·3 of potassium nitrate. The nitre crop is harvested during six months of the year by chipping off the incrusted portions of the walls of the caverns; the fragments are reduced to powder, mixed with an equal portion of wood ashes, and dosed with water. The potassium nitrate present, as well as that produced from other nitrates by the action of the wood ashes, is dissolved by the water, and the solution is evaporated first in pits exposed to the sun's rays, and then to the crystallising point in fire-heated pans.

Burma.—Some of the caves contain accumulations of nitrous earth, and the preparation of the salt is carried on extensively between Pugan and Ava, on the Irawadi.

Thibet.—In the government of Rudokh, saltpetre is obtained by digging up the soil, which is put into brass vessels, and treated with hot water. The solution thus formed is decanted into another vessel, and there allowed to cool, that the nitre may crystallise out. By the crude native method, no man can prepare a sheep load (say 20 lb.) in three weeks.

Sumatra.—The nitre caves in the county of Caltown, near the land of the Duni river, are filled with nests of innumerable birds of the swallow kind, which abound the more the further the caves are penetrated. It is their dung, forming a deposit in many places 4 to 15 feet thick, which forms the saltpetre. A cubic foot of this earth, on boiling, will afford something like 8 lb. of nitre.—*Journal of the Society of Arts.*

AGRICULTURE IN JAPAN.

Field farming in Japan is unknown, the tillage being really gardening, but of the most thorough character. Consul-General Van Buren says that fully one-half of the population are farmers, and of the day labourer or coolie class a large number is employed in the cultivation of the soil. The average size of the garden farms is about half an acre. The fee simple of the soil, formerly in the feudal lord, is now held by the farmer. The area under cultivation has been extended fully one-fifth within the past ten years. The Japanese Archipelago extends north and south through fifteen degrees of latitude, and the cultivated areas are at all altitudes, from the sea level to 10,000 feet above, with the climate of the temperate or sub-tropical zones. Of the 50,000,000 acres of tillable land, a little less than one-fourth, or about 12,000,000 acres, are under cultivation. This is owing to the absence of good roads and proper means of transportation; most of the carrying in the farming districts is done upon the backs of men and animals. Rice is the staple product of the country, growing in all districts of the empire; about 6,800,000 acres, or more than half of all the area under tillage, is, during the summer, devoted to its cultivation. Wheat is grown in all parts of the empire, and it is estimated that the yield averages twenty bushels to the acre. It is mostly eaten in the form of cakes, cooked without any process of fermentation. The wheat flour is ground in a small stone mill, and is bolted by hand in a small box about two feet wide and three feet long. The uplands are preferred for wheat growing, and the soil is thoroughly dug up and pulverised with a long bladed mattock. It is then divided into small plots, each of which is then furrowed by the same instrument into rows, three or four inches deep and twelve or fifteen inches apart. Into these furrows, ashes and a thoroughly decomposed compost is scattered, and in October, seed is dropped by hand, about one to one bushel and a quarter to the acre, and covered by the mattock to the depth of about one inch and a half. The ground is turned up two or three times a month, and liquid manure is applied three or four times during the winter and spring to the roots. In the autumn some hardy vegetables are planted between the rows of wheat. The wheat ripens in May, and is cut by a knife and bound into small bundles, which are either hung up on trees or bamboo poles, or laid on hard ground to dry, when it is carried to the farmhouse, where it is thrashed.

The threshing process consists of first pulling off all the kernels of grain and the husks by means of a row of iron teeth, long and saw-like, closely set in a stick of wood. Between these teeth a few heads of wheat are rapidly drawn, tearing off the kernels and their coverings. The grain is separated by threshing on mats with a flail, and the chaff is separated by one person slowly pouring the grain from a scoop-shaped basket held four or five feet from the ground, while another person stirs the air with a large fan. The wheat is then put into straw sacks and carried either on hand-carts or on the backs of horses to market. Barley is a much more important product than wheat, and is more universally eaten; and it is also used for making *saki*, a liquor largely consumed in Japan. That which is made into flour is ground and bolted in the same manner as wheat, and is also cooked without fermentation. The mode of cultivation, harvesting, and threshing are the same as with wheat. The sugar of Japan is made from that species of the sorghum plant known as the Chinese sorghum. It grows luxuriantly in the southern parts of the empire. For three or four hundred years the processes of granulating and refining sugars have been known and practised. Sorghum is grown from cuttings and not from seed. In September selected stalks are cut and buried in trenches a foot deep. Through the winter, from each joint of the stalks sprouts shoot out, and in the spring these joints are cut off and set out in rows fifteen or eighteen inches apart, and about the same distance from each other in the rows. The ground has previously been dug up and pulverised by a long-bladed mattock. The fertilisers used are ashes, fish, decomposed hay, straw, and seaweed, and the plants are thoroughly hoed and irrigated. In October and November the leaves are stripped off, and the stalks are then cut, and the hard outer covering removed; the remaining portion is then ground between rollers of stone on hard wood. The cane juice is then boiled in iron kettles till the granulation takes place, when it is placed in bags and pressed dry, the expressed syrup being used as molasses. Dry, upland soils are required for the successful growth of the cane, and the expenditure in labour and fertilisers is greater than for any other crop. Tobacco is also an important product, about 90,000,000 pounds being produced in one year, and amounting in value to £1,500,000. It is grown on uplands, and the seed is planted at the end of March, or begining of April, in rows about 15 inches apart. In September the lower leaves are picked, at the begining of October the middle ones, and the upper ones at the end of October. The leaves so picked are dried and packed in small bales. Beans, peas, and other leguminous plants are extensively cultivated in Japan, and Consul van Buren says that there is probably no country in the world where this class of food-plants enters so largely in the diet of a people as in Japan. The cultivation of tea is one of the most important branches of Japanese agriculture, the total production for the year 1880 amounting to as much as 90,000,000 pounds. As regards textile fabrics, silk is the most important, the mulberry tree growing on nearly all parts of the islands south of Yesso. The principal provinces in which it is cultivated are Iwate, Miyagi, Yamagata, Fukushima, Gunba, Tochigi, Chiba, Iberaki, Kanagawa, Nagano, Yamanashi, Shidyuoka, Gifu, Ishikawa, Shiga, and Kioto Fu. The variety of the mulberry most in use is the *Morus nigra*, and it grows from five to ten feet in height. Hemp is grown on the lower and richer soils, in drills sixteen inches apart. It is sown in March or April, and receives the same careful garden tillage as all other products of the soil in Japan. The soil is carefully prepared by the small Chinese plough, or the long-bladed mattock, and well manured in the drills where the seed is sown. During the summer it is frequently hoed, and fertilisers are applied to the root of the plants. All hemp lands are flooded three or four times in the season, from the irrigating ditches. The stalk, usually ready for harvest in August, grows from four to seven feet high, and is pulled and spread on the ground, where it is allowed to rot, and the fibre is easily separated. This is done by beating with a bamboo stick. The resinous substance is removed by hand-scraping, with a sharp-edged bamboo knife, and the fibre is of great length, strength, and lustre. Flax is not grown in the country. Consul van Buren says he cannot render too warm a tribute to the thoroughness of the present tillage by the Japanese farmers, the value of which is proved by its immense results. When the mattock or broad-edged pick is alone used, the whole surface of the ground is dug up and turned over to the depth of eight to ten inches, and then the whole of the soil is pulverised and raked over, until not a lump of earth is left. When the small Chinese plough is used, the soil is ploughed and re-ploughed from four to eight times.—*Journal of the Society of Arts.*

Manures for Vines and Peaches.—For Vines and Peach trees I mix the following materials in the following proportions:—4 bushels of fresh lime, 10 bushels of good fresh soot, 20 bushels of wood ashes, 2 cwt. of guano, or 6 cwt. of night-soil. Put water on the lime to slack it, then carefully mix all the materials well together, and as soon as it has got well heated, turn it over three or four times, when it is fit for use. Put the mixture about 1 inch thick all over the Vine borders, both inside and out, and then lightly fork it in. After this operation give the inside a good watering with diluted liquid manure. I give my Vine borders a dressing every year with this manure as soon as the Grapes are cut, and have used this first-class fertiliser for many years with the best results. It destroys insects in the soil and prevents mildew.—W. Smythe, Basing Park.—*Gardeners' Chronicle.*

Non-Germination of Seeds.—The seedsmen of the present are beginning to realise that if they would have their trade grow, they must supply their customers with fresh seed, without any attempt to get rid of the old stock by mixing with the new. Hence, *now*, the fault of non-germination is the purchaser's more commonly than the seedsman's. It is a great mistake to cover small seeds too deeply, and to sow in ground but freshly broken up, or too loose open will largely promote failure. Ground sufficiently firm to retain an even moisture, is a condition of the first importance, for open ground may contain just sufficient moisture to start the seed, and then for want of it to let it perish. Very light and open soil should be trodden down firmly with the foot and raked level, before and after sowing the seed.—*Rural Australian.*

Hot Water as an Insecticide.—Hot water is a clean, safe, and effective means of destroying green fly on pot plants. To the amateur whose stock of plants might be small, or who might not have accommodation for fumigating, it would be found a convenient remedy. There is a margin of many degrees between the lowest temprature that will destroy this insect, and the highest that a plant will stand with impunity. 130 degrees is a good medium, or as hot as the hand can be held in two seconds. The plant should be plunged into and withdrawn from the water instantaneously. The smaller body and more delicate skin of the insect is more quickly acted upon than that of the plant. Should anyone be afraid to employ the remedy, let him, if he has several plants effected, try it on one first, and the next day, when he sees that it has suffered no injury, he will have no misgivings about treating the rest in the same way.—*Rural Australian.*

Dr. Watt, writing in *Nature*, says that Manipur is a small valley surrounded by mountain ranges, and in this valley the rainfall was found to be only about 39 inches; but seventeen miles off, in the mountains which formed the north-east ranges, the rainfall was as much as 120 inches, and towards the Naga country to the north it became greater and greater in certain limited tracts. In the Khasia Hills 600 inches might fall in one place, and twenty miles off only 50 inches. Nothing in Manipur struck Dr. Watt so much, as a botanist, as the remarkable transitions of vegetation in that small region. Dr. Watt gathered twelve or more species of Oaks, many of which were new to science, and ten or

twelve species of Rhododendrons, in Manipur alone. The Rhododendron Falconeri found in the Naga Hills by Sir Joseph Hooker is nowhere met with in the immense tract between the Naga Hills and Sikkim. This and the epiphytic R. Dalhousiæ, which grows on a hill thirty miles north of Darjeeling, Dr. Watt found in the Naga Hills at an altitude of 6000 to 8000 feet, but these Rhododendrons never occur in Sikkim below 10,000 to 13,000 feet. There were many instances of plants falling in their altitude as the traveller passed to the east and south-east from Sikkim, until at Moulmein a Rhododendron was found growing near the sea—a circumstance which was not met with in any other part of Asia.—*Gardeners' Chronicle.*

FORMATION OF DEW.—From a paper read before the American Association for the Advancement of Science, in August, 1886, by Prof. H. E. Alvord, on the "Formation of Dew," we learn that the facts established by repeated observations are, that the lower stratum of air rapidly increases in cold as we descend towards the ground, until checked by the radiation of heat stored up there during the day. The height of this critical stratum, where the two temperatures just counteract each other, varies under different conditions. On bare soil it is usually very near the surface, and even may be slightly below it. Grass or other thick growths of vegetation behaves like the soil in retaining a considerable degree of heat in the air entangled among its foliage, so that its presence restrains the cold stratum of air at a still greater height. There is, therefore, on the occasions when dew is formed most copiously a stratum of air of markedly low temperature lying close down to the surface of the ground, with its lower limit sharply defined, but above gradually increasing in heat. Above this stratum is the comparatively warm atmosphere, bearing watery vapour; below it a thin layer of air supplied with heat and moisture from the soil. The result is the formation of dew by condensation of watery vapour within the cold stratum. Most of the moisture seen upon many plants in the morning, in the course of a season, is transpired by the plants themselves, and this transpiration is sufficient in quantity to supply an appreciable portion of the atmospheric vapour subsequently deposited as dew.—*Gardeners' Chronicle.*

AN EASY METHOD OF MEASURING THE HEIGHT OF A GROWING TREE.—Several methods of measuring growing trees have appeared in your columns at various times, but all requiring a more or less complicated calculation, and consequently can only be worked out by those who have a fairly good education, and in some cases, probably, expensive instruments. An accurate measurement may be quickly taken without either, as any one may make all necessary apparatus in a very short time, and at a cost of not more than sixpence. Take a straight piece of common slater's lath, say, for convenience in measuring, 10 feet long, plane smooth, and mark it in feet and inches; also a small piece of board, half an inch thick and 6 inches square will do very well (it must be perfectly square); draw a line diagonally across one side of the board, and on the other side screw two square staples sufficiently large to admit the lath to slide closely through; these must be exactly opposite each other. At from 5 feet to 6 inches above bore holes in the lath to admit a peg to hold the board in position, to suit the height of different persons (a stout wire nail makes a good peg); a yard of fine string, with a loop at one end and small weight at the other for a plumb-line, and that is all that is required. To measure the tree put the peg in a hole to suit your height, slide the board on to the lath to the peg, and hang the plumb-line on the peg, then walk to a distance from the tree, so that when holding the lath perfectly upright, which the plumb-line will show on looking up the diagonal line across the board it is exactly straight to the top of the tree, the corner of the board nearest you will be exactly the same distance from the tree that the tree is high from that level, which can at once be measured by the 10 feet lath; add to that the height the board was from the ground, and you have the exact height of the tree. It is simply two sides of a square which must be equal This can be done by any one, and certainly will not take five minutes.—THOS. WOODFORD, The Nurseries, Atherstone. [This method is accurate enough if the ground be level, but it sometimes happens that it is not so, or the base line is inaccessible, owing to water or other trees or objects of some kind. ED. *Gardeners' Chronicle.*]

FRUIT TREES CANKERING (*An Old Gardener*).—While it is not wise to be prejudiced against what you call "new notions," we think you are right in considering that the truth of the "insect theory" is not yet established beyond dispute. But this is not such a "new notion" as you appear to imagine. We have heard of it years ago, and seen the insects alluded to after the canker appeared, not before. Insects cause ulceration, as in the case of the Aphis lanigera, or American blight, but that is not canker as the term is generally understood. The following remarks cited from the "Cottage Gardener's Dictionary" are pertinent to your inquiry, and we have not a doubt there is a considerable amount of truth in them:—"This disease is accompanied by different symptoms, according to the species of the tree which it infects. In some of those whose true sap contains a considerable quantity of free acid, as in the genus Pyrus, it is rarely accompanied by any discharge. To this dry form of the disease it would be well to confine the term *canker*. In other trees, with sap abounding in astringent or gummy constituents, it is usually attended by a discharge. In such instances it might strictly be designated *ulcer*. This disease has a considerable resemblance to the tendency to ossification, which appears in most aged animals, arising from their marked tendency to secrete the calcareous saline compounds that chiefly constitute their skeletons. The consequence is an enlargement of the joints and ossification of the circulatory vessels and other parts—phenomena very analogous to those attending the cankering of trees. As in animals, this tendency is general throughout their system; but, as is observed by Mr. Knight, 'like the mortification in the limbs of elderly people,' it may be determined, as to its point of attack, by the irritability of that part of the system. This disease commences with an enlargement of the vessels of the bark of a branch or of the stem. This swelling invariably attends the disease when it attacks the Apple tree. In the Pear, the enlargement is less, yet is always present. In the Elm and the Oak sometimes no swelling occurs; and in the Peach we do not recollect to have seen any. The swelling is soon communicated to the wood, which, if laid open to view on its first appearance by the removal of the bark, exhibits no marks of disease beyond the mere unnatural enlargement. In the course of a few years, less in number in proportion to the advanced age of the tree and the unfavourable circumstances under which it is vegetating, the swelling is greatly increased in size, and the alburnum has become extensively dead; the bark above it cracks, rises in discoloured scales, and decays even more rapidly than the wood beneath. If the canker is upon at moderately sized branch, the decay soon completely encircles it, extending through the whole alburnum and bark. The circulation of the sap being thus entirely prevented, all the parts above the disease perish. Trees injudiciously pruned, or growing upon an ungenial soil, are more frequently attacked than those which are advancing under contrary circumstances. The soil has a very considerable influence in inducing the disease. If the subsoil be an irony gravel, or if it is not well drained, the canker is almost certain to make its appearance amongst the trees they sustain, however young and vigorous they were when first planted. All these facts before us unite in assuring us that the canker arises from the tree's weakness, from a deficiency in its vital energy, and consequent inability to imbibe and elaborate the nourishment necessary to sustain its frame in vigour, and much less to supply the healthy development of new parts. It is quite true that over-luxuriant trees are particularly liable to this disease; but over-luxuriance is really a demonstration that the tree does not digest and secrete its juices healthily." We do not consider that canker arises from either weakness or exuberance only, but both are contributory causes, and when they exist remedial measures should be adopted accordingly. —*Journal of Horticulture.*

INDIAN AND CEYLON TEA STATISTICS.

Messrs. Gow, Wilson & Stanton's Circular which we publish below, goes largely over the same ground as, and puts forward many of the conclusions arrived at in Messrs. Stenning, Innskip & Co.'s, which we lately dealt with. On the one hand, we see, that the deliveries of Indian and Ceylon teas had increased by more than fourteen millions of pounds in five years. On the other large imports, and, unfortunately, the inferior quality of some of the tea had sent down prices to an unprecedented extent. The fall in prices would be alarming, but for the reflection that low prices have always led to largely increased consumption, and that a subsequent reaction to higher prices has not lowered deliveries. If, therefore, the prices of last year were the lowest ever reached, comfort is to be derived from the fact that never were the deliveries of Indian and Ceylon kindslarger. Ceylon contributed a considerable proportion of the increase of thirteen millions of Indian kinds imported in 1886 over 1885, and it is time that Ceylon teas were separately dealt with, rather than included in the Statistics of Indian teas. They stand apart as much as Java, and in a far more favourable position.

Nevertheless, for ALL the producing countries, the figures showing exports and transhipments to places on the Continent of Europe and elsewhere, are very interesting and suggestive. Of the estimated deliveries equal to seven millions of pounds per mensem in 1887, we may take it for granted that over 10, probably 12 per cent will be Ceylon teas, which, although they also have gone down in value, still continue to hold the first place in the London market, as they will in other markets, when their quality becomes known in such markets. It is satisfactory to learn that, in the face of largely increasing production especially in Ceylon, not only is home consumption increasing, but also deliveries for export; it is well to observe the advice tendered to us to pay attention to new markets and to the sustaining of quality. In the latter respect however, we are far more dependent on *seasonal* influences,—the effect of local weather,—than our friends at home, may be ready to admit. Certain it is that never were science, skill and care more fully applied to the preparation of tea in India and Ceylon, and yet at this moment, lowered prices are attributed to a falling-off in quality! The great hope of the Indian and Ceylon tea-producer as regards "new markets" must be based on the United States and Canada, while a steady increase in consumption of good teas in Britain may be anticipated.

INDIAN TEA STATISTICS.

LONDON, E.C., 11th Feb. 1887.

The lower quotations chronicled last year were not confined to the grades shown in the accompanying diagram; they extended to all descriptions except the finest Pekoes and Broken Pekoes. The supply of these kinds was unusually limited; hence they alone have maintained their values. The fall in prices was heaviest during the last few months of the year, and had the effect of raising the deliveries for the last quarter to the highest figure ever yet reached.

Without giving a detailed review of the many variations in price which have occurred, and which are common to most seasons, there are a few points which render the year 1886 remarkable, and which from their importance deserve more than passing comment.

The first of these is the increase of over 13 million pounds in the arrivals from India.

The second, the unusually large proportion of inferior liquoring Teas contained in the Indian crop.

The third is the rapid increase in the imports from Ceylon.

These three causes have resulted in a serious depreciation in the value of Tea generally—particularly the lower grades—and in an unusually heavy accumulation of stock at the close of the year.

The pressure of the increasing imports from Ceylon was first seriously felt about May to July, when arrivals from Ceylon were heaviest, and the trade was at its slackest point,—a position which may be intensified during the coming season. These unusual arrivals thus exercised considerable influence and temporarily depreciated values.

The Indian crop then beginning to arrive proved most disappointing in quality, and thus caused a demand for the few finer descriptions. The crop soon assumed larger proportions than the trade could absorb, and prices generally commenced to recede. The flood of common teas, of which the arrivals chiefly consisted, also told seriously upon the market, and during the last quarter of the year quotations for the lower descriptions fell to a point never previously reached. Although this reduction in values soon caused an increase in the deliveries of Indian and Ceylon teas and lifted them higher during the last quarter than any previous record—as depicted on the chart—the drop occurred too near the close of the year to prevent an accumulation of stock, nearly 9 millions in excess of that on 31st December, 1885.

	1883.	1884.	1885.	1886.
a Imports of Indian and Ceylon tea	61,667,000	67,152,000	66,863,000	83,460,000
b Delivery of Indian and Ceylon tea	59,096,000	64,217,000	68,895,000	74,665,000
Stock of Indian and Ceylon tea	24,116 000	27,076 000	25,780,000	34,548,000

a Import of Indian Tea 1885, 67,160,000 1886, 76,585,000. Import of Ceylon Tea 1885 3,703,000; 1886; 6,875,000.

b Delivery of Indian Tea 1885, 65,678,000; 1886 68,420,000. Delivery of Ceylon Tea 1885, 3,218,000 1886., 6,245,000.

The Home consumption of Indian and Ceylon Tea has increased from 38 per cent of the whole in 1885 to nearly 42 per cent in 1886; still the Home consumption of all tea was less than in 1885—hence the increase in these sorts was gained entirely at the expense of China Tea, the Home consumption of which fell 9 million pounds during the year.

Home Consumption.	1882.	1883.	1884.
China Tea, &c.....	114,461,000	111,685,000	110,843,000
Indian and Ceylon Tea.....	50,497,000	59,096,000	64.217,000
All Tea.....	164,958,000	170,781,000	175,060,000

	1885.	1886.
China Tea, &c.....	113,514,000	104,226,000
Indian & Ceylon Tea.....	68,895,000	74.665,000
All Tea	182,409 000	178,891.000

EXPORT.—One effect of the low range of prices has been to draw the attention of various foreign markets to the lower grades of whole leaf Indian Tea. The export of these has been large, and shows distinct signs of extension. Another and very important cause of this export demand is to be found in the larger size of breaks arrived during the present season,—a matter which is of great importance to shippers. It is probable that the small breaks into which Indian Tea was until very recently divided, had much to do with the slow progress of the export trade in previous years. The exact quantity of Indian Tea exported cannot be

ascertained, as Indian Tea is included with China in the export figures published by the Customs Authorities. The separation of the descriptions might be an advantage to the trade.

PROSPECTS OF INDIAN TEA TO END OF JUNE.—Having now considered the subjects of both Home consumption and export, let us glance at the probable position of the Indian Tea trade during the next six months.

The amount of the Indian crop available for London is generally estimated at about 75,000,000 lb. Of this amount 52,500,000 had arrived to 31st December, thus leaving 22,500,000 lb. to come forward. Estimating the arrivals from Ceylon to the end of June as 6,000,000 lb., we get a total import of 28,500,000 lb. This quantity added to the stock on 31st December of 34,500,000, gives us a total of 63,000,000 lb. to deal with. Calculating the deliveries of Indian and Ceylon Tea at as high a figure as 7,000,000 lb. per month —which the lower range of prices may warrant us in doing—we get a total delivery of 42 000,000 lb. for the six months, thus leaving a stock at the end of June of 21,000,000 lb.—as against 18,345,000 lb. at the same time last year.

However, as the December stock would thus be reduced by nearly 14,000,000 lbs., there is ample ground for the hope of some re-action from the unsatisfactory averages now being obtained. Periods of the most rapid increase in the consumption of Indian tea have usually been the effect of low prices; but after prices had again advanced, deliveries have seldom materially receded, and even then have soon re-attained the higher rate.

NEW MARKETS.—Still, looking at deliveries even in the most favorable light it is more than doubtful whether they can long keep pace with the rapid increases taking place in production not only in India, but especially in Ceylon,—unless indeed new outlets can speedily be found, or existing foreign markets can be considerably extended.

CONSULAR REPORTS.—The published Consular Reports contain information of a specially useful character to those interested in the development of an export Tea trade. In addition to instancing various foreign markets recently opened, or largely extended for Tea, they throw much light upon the condition of British enterprise in many important localities as compared with more pushing commercial nations on the Continent. It may be mentioned that for every *one* British commercial traveller in the Levant, there are *twenty* representatives of Mercantile Houses owned by two only out of the many foreign nations competing against us.

The subject of New Markets is of great importance to us, as a nation bestowing considerable attention upon the cultivation of Tea. We therefore append a table showing the quantity of Tea exported from England to various countries during recent years.

Table showing the average amount of Tea in pounds exported from Great Britain to the following countries during 1882-83, and 1884-85:—

Countries	Average Exports during 1882 & 1883 lb.	1884 & 1885 lb.
Germany	17,671,000	17,879,000
Canada	6,231,000	8,229,000
United States	1,301,000	3,775,000
Holland	3,373,000	3,422,000
Russia	3,361,000	2,517,000
Turkey	579,000	991,000
Denmark	813,000	791 000
Newfoundland	844,000	771,000
Chile	607,000	744,000
Channel Islands	612.000	664.000
Morocco	444,000	643,000
Portugal	589,000	631,000
France	616,000	542,000
Brazil	406,000	393,000
Victoria	21,000	235,000
Belgium	(no returns) 1885	207,000
Argentine Republic ...	275,000	195,000
Gibraltar	150,000	144,000
Cape of Good Hope ...	114,000	141.000
Austrian Territories ...	162,000	120,000
Malta and Gozo	106,000	100,000
British West Indies ...	98,000	93,000
Natal	122,000	87,000
Uruguay	84,000	77,000
Peru	58,000	60,000
Spain	48,000	49,000
Egypt	34,000	43,000
Bolivia	29,000	40,000
Roumania	36,000	28,000
Azores	14,000	22,000
Bermuda	19,000	15,000
Maderia	13,000	13,000
St. Helena	14,000	12,000
Danish West Indies ...	7,000	4,000
British Guiana	5,000	4,000

It is necessary to mention that only a small portion of the large amount exported to Germany is consumed in that country, the greater part being re-exported. In addition to the above exports from Great Britain large quantities of tea are transhipped to various places. In 1885 the principal transhipments were as follows:—

United States...	6,012,000
Germany..	2,380,000
Holland	895,000
Russia	262,000
Turkish Dominions	225,000
British North America ...	138,000
Argentine Republic	685.000
Austrian Territories	89,000
Uruguay	78,000
Norway	91,000

Cannot Indian and Ceylon tea be introduced in some of these numerous markets? There is a large field for enterprise in the extensive markets of the United States of America, where some 70 million pounds of tea are annually consumed; and there, the proportion of Indian and Ceylon tea used is at present infinitesimal.

In order more fully to elucidate this important subject, we intend issuing in a circular upon Ceylon tea, a list giving the quantity of tea consumed in various countries—together with the different rates of duty charged upon the article.

PRODUCTION.—In view of the rapidly increasing imports we venture again to draw attention to the subject of "Plucking," upon which we have frequently commented on former occasions; we would strongly urge the advisability of pursuing a medium course, and above all, of avoiding the dangerous policy of flooding the market with an enormous quantity of inferior liquoring tea. The great point to be aimed at in the future is *quality* not *quantity*. The need for utilizing every facility for improvement in manufacture, and for systematic economy is becoming more urgent every year.

BONDED WAREHOUSE RETURNS do not unfortunately show the movements in the different grades of Indian Tea; this is a matter in which we believe an alteration would be of advantage to the trade, as it would often be useful to know in what particular sorts the deliveries were most extensive.

GOW, WILSON & STANTON,
Tea Brokers, 13, Rood Lane, London, E. C.

PLANTING IN NETHERLANDS INDIA TOBACCO.

(Translated for the *Straits Times*.)

In Java, encouraging signs are not wanting, evidencing a determination on the part of the interests suffering from the prevalent depression, to put their shoulders to the wheel, and help themselves in place of relying upon the aid of the Government, which indeed shows no disposition to move out of old fashioned grooves. The planters there who have already taken the pioneer lead to protect themselves more than once have again bestirred themselves to set an example to their fellow colonists. The *Java Bode* says that, with a rare spirit of co-operation, they recently decided upon setting up experimental stations for the behoof of sugar growers. Now they have laid the foundations of another station of the kind for the cultivation of hill produce articles. There is every prospect of the scheme coming to maturity. Under influence of the thought that the only way for Java planters to carry on the struggle for existence with any hope of success in the future

would be for them to take every advantage of scientific improvements in the direction of reducing the cost of production, the members of a planting association in the Preanger Regencies, have taken the first step for the purpose, by sending round to their fellow planters a circular requesting their cooperation in gaining the desirable end in view. The Government has also been applied to for part of the money required in the shape of a subsidy.

A gentleman named Carst who intends starting a tobacco estate in Cotie on the East Coast of Borneo, writes to a Batavia journal pointing out that the British North Borneo Company has committed a blunder in failing to forward its tobacco to Amsterdam or Rotterdam instead of to London. In these Dutch cities, there is better chance of securing higher prices, owing to the greater demand for the article, in consequence of the hundreds of dealers from Germany and America, who carry on a brisk competition there. At London, adequate competition is wanting from so few dealers having the means to travel there for the purpose of buying tobacco. In fact, the consumption of tobacco is so limited in Britain that the latter country has no chance of becoming a market or emporium for leaf, coming up to the kinds produced in British North Borneo.

MANURING FRUIT TREES.

We have often noticed great waste of material and labour expended on fruit trees, and because no visible reward—by finer or more abundant produce—was experienced, the practice of surface-dressing was denounced as useless, and then abandoned. But the mistake was in the application of the manure, the feeding roots being far distant from the stems of the trees, and I need not say that these roots had no assistance rendered them whatever. In a large West of England orchard which we visited during last summer, manure in abundance was placed over the hard dry surface, in circular form 1½ foot wide, by the trunks of the large trees. The advice was copied from some horticultural journal, but certainly not to the letter, and it is because such work is often performed in such an unintelligent manner that the instructions so well given have been treated with contempt. Often manures scientifically prepared to meet the wants of fruit trees, vegetables, and flowers are denounced as being worthless because they have been misapplied.

Vines are frequently victims to barbarous treatment in the manner indicated. Borders which may have been well prepared with the best of material are long since vacated by the feeding roots, which may have gone out into the vegetable quarters, or into a hard road if such were near by. Cultivators may sometimes be seen treating such borders to their annual dose, or biennial supply of choice manure, solid and liquid, and at the same time all was waste—none could reach the feeders. The Vines gradually failed, disease became prevalent, and failure was certain. We have more than one such case in our mind's eye at present, where valuable applications are given which is utter waste. The hint given regarding the renovation of the Madresfield Vines may be taken by many who have long been helping (in vain) the roots of their Vines. Trace the feeders to their utmost limit, and good service may be then done by feeding them where they can consume their food.

Shrivelling is much complained of this season (we have a little of it), but attribute it to absence of moisture at the roots, or to a dry, hot atmosphere, or both at the same time. Our shrivelling is easily accounted for. The roots of some two Vines had grown up into the surfacing of manure in the inside border, and when damping the house was discontinued these roots were dried up.—Caledonian.—*Gardeners' Chronicle.*

CULTIVATION OF CHAVICA BETEL.

BY MR. S. RAMASAWMI IYAH OF CHINGLEPUT.

(*From Journal of the Agricultural Students' Association, Saidapet, Madras.*)

I purpose to give you a detailed report on the cultivation of Chavica Betle as practised in this part of the District (Chingleput). The subject is one of much interest, and it is hoped that it will secure the attention it deserves.

Varieties.—There are two important varities, *viz.*, the white, and the black. The former is sub-divided into "Karpuram" and "Goulipathrum," whereas the latter, into "Kammaram" and "Kalizeru."

Karpuram.—Small, fine, and agreeable to the taste.

Goulipathrum.—Large, thick, agreeable to the taste, and aromatic.

Kammaram.—Large, thick, pungent, and aromatic.

Kalizeru.—Small, not very thick, and bitter to the taste.

Extent.—The white variety is cultivated largely in this District to the extent of 1,842 acres, whereas the latter occupies only 398 acres.

Selection of land.—Red loams and clayey soils are best fitted. Sandy soils are objectionable. As a rule, the land selected should contain a fair amount of organic matter. The crop requires a very copious supply of water, and, therefore, it is desirable that the land be freely irrigable by gravitation.

Preparation of land.—Land which has recently been cropped with paddy is fallowed for three months. In the beginning of June, straight furrows are made by a plough 6 feet apart. Trenches are then dug in the field (1 foot 3 inches deep by 2 feet broad) along the furrows. The soil removed from the trenches is heaped in the interspaces, leaving a margin of 9 inches on either side, to a height of 1 foot. The length of these trenches depends upon the extent of the field: the trenches referred to throughout my report were 280 feet in length.

Agathi Planting.—As a rule, the betle crop is planted along with Agathi albiflora. The advantages of growing them together are as follows:—1.—that the gardener may have free and full control over each plant. 2.—that the creeper may be trained on the agathi plant. 3.—that the creeper may be protected from high winds. The method of sowing the seeds of the agathi is as follows:—Seeds are placed in water; those that float are rejected, and those that sink are taken for sowing. About 54 Madras measures of seed are necessary for sowing an acre. Under favourable circumstances and careful management a less quantity may suffice. Four rows of agathi seeds are sown on either side of the trenches, 4 inches apart between the rows and 9 inches in the rows. By the end of a week after sowing, the whole field is covered with young agathi plants in regular drills. These plants require no shade when they are young, but regular watering is necessary. When the whole field is well covered and the plants attain to a height of 7 feet to 9 feet, preparations are made to plant betle creepers.

Fences.—Fences are absolutely necessary for this crop. There are two fences, *i. e.*, the outer and the inner. The outer is generally a live fence while the inner is a dead fence.

Planting plantain shoots.—Plantain shoots are planted at the rate of 200 to an acre. The plantain requires no cultivation besides what is usually done for the betle crop.

Selection of Betle creepers.—Creepers (with leaves) specially selected, are the tops of healthy plants whose leaves possess superior qualities. Each of these tops, or creepers, must contain 9 nodes; 150 bundles to an acre are required.

When planted.—In the beginning of December, when sufficient shade is afforded by the Agathi plants, the creepers are planted.

How planted.—The creepers are arranged in sets of two each. Two such sets are placed horizontally opposite to each other in the soil between every two Agathi plants of the second row. Puddle taken from

the trenches, is then placed over the creepers so as to cover the cut surfaces but no manure is applied Three months after planting, *i.e.*, in the beginning of March the creepers strike root, when new leaves appear on the main stems. These, as they grow, are fastened to the agathi plant.

Irrigation.—As a rule, these betle fields are irrigated from tanks and but seldom or never from wells. Water is distributed in the trenches by gravitation. When the trenches are full, a cooly is employed to throw water on the ridges. Regular watering is usually necessary for the betle crop throughout its duration of growth. It may be remarked that the trenches are always filled with water which becomes stagnant and ultimately a nursery for injurious insects that feed upon the plants. Excess of water turns the plants pale in colour, and weakens them.

Diseases of the plant.—The betle leaf gets blanched and sickly, if deprived of light. When the evaporation is impeded, they suffer, while on the other hand when it is excessive, leaves dry and fall off. *Rot*, a disease in which the lower branches begin to decompose, is also seen when there is no free circulation of air. A *fungus*, characterised by small bundles of white globules, is also seen among them. It first attacks the roots and then the stem. The plant attacked by it, turns yellow, and the leaves fall off; the section of an internode exhibits a dark ring around the pith, and ultimately becomes rotten. When plants are affected in the abovementioned ways, the agathi plants are stripped off their leaves and the diseased plants are removed.

"Serva" operation.—In the beginning af April, the operation of arbouring the stems of Agathi plants known in Tamil as "serva" operation takes place. This is as follows:— A plant in the first row along the margin is tied up with the corresponding one in the adjacent row on the same ridge. When the whole field has thus been dealt with, a pair of agathi on the ridge is fastened to the opposite pair on the other. Bamboos are at the same time placed all along the interior angle formed by the junction of two pairs of agathi, facing the trenches. 600 bamboos of 2 inches in diameter, on the average, are required to each acre. This operation engages the labour of 50 men to complete an acre in a day.

Harvesting leaves.—No leaves are plucked until the plants are about 6 months old from the time of planting. The gardener never plucks leaves from the main creeper, but removes them from the branches. From the beginning of June, 25 bundles of 400 leaves each, may be collected from an acre per day till the first pruning takes place. The plants are afforded 3 months' rest between the successive prunings.

Pruning operation.—When the creepers reach the full height of the agathi plants, the ties are removed, and the whole creeper is shortened to 3 feet and the ties are replaced. The fibre used in binding is obtained from the stem of Cypress bulbosa.

Manure required.—At each time of pruning or *lowering*, 50 cart loads of compost are required for each acre.

Labour required.—One cooly takes 10 minutes to do all the manipulations necessary for one creeper. As there are 560 creepers in a ridge he will take 96 hours to finish the work. Considering that 8 hours= 1 working day, a ridge will be finished in 12 days by a cooly, in other words, 12 coolies are required to finish a ridge in one day or 300 coolies to an acre in a day.

Duration of growth.—Under favourable circumstances and good management, the crop will live for a period of not less than 6 years.

Labour difficulty.—The chief difficulty which the cultivator experiences in the cultivation of this crop is securing a sufficient number of coolies at the proper time, notwithstanding the enormous expense that he is prepared to incur.

PRODUCTS OF DOMINICA.

CACAO.

Dominica ought to make a fine display of cacao, as on its increased cultivation unquestionably rests, in no small degree, the future prosperity of the island. Two or three specimens will only show that cacao can be produced here, but a large variety of exhibits—say specimens from thirty or forty of the principal growers—will give visitors to the Exhibition some idea of the island's capabilities in regard to this staple.

The following are the classes under which our cacao and its products can be sent:—

1. Dominica plantation cacao—fermented.
2. Dominica plantation cacao—fermented and clayed.
3. Dominica settlers' cacao.
4. Prepared cacao.
5. Chocolate.

Three quarts of cacao should be sent, put up neatly in shallow boxes about 14 inches square, but two pounds of prepared cacao and chocolate will be sufficient.

The plantation cacao should of course have the name of the estate and the exhibitor as well as the ordinary marks that are placed on the bags before they are sent to the market. The cacao can easily be "clayed" by rubbing over the beans finely-powdered red earth or clay as soon as the fermentation (or "sweating") is completed. Clayed cacao fetches a better price than the ordinary article and it is usually bought by the French for their celebrated chocolate. In some instances red ochre is substituted for clay, and we know of an instance where it was so employed in this island.

Settlers' cacao forms the greater part of our crops; it is the cacao purchased by the merchants from the peasant proprietors, and unfortunately it is to this imperfectly fermented and sometimes unripe article that we owe the prevailing low prices for the Dominica cacao. To our merchants we must turn for representation in this class, and we sincerely trust that each cacao broker will send on a sample of "settler's cacao" with the name of the firm and the usual mark. This will really be an important exhibit, for if it be demonstrated to the trade that we have plantation and settlers' cacao, it will at once cause extra scrutiny amongst buyers, and raise the price of the former article to the great "benefit of all concerned."

Our prepared cacao and chocolate will also make important exhibits; and it would be a good commercial speculation for one of our merchants to consign these articles in quantity to the Executive Commissioner for the use of the refreshment bars and pavilions in the Exhibition grounds. A cup of pure Dominica cocoa or chocolate will be a surprising treat to those accustomed to the villainous decoctions usually sold in such places, and it cannot but tend to draw attention to our island.

COFFEE.

Under this head we make the following divisions:—

1. Arabian or "creole" plantation coffee.
2. Arabian or "creole" settlers' coffee.
3. Mocha coffee.
4. Liberian coffee.

Years ago Dominica was one of the chief coffee producing countries in the Western Hemisphere, and capital enterprise alone are wanting to make its name known again in the great markets. Liberian coffee grows well in the lowlands; and, in spite of the "white fly" blight, the so called "creole" variety gives remunerative crops in lands situated over 1000 feet above the sea. It is to be hoped, therefore, that there will be a good coffee exhibit at the forthcoming exhibition. Three quarts of each kind of coffee is the minimum quantity required, and the exhibit should be packed in flat boxes about 14 inches square, and about 1½ inch deep. The labels should have the name of the exhibitor and the estate.

We may here impress on every exhibitor to attend carefully to neatness in getting up his exhibit, for any article will look much better in a tastily made box than it would in a rough receptacle hastily knocked up out of an old packing case. Mr. Jemmott, the carpenter, made the most of the boxes sent to the Demerara exhibition, and the neatness of the Dominica exhibits at that show was the subject of much public and private commendation. Two shillings each were charged for the boxes.

SPICES.

We can send eight kinds of spices as will be seen by the following enumeration:—

1. Nutmegs.
2. Mace.
3. Cloves.
4. Cinnamon.
5. Ginger—*a*. Unscraped.
   b. Scraped and cleaned.
6. Vanilla.
7. Black-pepper.
8. Pimento.

Thus we see we have nearly all the known spices growing in the island, and this will be a most important fact to impress on the visitors to the exhibition—for the bulk of the spices used come from the East Indies, and therefore they cost more to place in the English and American markets. Nutmegs have done much to help on the prosperity of Grenada, and it is to be hoped that in a few years the same thing may be said of Dominica. Already two of our planters have commenced the cultivation in real earnest, and other doubtless will soon follow in their wake.

Pimento, allspice, or Jamacia pepper, is the fruit of our "Bois d'Inde" picked green and dried in the sun. It is a very important article of export from Jamaica.

OTHER FOOD PRODUCTS.

Of these we have a large variety, and possibly our readers will be able to add to the following, fifteen classes which we have made in the division:—

1. Farine manioc.
2. Farine starch.
3. Arrowroot.
4. Tous-les-mois.
5. Plantain starch.
6. Yam starch.
7. Tania starch.
8. Bread-fruit starch.
9. Sweet-potato starch.
10. Tapioca starch.
11. Plantain meal.
12. Dried sliced plantain.
13. Rice.
14. Dried peppers (or capsicum) whole.
15. Ground peppers. (or Cayenne pepper).

Most of the above articles can be exhibited by the ladies, and we take this opportunity of pointing out that the sterner sex are not expected to carry off all the honours. The Exhibition Committee will be very glad to receive all the help the ladies can give in making the Dominica Court at the Exhibition worthy of the island, and their Honorary Secretary will only be too happy to assist *all* intending exhibitors to the best of his ability.

We may remark that the true Cayenne pepper is made from the bird pepper—a common Dominica wayside plant of two kinds. One kind bears small round red berries, and the other has elongated pyramidal ones.

Three quarts is the quantity fixed on for the meals and starches, and the article may be exhibited in boxes similar to those described above. It will be as well to line the boxes with blue or white paper.—H. A. A. N.—*Dominica Dial.*

CINCHONA IN MEXICO.

Notwithstanding the discouraging state of the Cinchona market fresh competitors in the industry are entering the field, and the latest of these is the Mexican Government. Cinchona was first introduced in Mexico by the Emperor Maximilian, in 1866, upon the advice of Mr. Maury, a scientist and lieutenant in the United States Navy, who had been making a tour through the South American Andes, and was struck with the climatic similarity of those regions to certain parts of Mexico. The Emperor Maximilian applied for cinchona seed to Mr. Waltham, who had introduced the plant in the East Indies, and received from him a supply of three different species, together with instructions regarding the treatment of the seed. By the Emperor's orders the seeds were handed to the Geographical and Statistical Society of Mexico, who in turn, commissioned a Mr. Jose Apolinar Nieto, of Cordoba, to plant them, and supplied him with the necessary funds for the experiments. A German named Finck, carried on an experiment with some seed of the *C. condaminea* variety, which planted and produced good seed at the end of four years. He afterwards planted a number of seedlings on an estate at a height of between 1,800 and 2,000 feet above the sea-level. But the mean temperature of these plantations, 75° F. was found too warm, and the plants did not succeed, although they attained a height of thirteen to sixteen feet. In 1873 only 115 of the trees survived. Dr. Finck, notwithstanding this disappointing result, remained a firm believer in the feasibility of successful cinchona-growing in Mexico. In 1874 he made a fresh attempt, this time on a "rancho" about 2,900 feet above sea-level, and had the satisfaction to see his efforts crowned with complete success and to find other planters following his example. At present 12,000 trees are flourishing on Dr. Finck's plantation, and it is said that the total number on the plantations around Cordoba is nearly 20,000. A great many varieties have in course of time sprung up from the original three species, and the alkaloidal percentage of the Mexican cinchona is equal to that of the best Bolivian bark. Nevertheless it would seem that for the next few years, at any rate, there is no probability of cinchona being exported from Mexico. All the bark which is grown in the republic is consumed in the country, local wholesale druggists buying it at prices ranging from 56½c. to 75c. (2s. 4d. to 3s. 1d.) per lb. It is not, therefore, worth the while of growers to export their cinchona to markets where, most likely, it would realize less than at home. Foreign cinchona has to pay an import duty of about 2d. per lb. in Mexico, and quinine about 1½d. per oz., while the shipping and carrying expenses are very heavy.—Local "Times."

RHEA IN MEXICO.

I notice from time to time an expression of opinion by correspondents in your columns to the effect that, successful as tea has become, Ceylon planters will do well to see that they be not again caught, as was the case with coffee, with all their eggs in one basket. With this in mind and remembering the nature of your climate in the low country, and in mid-region between it and the hill-ranges, I have lately been taking notes in regard to the growth of the rhea plant, from which is made the well-known and valuable China grass, as well as of its manufacture into a great variety of fabrics. There is a Rhea Manufacturing Company in London with a factory on the River Lea, and a large extent of land in the Madras territory, where the plant is being grown and treated for handy shipment. During the currency of the Colonial Exhibition, I had frequent opportunities of examining the beautiful fibres and cloths shown by the Company in the Indian Court. They have already indeed manufacturers to take up the article, but what is wanted is a larger supply, for there is very little doubt that many thousands of tons of the prepared fibre would be taken at paying prices. Having had, whilst in India, some experience in the growth of the rhea plant, I do not hesitate to say that it is most readily cultivatable in a moderately good and light soil, in a climate such as exists in the Ceylon maritime districts, and, even as high up as Gampola and Kadugannawa. In many parts of India it is successfully grown, but hitherto the difficulty has been in separating the fine long fibres from the woody stalk, covered as it is with resinous matter. This, the Company declare, can be easily and economically carried out by adopting a very simple process which they have patented. They are prepared to enter into engagements with any persons who will grow the plant and supply them with the fibre in the raw state under their patent. In placing before you, for the information of your readers, a few extracts from the Company's lately published pamphlet, I have in view the possibility that the cultivation may find someone willing to give it a trial on a small scale in some moderately

moist district, Saffragam, Kurunegala, the Kelani Valley, Kalutara, Galle, Matara, and doubtless other localities would be suitable. The pamphlet in question says:—"The Rhea Manufacturing Company will supply seeds and plants and cuttings, and will either buy the crop, or, in certain cases, accept drafts against consignments intended for treatment and sell them to the best advantage of the consignor. The Rhea Manufacturing Company is prepared to consider propositions for its sole agency in such of the British Colonies and dependencies as are not already occupied by its licensees; the principal duties of such agents being to facilitate the cultivation of rhea by even the smallest landholder. The patent processes of M. Favier and Professors Frémy and Urbain, of which this Company holds the exclusive rights, render it possible to convert into "ribbons" on the ground where grown the whole crop so soon as cut. As this is done without breaking or bearing the stems, all the "nature" and valuable qualities of the fibre are preserved. The preparation of the raw material so obtained is completed at the Company's extensive works on the River Lea, near London. Growers, therefore, dealing with the Rhea Manufacturing Company, Limited, will produce at the smallest cost, and will receive the highest market rates. Rhea varies in its yield and quality according to the latitude in which it is grown, the land in which it is planted, the time of year in which it is cut, the rain-fall of the locality or facility obtainable for artificial irrigation. A consideration of paramount importance is that the outlay, diligence and care indispensable for a rhea plantation *cease* (so far as the area planted is concerned) with the end of the second year. After the second year the agriculturist has an increasing and perpetual income and a minimum expenditure. Rhea is an evergreen, and once properly planted fills every vacant spot of ground, leaving no room for weeds. The normal crops really begin only after the second year of planting; from that time the crops obtainable throughout India and latitudes from 0° to 20° may be calculated as from 3 to 6 per annum, each crop giving in the third year about 200,000 stems per acre. This number, however, as well as the weight of each stem and of the fibre in each stem, will vary according to the conditions mentioned above. Taking an average of four crops a year or 800,000 stems per acre per year, and 10 green stems (stripped off their leaves and with the tops cut off) to the pound, and taking it also that the ribbons, when decorticated, will weigh one-tenth of the gross weight of the green stem (stripped off its leaves and minus its top) the 800,000 green stems will weigh 80,000 lb. and should yield 8,000 lb. of dry ribbons. Assuming the selling price of these ribbons to be £10 per ton on the ground there would be in the first and second years enough tops for the nursery, plants for transplanting, and stems cut for ribbons to cover all costs incurred except the original outlay for preparing the ground and purchase of plants. According to the statements of the manager of the Company it will require about two millions of matured stems to yield a ton of marketable fibre worth £30. The preparation of the ribbons for working into the fibre is, I am assured, of the simplest and most inexpensive kind, by a patented process which the Company will place at the disposal of anyone working them. I furnish these outlines in the belief that someone or more with spare land on his hand may care to try this new cultivation.—Local "Times."

BRITISH NORTH BORNEO: ITS PEOPLE AND PRODUCTIONS.

The island of Borneo and the surrounding seas are exceptionally rich in natural products, many of which, are, as yet hardly, if at all, collected or utilized. The main reason why these resources have been so little taken advantage of hitherto, is, that matters have been in such a disorganized and anarchial state, that it was impossible to store up the slightest wealth, without some one more powerful than the possessor coming and seizing it, by force of arms, if need be. It was useless, therefore, up to quite lately, for any one to attempt to do more than provide for his immediate wants, and so much has this grown to be a habit, added to the natural laziness of the Malay character, that the bulk of the people simply have, even now, no thought for the morrow. A remarkable illustration of this is found in the undoubted fact, that it has been known that Bajau boats having brought some "find" of a rather higher importance than usual to market, and bartered it for the only article they attach any value to, rice, have afterwards thrown the greater part of the remainder into the sea, rather than be at the trouble of taking it about with them. It will thus be understood that the people of these parts have come to regard it as but a natural state of affairs that they should be surrounded by wild produce of a valuable character, which they have only to stretch out their arms to gather, and, in fact, as a Bank upon which they simply have to draw, whenever the need arises.

Sea Produce.—Bêche-de-mer, scientific name, *Holothuria*, or Sea-cucumber: Malay, *trepang*: Bajau, *bart*. These repulsive looking echinoderms occur in quantities all round the coast, and are collected principally by the Bajaus, or sea-gipsies, who cure and dry them, and bring them to market, where they are bought by Chinese traders, and sent ultimately to China, where they are much appreciated, being used principally to make soup of. They vary considerably in price. Some of them have no value at all, and go uncollected; others fetch as much as $25 a picul, but the usual price is from $10 to $15 per picul. Along our own coast they are rather fully collected, but amongst the islands, and on the coast line down to the south there are immense quantities left undisturbed from year to year. The exports of this curious produce during the years 1882, 1883, and 1884, were valued at $6,739, $9,057 and 7,373 respectively.

Keema is a large mollusc, resembling an enormous cockle or clam. Their shells may occasionally be seen in museums in England, and are much used in France as vessels for Holy Water at the entrances to churches; these shells are sometimes found six feet in width, and the natives aver that they grow very much larger, and state that on the coast of Tawi-Tawi, there is one as big "as a house." It may be mentioned, however, that fifteen feet broad for a Bajau house, would be quite a respectable size. *Keema* is usually found on a coral bottom, and it requires the keen and practised eye of a Bajau, to distinguish between them and the surrounding lumps of coral, &c., they usually present the appearance of an indigo-blue streak, the partly opened mouth being all that is visible, the shell being too much covered by sea-weed, anemonies, &c., to be seen, and when the Bajau distinguishes one from amongst the quantities of other creatures and colours, with which the bottom abounds, he thrusts a three-pronged spear into the aperture, whereupon the two shells close with a firm grasp, which enables the fisherman to bring it to the top without further trouble. The price of *Keema* is usually so low, that it is despised by the gatherers, though however low the price might be, $2 to $3 a day, could always be earned by collecting it. During the war between France and China the prices of *Keema* rose considerably, owing, I was told, to its being more easily prepared for culinary purposes than *trepang*, and therefore more adapted for soldiers on the march. There are places on the coast where boat loads can be got in a very few days, and its collection was being largely expanded, when the end of the war came, and prices showed a disposition to fall.

Agar-agar, an edible sea-weed grows freely enough in many places at the bottom of the sea, and is to be had for the collecting.

Mother-of-Pearl Shell is the produce of a very large oyster, known locally as *tepai*. Beds of this oyster are found in the seas all the way from Borneo to Australia, more or less; they would seem to terminate, however, about Lat. 6, North. There is a tradition of a large bed being situated outside Balhalla, somewhere between the islands of Nunuyan and

Taganac, and in confirmation of his report, occasional single specimens have been obtained. A bed also exists, without much doubt, on the 'Rene" shoal off Tambesan, but the mouth of Darvel Bay has to be crossed to the southwards before ground is reached, where they are constantly found. Information apparently trustworthy has been received of an important bed, extending from Port Elphinstone to some sixty miles to the southward, called the Ada Bank, so named after the wife of Mr. Pryer, the Resident of the East Coast. Shells from this bank are sent in occasionally, and some pearls are said to have been found. The price of shell is usually about $45 a picul. Exports hitherto in this article have principally been composed of a few shells that have, from time to time, found their way over from the Sooloo islands to Sandakan.

Pearls.—These are found in the above-mentioned mother-of-pearl or tepai oysters. Hitherto but very few have been found on our own coast, and those which are offered for sale in our market have come principally from the islands of Tawi-Tawi, Skobong, Ubian, &c., in the Sooloo Archipelago. Pearls of very high price are not unfrequently to be bought in Sandakan. The largest one that has been seen was valued at $8,000. The diving powers of the people who bring up these shells is something extraordinary, and is probably not to be exceeded anywhere in the world; without any stone or weight they turn over on the surface of the water and swim down head foremost to the bottom, collect shells, and bring them up, each one weighing six or seven catties. In this manner they will descend to an ascertained depth of twelve fathoms, and claim to be able to go down much greater depths. In waters much infested by sharks, a sort of plough shaped trawl, here called "badjer" is used.

Seed-pearls.—These are found in a thin flat pinkish-shelled oyster, known locally as *Selisiep*, which occurs usually in shallow water on the mud at the mouth of rivers. This oyster is somewhat peculiar in character, the water in which alone it can thrive must be slightly brackish, as it cannot live in entirely salt water, while on the other hand, an admixture of too much fresh water kills it at once. There used to be large beds of it in Sandakan and Lakuk Bays, but very heavy rains in the year 1879, so thoroughly destroyed the oysters, that they have never properly recovered yet, (December, 1885.) On several occasions it has been said that the oyster was beginning to be found again, and that minute pearls were forming in them, but rains always came at the critical moment and destroyed them. In Maroap Bay, a certain amount of collecting has been in progress for the past two years, and there are places in Darvel Bay, where these oysters are abundant, but other natural produce, more easily collected, is so plentiful in its neighbourhood, that they are never touched. Seed-pearl collecting is great fun. It is always necessary for several boats to rendezvous, at the same time and place for the purpose of frightening away the crocodiles and sharks, and for the same reason, as much shouting and splashing about as possible, is indulged in. The consequence is that there are rarely less than from twenty to thirty persons in the water at one time, all diving, splashing, laughing and shouting at once, and rarely bringing up less than three to four shells at a dive, whilst extra yells from all hands salute a rather larger find than usual. The mode of obtaining the pearls is by opening the oysters and throwing their contents into some vessel, and there leaving them to decompose, stirring them up daily during the process, until at last the liquid putridity being poured off, the pearls are found at the bottom. Very few of them are large enough to be of any value individually, but they are sent to China where they are pounded up and made into powder and there swallowed by ladies who desire to improve their complexion, at least so we are told. Another and rather larger kind of oyster known as *beloong*, found in somewhat deeper water than *selisiep*, also always contains seed-pearls. Exports 1882 $71, 1883 $106, and 1884 $2,401.

Tortoise Shell.—The name applied to this article of commerce is somewhat of a misnomer, as it is supplied by a turtle; these turtles are fairly common in our seas, and are usually obtained by means of spearing as they lie asleep on the surface of the water. It is averred that the turtle-egg collectors, if they find a lay of eggs, less than one hundred and thirty in number, return to that spot twelve nights afterwards when the same turtle comes again, and, being secured, is always found to be of a good kind. (The ordinary turtle is not interfered with.) The usual price of tortoise shell is about $6 to $12 for the produce of one turtle, but occasionally, single shells are valued at extraordinarily high prices. Some short time since one was secured by Panglima Ypel, which was said to have been sold for $500, and more recently, we have heard that $2,000 was asked for a single specimen brought to Sandakan. No people but Chinese, would pay such prices for such an article.

Turtle Eggs.—Some of the sandy shores of the islands about the East Coast, abound with turtle eggs, which are collected by boats which go in search of them, and quite a large trade is the result, baskets' full always being exposed for sale during the season in the shops at Sandakan. The island of Bergoan is the one most favoured by the turtles, and the season is during the continuance of the southern monsoon, viz., fron April to October.

Sharks' Fins.—Sharks abound in these seas, and are caught chiefly by the Bajaus, in a variety of ways, sometimes by hook and line, sometimes in *keelongs* (fish-stakes or fish-weirs they would be better known as in England), and sometimes by spearing, but by none of these methods can the very largest be captured, and they sometimes are seen of immense size. A Bajau boat however rarely returns from a trip of any duration, without bringing a bunch of tails and fins, usually cut off from fish four to seven feet in length. The quantity in the sea may be described as inexhaustible, and the larger our sea-population grows the more sharks fins are likely to be brought to market. Our sharks are, to a certain extent, dangerous, but not so very much so; an occasional mother-of-pearl shell diver is carried off, but otherwise accidents happening to persons going into the sea are rarely heard of, not by any means so often, as from crocodiles up the rivers. I have seen a canoe pass over the spot, where, a few minutes before, the two back fins of a shark had been visible, and between which the canoe (a very small one) could almost have been placed lengthways. A crocodile of similar size (if such a thing were possible) would almost certainly have tried to upset it, or at any rate knock the man overboard. The trade in sharks' fins, like most of the other articles hitherto mentioned, is carried on exclusively with China. Prices range from $8 to $25 a picul, and Exports were in 1882 $837, 1883 $1,105, and 1884 $1,516.

Sponges.—These are frequently washed ashore all along our coast line, wherever there exists much coral. I have seen one or two pretty fair specimens, but if sponges of any real value could be obtained by systematic searching or by a slight amount of culture, remains yet to be seen.

Edible Oysters.—In some places these abound to such an extent, that there are as many lying on the rocky shores as there are stones, and at first sight it is difficult to distinguish one from the other, boat loads could be obtained without any trouble. They are very good eating and quite innoxious so long, that is as the *rock* variety is procured. There is another kind found adhering in masses to the roots and branches of the mangrove trees, which ought to be carefully avoided, for, if eaten, this oyster occasionally produces an attack very much resembling colic, and even more dangerous. When dried, however, its harmful qualities are, I believe, to some extent destroyed. It is expected that a certain amount of export business will in time be developed in both these kinds of oysters.

Fish.—Nowhere in the world, probably, is there such a quantity and variety of good eatable fish, Eswarming in the seas, as off the ast Coast of North

Borneo. This is mainly owing to the wide extent of shallow seas (up to one hundred and fifty fathoms in depth) and to the numerous islands. Various of these fish resemble cod, rock-cod huge perch, whiting, herrings, &c., *menungin* is like haddock; *pila-pila*, soles; *ikan-mirah* red garnet; *ikan-parey* is a general term for all sorts of flat fish, skate, flounders, &c.; *ikan-tumbun* is nothing other than sardines; *ikan-blannak*, mullet. A large silvery-scaled fish has the appearance of salmon, but there the resemblance ceases. A great variety of others have no synotypes, in our English waters, but are excellent eating. Several methods are employed in their capture. *Keelong*, (fishstakes); hook and line; *scrambau*, (dip-net.) nets; casting-nets; spearing with and without torches, and *bubut* (a sort of trap sunk in the water) are the principal. Of these *keelong* fishing is the favourite when it is intended to take away a quantity. The principal, upon which the *keelong* is designed, is that of the wire mouse-trap, which being once entered it is impossible afterwards to escape out of. A fence, or barrier, extends from the shore to the required distance out at sea; the fish encountering this, skirt along it, and thus find their way through two outer chambers, till in time, they arrive in the end compartment. When once the fish have gone into the first chamber, there remains little chance of escape for them, the sides being curled inwards in a heart-shape at its entrance, so that though very easy to pass in by, it is a difficult matter to return. The compartment at the end is usually round, and about seven to nine feet across. The *keelong* is made of split bamboo, driven into the sand, and lashed together by split rattans. The total length of the split bamboo, at the end of the *keelong* being usually from twelve to fifteen feet. Low tide is naturally the time the fish are captured, a canoe paddling up from the shore frightens as many as possible from the first and second chambers into the end one, the narrow entrance or door-way into which is then closed altogether for the time by men who descend into the water, and put through the catching operations, with some little assistance from above. A curious sight may be seen when all is ready by anyone getting upon the slender scaffolding which surrounds and surmounts the end chamber, the water below being thick with fish of all sorts and sizes. The next proceeding is to lash a loose piece of *keelong* or bamboo-matting stick or screen kept for the purpose to the inside of the chamber (most of these operations, it will be understood being conducted under water), and being unfolded gradually, the fish are driven into a central fold of it till there is almost a solid heap of them. A basket is then let down from the scaffolding on top, and the fish are simply bailed out by the basketful and thrown into the canoe alongside. Many of the fish manage to get by or under the loose piece of *keelong*, as it is being folded around them, and this process has to be repeated three or even four times before all are taken, and even then there are frequently one or two so large that they cannot be got with the basket, and have to be speared. From three to five piculs of fish is not an uncommon take from one *keelong* a day; and four *keelongs* have been known to yield nearly thirty piculs a day between them for a week together. There is an absence of mental strain or physical exertion in working a *keelong*, which much commends it to the Malay character, for, as soon as the fish are caught, they are taken to market and sold in one lot to the stall-keepers, and there remains nothing else to be done during the rest of the day. This industry is capable of being indefinitely increased. If our population were larger and more pressed for means of subsistence, the fishermen would make larger and deeper *keelongs*, and would no doubt catch many more fish and a large export trade in salted fish would soon be inaugurated. In the south of Borneo, and in Java, there is a large inland population, salt fish being one of their staple articles of consumption, and their own seas being unable to supply all they want they would come to us for the balance.

Keelongs are a sure method for capturing crocodiles, should one appear in the neighbourhood of a *keelong*, it is certain to be found inside it during the course of the next day or two. No matter how large they happen to be, they but very rarely succeed in forcing their way through the fencing, as the bamboo is very tough and yielding, and, owing to its being partly curled round, the creature cannot exert its full strength. When once caught, they are easily despatched by a rifle shot through the head, fired from the scaffolding above. The next most important method of catching fish, in any quantity, is by seining. This mode hitherto on our coast can scarcely be described as successful, the takes, by its means, not affording an adequate return for the capital invested in the seine and the labour involved. Seining has been principally practised by Chinese fishermen from Hongkong, and there is no charge to be brought against them for lack of energy, but it has been almost painful to notice the disappointing results they have brought to market after a hard day's toil, with expensive apparatus as compared with the boat loads of fish brought in by Sooloo men who have simply bailed them out of their *keelongs*, the construction of which costs but little money. The Chinese however are very loth to adopt new ideas, and sooner than practice what is clearly the best mode of obtaining a good catch in these waters, they give up the whole thing in disgust and return to Hongkong. Far too many young fish are captured in the seine, a matter which will require legislature in the future. All the other methods, by which fish are caught, may be described, as hand-to-mouth, ones, or at all events, suitable for the supply of the local market only. Hook-and-line fishing, is, perhaps the principal. When owing to want of rain, the water is very clear, the fish avoid the *keelongs*, and the supply in the market falls short, a canoe with two men, lying inside the harbour, can always capture from sixty to eighty catties of fish, in a few hours, which being in request, they can easily obtain $3 or $4 for, in the market. *Scrambau*, or dip-net fishing sometimes results in large takes, but it is only had recourse to in the off season: it is usually over twenty feet in width and is managed by a man sitting in an elevated position, who when he sees a shoal of fish passing over the net, lifts it and captures them. The fish thus caught are nearly always mullet; eighty catties a day is by no means an unusual take. The casting net is usually employed as a means for providing fish for single households. The correct way of handling it is a small art soon acquired, and it affords good amusement when fishing for shrimps and *ikan tumbun* (sardines.) These latter fish are very abundant in the Omaddal district, shoals of enormous size being always visible. The spearing of fish is practised from boats when opportunities offer; large skate and other flat fish which have a habit of sleeping on the surface being frequently taken by this means, and at night a bright light, either carried by hand or in a canoe attracts fish which are then easily speared, but no great quantity is taken in this way. Up to the present time the export of salt fish, has been very small, the upcountry demand being large enough to take all that is salted, but with an increased population, and cheaper labour a very large and important business may be expected.—*North Borneo Herald.*

CUTTING BACK PEACH TREES.—A "Maryland correspondent" says: "Some weeks since a very intelligent gardener insisted with me that cutting back budded peach trees was one source of weakened power that led to disease. The budded peach is, as you know, operated on near the ground. The next winter or spring the plant, perhaps four or five feet high, is cut down to the bud. Numerous sprouts come, and one only left to form the tree. This check, he says, affects the constitution of the tree. The seedling tree is not cut back, and for this reason it is always a healthier tree. Is there anything in this doctrine?" [We think there is a little theoretically—but practically it is we think so little of an injury as not to interfere seriously with the health. But it is worthy further thought.—ED.—*Gardeners' Monthly.*

CONSUMPTION OF TEA.

Those who are afraid of tea being overdone, may derive encouragement from the fact that in the seventeen years between 1870 and 1885, the consumption in Britain has increased by 60½ millions of lb., or by about one-half of what the consumption in 1870 was. The average rate of increase per annum was very nearly 3½ millions of pounds, a rate which, if peace is preserved and prosperity prevails, is likely largely to increase with the increase of population. There is every reason to believe that the present depression in India and Ceylon tea is only temporary.

PLANTING IN DELI.

(*Translated for the Straits Times.*)

A novelty in the commercial line is coming into vogue in Deli. Efforts are being made by certain parties there to buy up cover-leaf tobacco on the spot by Europeans. Their intention is to secure all the leaf available, so that none can be sent to the Amsterdam market. The local *Courant* is dead against the continuance of this practice, on the ground of its trenching on the virtual monopoly of the Amsterdam tobacco dealers which, so far, has worked advantageously in the interest of planters, importers, and traders generally. The rise of Deli as a tobacco producer, and the high position taken up in the market by that article, are said to be mainly due to the present state of things in this regard. The novelty, if allowed free play, will result in Sumatra tobacco being forwarded direct to smaller markets in different parts of the globe instead of to one central market at Amsterdam, where the multitude of dealers congregating in the busy season, ensure competition resulting in higher prices than can be secured under other circumstances.

Tobacco growing in Deli bids fair to distance that branch of cultivation as carried on in Java, owing to the crushing fiscal burdens weighing upon growers in the latter. To bolster up the failing revenue, a license tax has been imposed in Java, which has proved so heavy and oppressive as to be intolerable to the long suffering Javanese. The land tax is pitilessly exacted from the latter in spite of the circumstance that their means of meeting it are crippled by the price of rice falling 25 to 30 per cent. To make both ends meet, they had to set about growing tobacco. When ripe they gathered and cured the tobacco at home for sale in the neighbourhood. The money earned thereby, however small, proved welcome additions to the budget of the overburdened cultivators. Nowadays they have to take out licenses before they can plant tobacco at all. The bother and expense of taking out licenses have turned out so great as to deter the simple villagers from growing any more tobacco. No wonder the license tax has become hateful, detested, and vexatious.

The Battaks go on merrily burning down tobacco storehouses on estates. Sometimes they act on one pretence and sometimes on another. In one instance incendiarism was resorted to for the purpose of recovering alive a Battak killed by a certain headman. The authorities are too busily engaged in other matters to admit of their grappling firmly with this evil, no matter how hard it may prove upon the planters.

FISH-BREEDING: THE HISTORY OF HOWIETOUN.

The History of Howietoun. Part I. By Sir J. Ramsay Gibson Maitland, Bart. (Stirling, N. B. : J. R. Guy. Secretary Howietoun Fishery 1887.)

In view of the recent successful introduction of trout ova to the Nuwara Eliya Lake, our readers will be interested in the following extract from a review in *Nature* :—

Probably every one at all interested in fish-breeding has heard the name of Howietoun, and a great many people, especially in Scotland, have some knowledge of the character of the establishment and the operations there carried on. Occasional paragraphs in scientific periodicals, as well as in daily papers, announce some experiment in the artificial stocking of home waters with some kinds of trout or with salmon fry, or some successful exportation of salmonoid ova to America or to the colonies at the Antipodes. The name of Sir James Maitland or of Howietoun very often occurs in such announcements. Those who have given attention to the subject will find much to interest them in the account of the development of his fish-farm, and in the description of its present condition, which Sir James Maitland is now placing before the public. * * * *

In Chapter III. an elaborate account is given of the methods of packing ova. The first operation is to transfer the ova which are to be packed from the *grilles* to peach netting stretched on square wooden frames. This step is carried out in a specially constructed sink, through which water is kept running. The ova are emptied from the *grille* into a wooden box, from which they pass into a leaden basin with a narrow bottom. One of the frames is then floated in the sink, and a glass measure containing 1,100 eggs is used to measure the eggs from the basin on to the frame. The frames are placed in the packing-room in piles, one pile for each box. Next morning the frames are examined, so that any egg with an ill-developed embryo may be picked out. Then a square of swan's-down, contained in a special tray, is placed over the eggs on the frame, and, the two being suddenly reversed, the eggs rest on the swan's-down without altering their relative position; thus each egg lies separately on the swan's-down. The frame is removed, and the square of swan's-down with its burden placed in one of the travelling trays. Above the eggs is next placed a square of felted moss (*Sphagnum*). Above the moss is placed another layer of swan's-down carrying layer of eggs, and then another layer of moss, and so on, till the travelling, tray is filled. The bottom of the travelling-tray is made of perforated zinc, and before any eggs are placed in it, the bottom is coverved with a thin layer of moss. The eggs thus rest on swan's-down, and are covered with felted moss, a layer of which also forms the lowest and uppermost layer of the tray when full. For journeys to the Continent or America, unbleached lino is substituted for the swan's-down, because swan's-down retains so much carbonic acid that advanced embryos are asphyxiated. For the Antipodes, an extra precaution has to be taken: a thin layer of moss is inserted between the layer of unbleached linen and the eggs, so that the latter are in contact with the moss above and below. The travelling-tray is 10 inches square and 2½ inches deep. The trays packed in an inner box only ⅜ inch larger than themselves, and this is placed in an outer box 4 inches deeper and 3 inches wider than the inner. Between the two is a layer of sawdust. The outer box or case measures 1 foot 4 inches square, by 1 foot 10 inches deep. This is the method of packing for short journeys within the United Kingdom. The boxes for foreign consignments are larger, and oblong in shape; there is a sawdust space as in the boxes already described, but the trays are separated by meaus of charred fillets, so that an air-space surrounds each tray: above the pile of trays is a large ice-tray, which occupies the whole of the top of the box. Ova can be safely kept in one of these boxes during a period of sixty days.

COFFEE-CROP PROSPECTS—We hear that in consequence of the showers we mentioned a fortnight ago in the Ouchterlony Valley and Gudalur, there is now a fine display of vigorous blossom which, with a continuation of a favourable weather, should resu in large crops.—*S. I. Observer.*

BRAZILIAN RUBBER EXPORTS—during 1886 (according to the *American Grocer)* were 28,457,299 pounds, of which 17,411,662 pounds were to the United States and 11,045,637 pounds to Europe. The stock in Brazil, Jan. 1st 1886, was 2,435,400 pounds, and at the close of the year, Dec. 31st 1886, 1,541,375 pounds.

THE RECENT "PEPPERETTE" disclosures, which prove that a great deal of what is commonly called pepper is really ground olive stones, will not surprise people acquainted with the tasteless powder usually to be found in restaurant pepper-casters. The only way to defend oneself against the adulteration of coffee is to grind it oneself, and the same applies to pepper.—*Globe.*

TEA: BONDED GOODS.—The monthly account of the quantities of bonded goods remaining in the Customs and Excise warehouses of the United Kingdom on January 31st as published in the B. Bill of Entry, shows a stock of tea amounting to 109,386,375lb., against 108,154,004lb. in 1886 and 116,310,677lb. in 1885; cocoa, 8,931,998lb., against 6,164,303lb. in 1886 and 6,875,895 in 1885; coffee, 283,327 cwt., against 312,735cwt. and 372,523cwt. respectively.

GOLD IN BORNEO.—We have been shewn by Hadji Brahim a sample of coarse gold from the Bole river got a short distance above its junction with the Segama river, one piece is half quartz, and evidently not travelled from the matrix. In the opinion of the diggers in Sandakan the quartz reefs containing the gold are not far to seek. The dry weather and the search of experienced miners will doubtless bring them to light.—*British North Borneo Herald.*

VANILLA CULTIVATION.—Mr. W. H. Wright's culture of Vanilla—an orchid be it remembered—is likely to be most successful. On his two brickwork circles of trellis work at Wilhelmsruhe, Mr. Wright has up to date artificially fertilised no less than 3,000 flowers. He is also trying experiments with gum arabic and with ants in modes of fructification. It must be remembered that to Mr. Wright—in the old Peradeniya days of 30 years ago—belongs the credit of being perhaps the first in Ceylon to cultivate Vanilla for the European market. Some pods sent by Mr. Wright to an Exhibition in Sir Henry Ward's time were valued at 5 guineas the pound. A portion of the same Vanilla was sold at that rate in London through Messrs. Baring Brothers.' On that occasion the Committee, (Messrs. Rawdon-Power, Layard, &c.) red-tape-like, decided that Mr. Wright's small assortment could not be sent on. So also said other big-wig officials when applied to. Mr. Wright asked to see the Governor. Mr. John Bailey and others in attendance said: "Impossible—Sir Henry is deeply engaged with the mail." But Mr. Wright persisted and finally got an interview, with the result that like the hearty, manly English gentleman he was, Sir Henry entered into the Peradeniya Assistant's experiment with the greatest interest. "Stop the mail" was the Governor's cry;—but it was too late. "Well then prepare a runner express at once" was the order and all this for Mr. Wright's Vanilla! No wonder though Sir Henry Ward endeared himself at every turn in his Government of Ceylon.—Mr. Wright's experiment at Wilhelmsruhe is merely preliminary to cultivation at Mirigame where about 10 acres are being devoted to Vanilla.—Dr. Trimen has pronounced Mr. Wright's garden Vanilla the finest he has ever seen.

COFFEE AND CAFFEINE.—Some interesting experiments have recently been made by Dr. B. H. Paul and Mr. A. J. Cowuley on coffee berries in the unroasted state, and the results as published by them have revealed several important facts hitherto imperfectly understood or erroneously recorded in chemical literature. Many varieties of raw coffee, it is well-known, come into our markets, and their value varies so greatly that it is natural to suppose that their quality, so far as caffeine content is concerned, may vary proportionately, and a semblance of reality is given to this supposition by the published data, which put down the percentage of caffeine in raw coffee as from a fraction of 1 per cent. to as much as 3·64 per cent. Dr. Paul and his coadjutor have examined altogether about a dozen different kinds of coffee, and find that, instead of the percentage of alkaloid being variable, it is wonderfully constant; for example, Ceorg coffee beans yielded 1·1 per cent. (the minimum), while the maximum, 1·38 per cent., was shown by Liberian coffee, the variety which has been found to withstand climatic influences under which all others succumb. Continued experiments corroborate the first results, and it is fairly established that pure coffee may be judged by the amount of caffeine which it contains, about 1·3 per cent. being taken as the standard for roasted coffee. Consequently, the fraudulent sale of mixtures of coffee with chicory or other less valuable substances is now rendered easy of detection by Paul and Cownley's discovery, and they have rendered important service to chemical analyses by it. Another statement which they appear to have disproved is that caffeine is volatilised from coffee beans during the roasting process, for they find that the roasted beans contain proportionately the same amount of alkaloid as the raw beans.—*Chemist and Druggist.*

COFFEE IN AFRICA.—A planter writes:—"Have you seen the annexed from the 'Free Church of Scotland Monthly Record' for January *re* coffee planting in Central Africa. I remember going in company with the late Professor Balfour of Edinburgh, through the Edinburgh Botanic Gardens, and if I mistake not seeing the very coffee trees from which the seed sent out was derived, and at that time they had a quantity of white bug, the common white coffee bug of Ceylon, on them. No attempt had been made to take off the bug, though I daresay there being only one or two trees, it might easily have been done:—'2. African Missionary Coffee:—We have received from Mr. Ewring, Secretary of the African Lake Company, a sample of coffee drawn from the Company's first shipment of African coffee. Its history is noteworthy. Of three plants sent out to Shire Hills from the Edinburgh Botanic Gardens one survived. That plant has, in eight years, by the careful culture of the Messrs. Moir,' (sons of the well known Dr. Moir of Edinburgh) 'and their assistants, produced seventy bags of many hundredweights, of the finest coffee. The culture is a commercial success, and should result in time in the covering of all the hills and plateaus around the lakes with the best foe of the slave trade and substitute for fast disappearing ivory.' *Note.*—I fear, however, they are reckoning without another foe viz. leaf-disease. It will, indeed, be strange if this coffee should be without it." [Africa is, of course, the home of coffee: and in Abyssinia on the east, as in Liberia on the west, and no doubt in other parts, the shrub or trees can be found growing wild. But to get over the difficulties of securing steady labour, *transport* &c., will take many years, and it will be long before an appreciable effect is made on the exports and world's supply. Taking coffee plants from Edinburgh to Africa seems like taking coals to Newcastle.—ED.]

Mexican Ixtle.—The United States Consul of Mexico writes that the ixtle fibre, which comes from the lechuguilla, is becoming more widely known in Europe and America. It is used largely in the manufacture of brushes, sacks, mats, ropes, cordage, ladies' corsets, carpets and coarse cloths. It is also employed with success in the fabrication of imitation Brussels carpet, and in the imitation of hog bristles for brushes. Ixtle is exported from Mexico only as raw fibre. There are no factories in Mexico for the manufacture of goods from the fibre. The fibre is extracted from the lechuguilla plant, which grows wild in certain mountainous regions.—*Bradstreet's.*

Ceylon Pepper.—Pepper has been one of the oldest of Ceylon exports; the Dutch paid attention to it, but since then, it has become of little importance, save in its growth by natives for consumption in their local markets. Among "new products," however, which have of late years been claiming the attention of European planters is pepper, and we are glad to learn that a favorable report has been obtained on the North-Matale-grown article which has been valued in quantity at 8d to 8½d per lb. The report goes on to say:—"It is highly charged with the natural oil, *i. e.* pepperine, on which account it would be valuable for mixing purposes." Seeing that the treatment of the product in preparation, in the case referred to, was that of beginners, the report should, we think, be considered eminently satisfactory.

Tea at High Elevation in Ceylon.—The actual yield last year of six different estates of varying altitude from 4,200 to 6,700 ft. The yield of each field had throughout the year been kept separate, so that only the results of tea five years and upwards was taken. The highest yield from a 20 acre field was 631 lb. and the altitude almost as high as any others 5,800 ft. The lowest was 320 lb. and the altitude 4,960ft. All the tea was grown on old coffee land, though the coffee was not very old and not a bit worn out when removed to make way for the new product and realized good prices in London, none selling under an average of 1s 2¼d so that the financial results were capital. The real significance of this result can only be understood when I say that three-fourths the land likely to be in tea two years from now will be old coffee-land and very much more than half will be over 3,500 ft. altitude.—*Cor.—Indian Planters' Gazette.* Feb. 22nd.

The Samples of Cinnabar found up the Segama river in the vicinity of Pulo Itok Batu, mentioned in a previous number as having been sent home for assay have proved to be of a most satisfactory character. Messrs. Johnstone and Mathey report the average assay of the two samples to be 53 per cent, one sample averaging considerably better than the other at 75 per cent. This assay is decisive as to the fact of the Segama country containing payable Cinnabar lodes and a systematic search for the lodes should be set on foot. There are Sarawak men engaged in digging for gold in the Segama, men who have also worked for Cinnabar at Sarawak. These men should be only too glad to prospect for the sake of the Government reward. Mr. Sun Kuong Lung on being shown samples of Cinnabar at a meeting of the Gold Committee on the 27th January at once recognized them as identical with stones he had got in washing in the Bole river, but not knowing their value had thrown them away. Some of his coolies also indentified the samples. As those assayed came out of the main river some considerable distance above the junction with the Bole, it is evident the Bole deposits are distinct from these found in the main Segama.—*North Borneo Herald.*

Potatoe Disease.—Some highly interesting experiments have recently been made by Messrs. Jensen and Nobbe to protest potatoes from disease. The main thing in the system experimented upon is to earth the stalks as high as possible. Mr. Nobbe has constructed and used a special plough for the purpose; and he reports that all his experimental fields were free from disease, although the lattor prevailed in the district. The experiments were continued for three years, and in all cases the potatoes were free from disease. It was found, however, that the total yield of the protected crops was less than those which were unprotected in the above manner. It is thought that the loss is due to the injury caused to the leaves and stalks by ploughing.—*Australasian.*

Snake Poison.—A German chemist has been experimenting with snake poisons, and the following are the the conclusions he has arrived at:—In the Indian cobra the venom is not due to living germs, as some people have stated: nor even the so-called "cobric acid." All the alkaloids are entirely absent from the venom. The "cobric acid" crystals are in reality composed of sulphate of lime. Mr. Wolfenden says that the poisonous properties of the snake poison are due to its proteid constituents as follows—Globulin, which is always present, and kills by causing asphyxia; syntonin, very similar in its action to globulin, but less intense, and serum albanum, also poisonous, which produces paralysis. Again, in the venom of the Indian viper, Mr. Wolfenden found no germs, toxic acids, nor alkaloids, only three of the proteids above mentioned.—*Australasian.*

Sawdust.—Some of our best cultivators have lately been advocating the use of this for propagating, and it possesses all the qualities claimed for it, but, as a rule, I think it rather light and open for some things rooting freely when used by itself. When, however, a half-and-half mixture of it and sea or silver sand is made up, cuttings in it then root both quicker and better. Further, as the time is now upon us when our fresh Cauliflower, Cabbage, &c., will be planted out, and will offer tempting meals to snails, many will be at their wit's end as to how to prevent loss, and I may tell them that nothing proves a safer remedy than sawdust. If a good handful is placed around the stem of each plant it acts as a mulching to the roots in dry weather, and whether wet or dry a snail will hardly ever attempt a passage across its surface.—G. D. in *The Garden.*

Getting Rid of Stumps.—The *Scientific American*, gives the following important information to those who desire to get rid of stumps on their farms:—"In the autumn or early winter bore a hole one or two inches in diameter according to the girth of the stump, and about eight inches deep. Put into it one or two ounces of saltpetre, fill the hole with water, and plug it close. In the ensuing spring take out the plug, and pour in about a gill of kerosene oil and ignite it. The stump will smulder away to the very extremity of the roots, without blazing, leaving nothing but ashes.—*Rural Australian.*

Fish Farming is an industry that will yet find scope in Queensland. A great success has been realised with carp, perch, tench and other British and Continental fresh water fishes in Lake Wendouree, on Ballarat, Victoria; and an example furnished us Queenslanders to go and do likewise. Very deep tanks or waterholes are not best adapted for fish of this description. Water three feet deep, if shaded and permanent, is better than if ten feet in depth. We have very little confidence in the success of the experiment of letting fish—carp, perch, etc., loose in the Gold Creek Reservoir for that very reason. The best carp ponds in the old country are very little more than two feet deep; and there are plenty of fish farms now in America where the water is always shallow and often warm. There is no reason whatever—save lack of enterprise—to hinder Queensland becoming well stocked with this welcome addition to her bill of fare. Farmers, gardeners, and squatters could easily farm their own fish.—*Planter and Farmer*

THE USE OF THE ORANGE.

(Translated from the French of Louis Figuer.)

The orange is extensively cultivated in order to extract from its flowers and leaves the essential oil which they contain. In the south of Italy, about Sorren o, whole forests of oranges exist, the fruit of which is carefully harvested, of which Lamartine sings:—

"On the Sonorous Shore where the sea of Sorrento
At the foot of the Orange unrolls its blue wave."

The orange sometimes attains great age and dimensions. In the orangery of Versailles a magnificent bitter orange (C. Bigaradier) familiarly called the "Great Constable," is known to be 450 years old. Its trunk is 30 inches in circumference. It was planted in 1421 by the gardener of the Queen of Navarre. The orange tree at the Convent of St. Sabina, at Rome, dates from the year 1200. It is about 33 feet in height. At Nice, there was in 1789, a tree which usually bore upwards of 5000 oranges, was more than fifty feet high, with a trunk which it took two men to grasp.

The substance to which odoriferous plants owe the qualities which render them so useful at the toilets' is a volatile oil. It happens sometimes that distinct oils exist in the same plant. The orange furnishe, an example. The essence drawn from the flowers of the orange is very different to that furnished by the leaves, and the latter differs from that furnished by the fruit. The mode of extracting these essences varies according to their nature and condition. Some of them may be extracted by simple pressure. But the greater part of the essences are obtained by distillation but even this practice is being sup erseded. The essential oils obtained by distillation dissolve readily in fatty oils or alcohol, but very imperfectly in water. The condensed water, however, which passes over with the oil is a true watery solution of the essences, in fact, orange flower water. A large proportion of the essences used by the perfumer are not made by distillation at all, they are extracted from plants by the agency of fat.

At the season when the flowers are in bloom, clarified fat, generally lard, is "melted in a water bath," such as a "double glue-pot," and as many flowers, such as jasmine, orange or rose, are put into it. These are allowed to remain commingled about 24 hours, at a temperature just sufficient to keep the fat liqu d; the fat is then strained off. It is strongly scented; the flowers have lost their perfume. The same fat is melted again and further flowers are added. The process is repeated in all "seven times," and is then very highly scented, and is ready for use or exportation as pomade: to obtain the spirituous essence or tincture, suitable as a perfume for the handkerchief, the pomade is macerated in spirits of wine, which dissolves the greater portion of its perfumed oil, what remains, however, is sufficient to render the grease a rich pomatum for the hair. —*Rural Australian.*

ORANGE AND LEMON CULTIVATION IN SICILY.

Consul Woodcock, of Catania, states that oranges and lemons are designated, in Sicily, *marina* and *montano*, the former growing in the lower altitudes near the sea, and the latter on the mountains. The montano, or mountain fruit, is the choicest, and commands the best prices in the market, but the crop is not so sure, owing to the frost. The marina orchards bear more abundantly, and the crop is more certain. In commencing an orange or lemon orchard, the following is the method adopted:—First, the seed of the bitter orange is planted, and when the young plants are a year old, they are transplanted. When they have grown to be about one inch in diameter, that is, when they have attained the age of three to four years, they are again transplanted, and placed in the orchard where they are intended to remain. The tops of the young trees are then cut off about four feet above the ground, and when they have taken firm root, the best varieties of the orange and lemon are budded upon the stock. Two buds are generally inserted, and upon opposite sides of the plant. From these buds, branches shoot out, and when a quarter of an inch in thickness, become of a reddish colour. The distance to be maintained between the lemon trees in the orchards depends upon the situation of the ground, and conditions of soil and climate; usually it varies from thirteen to nineteen feet. When the soil is loose, rich, and easily cultivated, the lemon trees are planted at least nineteen feet apart, as they will then grow luxuriantly and attain considerable size. The distance maintained between the orange trees is from thirteen to fourteen feet, and this varies in accordance with the situation and quality of the soil, as in the case of the lemon. The ground in the orchards between the trees is always cultivated, and great care is taken to keep it scrupulously clean. The soil is worked at least five times a year, commencing in March and ending in October. When the trees are young and small it is not considered necessary to work the soil, as it is believed that the vegetable growth protects the young plants from the too powerful rays of the sun. The annual cost of cultivation in the best orchards per hectare (the hectare being equivalent to 2·47 acres) is estimated at about £30, but where extraodinary outlays are necessary, such, for instance, as is incurred when there are streets running through the orchards, as is often the case in the lava covered soil of Sicily, or through the necessity of obtaining steam power for irrigation, the cost per annum is sometimes as much as £80 per hectare. On the average, a lemon tree produces in Sicily one thousand lemons annually, and an orange tree six hundred oranges, and cases have been known where trees have produced ten times this amount of fruit. The trees are subject to various diseases. A parasite growth of a fungus nature frequently apppears upon the bark, and the lemon tree is more subject to this thanthe orange. This growth, after a heavy rain, or after being soaked in water, can be removed by scraping. The fruit of both the orange and lemon tree is also sometimes injured by a small insect which makes its appearance at the beginning of summer, and commences its work of devastation by depositing its eggs in the fruit itself, and these develop into grubs, which entirely destroy it. As a preventative, tar water and water slightly tinctured with kerosene, are used to wash the leaves and fruit, and soda ash is also frequently employed. In picking the fruit for exportation, which is usually done by hand in the month of November, the greatest care is taken to avoid bruising or injuring it in any way by rough handling, and it is then placed very gently in baskets lined with cloth. The stem is left on the fruit, cutting it about a quarter of an inch from the surface of the fruit. Before placing the fruit in the boxes, all insects and other injurious matter are removed. The boxes generally used are capable of holding from two hundred and fifty to three hundred and sixty oranges or lemons, and are made with a partition in the centre. They are lined with common silk paper, and each orange or lemon is encased in the same kind of paper before being placed in them. The boxes are not made air tight, but interstices are left between the boards for ventilation. Lemons gathered in the month of November, and thus packed, are supposed to keep without spoiling for six months, but oranges will not keep so long.—*Journal of the Society of Arts.*

QUESTIONS IN AGRICULTURE.

BY PROFESSOR JOHN SCOTT.

[We commend this valuable epitome of soil science to the attention of our readers.—ED.]

I.—SOILS.

1. Explain the origin and formation of soils.
2. Name the chief elements of plant growth found in all fertile soils,

3. In what respects do soil and subsoil differ?
4. Explain the following terms:—Weathering, Denudation. Alluvium, Drift, Nitrification.
5. Give a brief statement of the physical properties of soils.
6. What are the physical properties of (*a*) clay soils, (*b*) chalk soils, (*c*) sandy soils, (*d*) peat soils?
7. How is fertility of soil influenced by (1) mechanical texture, (2) climate and local conditions?
8. What practically determines fertility of soil?
9. Distinguish (1) between a *barren* soil and a soil *exhausted* and (2) between *natural* and *acquired* fertility.
10. How are soils classified?
11. What soils and conditions of soils possess the power of capillary attraction in the highest degree; and what is its importance as regards drainage, the retention of moisture, and the supply of that moisture, to the growing plants?
12. State some of the principal causes of infertility in soils.
13. Is there a ready test for ascertaining the presence of injurious constituents in soils?
14. Give instructions for a rough mechanical analysis of a soil.
15. What is meant by exhaustion of soil, and what causes it?
16. Mention (*a*) the surface distribution, and (*b*) the agricultural characters of (1) silurian, (2) old and new Red Sandstone, and (3) Greensand soils.

ANSWERS.

I.—Soils.

1. The mineral and organic matters forming the crust of the earth are the origin of all soils. The inorganic or mineral portion of the soil is derived from the crumbling down of the solid rocks, by the natural process of weathering or disintegration, which is favoured by warmth, and the presence of moisture and organic matter. All rocks, however, are not acted upon with the same ease: but the hardest of them are surely though slowly crumbling into dust under the mighty but invisible agency of the carbonic acid and oxygen of the air. The union of decaying vegetable matter in the soil with the oxygen of the air also helps to promote the decomposition of rocks,—as do frosts, rain, wind, and other kindred forces. These disintegrating agents are further aided by the root-growth of plants, by the burrowing of worms and other earth-dwelling creatures, and in no small degree by the acids generated by organic decay. The organic portion of the soil is derived from the remains of plants and of animals and insects of various kinds. In some cases the soils are purely organic in their origin. These are both plant and animal formations—the former comprising vegetable mould and peat mosses; the latter, beds of chalk and limestone, &c.

2. The inorganic or mineral constituents found in all fertile soils are—silica, alumina, calcic carbonate, potash, soda, magnesia, phosphoric acid, sulphuric acid, chlorine, and oxide of iron. The first three—sand, clay, lime—represent perhaps 90 per cent or more of the substance of most soils. The others vary from a mere trace to at most 2 per cent. The organic matter is formed of C. H. O., and a series of organic acids—humic, ulmic, geic. Sandy soils are generally deficient in this ingredient. Cold clays are also poor in organic matter. In fertile loams it is more abundant; and in peaty soils it is usually in excess. Altogether the organic matter in soil varies from 1 to upwards of 90 per cent.

3. In a majority of cases the *soil* is merely rotted *subsoil*, and differs from the latter chiefly in the greater amount of oraganic matter it contains, end in being less compact, and darker in colour.

4. "Weathering" is the term used to denote the natural disintegration or breaking up of rocks as explained in answer to the first question. "Denudation" is the wasting or carrying away of soils from the place of their original formation by rainfall or surface water. "Alluvium" is soil deposit which has been transported from higher to lower levels by the agencies of rivers or tides. "Drift" or *boulder clay* is a wide-spread surface detritus of the different formations, which is attributed to glacial action. "Nitrification" is the oxidation of nitrogenous bodies in soil—humus and ammonia—and their conversion into nitric acid.

5. The physical properties of soils which may be supposed to exert a greater or less influence on fertility have been well stated by Schubler as follows:—(1) The weight of the soil, its specific gravity as well as the absolute weight of a given bulk in a dry and moist state. (2) Its power of containing water, according to its weight and bulk. (3) The firmness and consistence of a soil in its dry and in its moist state. (4) Its different capability of becoming dry on exposure to the air. (5) Its diminution in bulk on drying. (6) Its absorption of humidity from the atmosphere, (7) Its absorption of oxygen from the atmosphere. (8) Its power of retaining heat. (9) Its capability of becoming more or less warmer by the sun's rays. (10) Its capability of developing heat on being moistened. (11) Its electric polarity and capability of conducting electricity.

6. A clay soil differs from all others by being tough, wet, and cold. In wet winter weather it sticks to the plough, like mortar, and in dry summer weather it is hard and cloddy, and the surface covered with chinks or cracks. A sandy soil is subject to defects of an opposite description. A chalky or calcareous soil contains a great deal of carbonate of lime and when wet is of a soapy nature, but is marked by the freedom with which it admits of natural drainage, and warm and productive though white in colour. A peat soil if light and spongy in texture, dark in colour, and very absorbent and retentive of both heat and moisture.

7. Mechanical texture influences fertility of soil in a great degree for the conditions of air moisture, and warmth which are essential to the development of the changes which occur in the process of germination, have little or nothing to do with the chemical qualities of the soil, but are all dependent upon its mechanical relations. This influence is not confined to the first stage of vegetation. Climate also exercises a great influence on fertility, and disregard of local conditions sometimes leads to very erroneous estimates of the value of soils which may be similar in composition, and texture.

8. Fertility of soil is practically determined by the *minimum* of any one essential ingredient and not by the maximum of the others, but intrinsic value depends on the depth of the soil; its mechanical texture, situation, altitude, and sorroundings, quite as much as on its chemical composition.

9. The difference between an *exhausted* soil and a *barren* soil is this: the former will recover its fertility or be renovated by nature in the course of time if, meanwhile nothing more is carried away from it; whereas a barren soil will continue barren, if the operating causes remain as before. A soil which has once been fertile can never be completely exhausted by the cultivator, and the deeper the soil the more superficial will have been its partial exhaustion. The distinction between *natural* and *acquired* fertility is that the former is a permanent quality and the latter is not. An examination of the soil and subsoil is the only reliable test. The appearance of the crops on arable land is often very misleading, and even in the case of grass land the herbage is not altogether a criterion of the quality of the soil; if the herbage is poor it may be the result of years of bad management; while, on the other hand, a splendid pasture may owe more to good farming than to the natural fertility of the soil.

10.—Soils are usually arranged in four classes—clay, sandy, calcareous, and organic soils—according to the dominant ingredient. A soil consisting of nearly equal parts of sand and clay is termed a *loam*; if two parts sand and one part clay, a *sandy loam*; and if two parts clay and one part sand, a *clay loam*. A soil consisting of nearly equal parts of clay and lime is termed a *marl*; if two of clay to one of lime, it is a *clay marl*: and if two of lime to one of clay, it is a *calcareous marl*.

11.—The soils which have their particles in the

finest state of sub-division possess the power of capillary attraction in the greatest degree. Its importance to plant growth in dry seasons and on dry soils can scarcely be over-estimated. It will be referred to again in connection with land drainage.

12. As regards the principal causes of infertility in soils the following are the conclusions arrived at under this head by the late Dr. Voelcker as set forth in his paper on the subject in the *Journal* of the Royal Agricultural Society:—Soil appear to be barren or more or less unproductive—*(a)* When they contain something inimical to vegetation. *(b)* When they are deficient in one or more important constituents which enter into the organisation of the living plant, *(c)* When they contain too large a preponderance even of a valuable ingredient, such as organic matter, sand, lime, and even clay. *(d)* When there is but a thin layer of soil resting on the bare rock. *(e)* When the land is thin, and rests on an impervious and very thick, clay subsoil, or on subsoils containing something injurious to vegetation. *(f)* When they are badly drained. *(g)* When they are affected by a bad climate. The soil constituents which are injurious to vegetation briefly are—(*a*) Superabundance of organic(humic) acids. (b) Sulphate of iron (green vitriol), even when present in the soil in small quantities. *(c)* Sulphate of iron (iron pyrites), and especially finely-divided black sulphide of iron which in the smallest proportion, is most pernicious to plants. *(d)* Abundance of protoxide of iron, and absence of peroxide, indicating a bad physical condition of the land, *(e)* Chloride of sodium (common salt) in proportions of 1-10th per cent and upwards. *(f)* Nitrates, and all soluble saline matter, in quantities exceeding small fractions of 1 per cent of the whole mass of soil.

13. The presence of injurious constituents in soils can be readily ascertained by bringing a strip of litmus-paper in contact with wet soil. If the blue colour of the test paper turns rapidly red, the soil is certain to contain something injurious to plant life. All good and fertile soils either have no effect upon red or blue litmus-paper, or show a slight alkaline reaction; that is to say, in wet condition they restore the blue colour to reddened litmus paper.

14. Put a given quantity of soil into a large glass jar of water; then shake well, and allow to stand. The ingredients settle and the following order, and their proportions can then be estimated:—(1) Sand or gravel; (2) clay; (3) organic matter.

15. A soil is said to be exhausted for a particular crop when it will no longer grow that crop —or, practically speaking, will no longer grow enough of the crop to afford the cultivator a profit. This can only be brought about by a continued course of cropping without manuring. But when a soil will no longer grow a certain crop, it may still have all the elements requisite for the growth of some other crop.

16. The silurian soils are for the most part high-lying, cold, and poor. Where limestone predominates the soil is better, but as a whole they are deficient in lime. Even where the soil is naturally good on the formation, the climate and position are generally unfavourable for the cultivation of wheat and the higher vegetables. Finger-and-toe in turnips and louping-ill in sheep are very prevalent diseases on these soils. The old red sandstone furnishes some of our best soils, but these, too, are generally deficient in lime. The old red-sandstone formation may be called the home of the Hereford breed of cattle, and of the old Ryland breed of sheep. The new red sandstone soils are light and moderately fertile. The greensands are light soils of great adaptability and productiveness. Want of space prevents a full reply to this and some of the other questions, but discussion is invited.—*Scottish Agricultural Gazette.*

WHITEWASH.—The following recipe for whitewashing has been found by experience to answer on wood, brick, and stone, nearly as well as oil paint, and is much cheaper: Recipe.—Shake half a bushel of unslacked lime with boiling water, keeping it covered during the process. Strain it and add a peck of salt, dissolved in warm water; three pounds of ground rice put in boiling water, and boiled to a thin paste; half a pound of powdered Spanish whiting, and a pound of clear glue, dissolved in warm water; mix these well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle on portable furnace, and when used put it on as hot as possible, with painters, or whitewash brushes. —*Rural Australian.*—[This whitewash might be useful in adding to the amount of light in the interior of tea houses.—ED.]

WOOD PULP FOR MAKING BARRELS.—The latest novelty in the application of wood pulp comes to us from America, namely, for making barrels for holding both solids and liquids. The following account of this manufacture is given in a recently issued report from America:—"Wood pulp, so conspicuous of late years as a material for the manufacture of paper, has been found to afford one of the best means of making light, cheap, and durable barrels, adapted for all purposes for which these useful packages are demanded. The barrel is made in one piece of coarse wood pulp, subjected to a pressure of 400 tons. The heads are made in the same way, giving a degree of compac ness of grain that is sufficient for every use. When the barrels are put together they are very light, very strong, and very satisfactory in every way. Two kinds of barrels are made—one for fruit, flour, and other dry substances; the other for oil, lard, beef, pork, and liquids of all kinds. These latter are made impervious to the infiltration of oil and other liquids by a simple process. The flour barrels are so strong that when filled they can be dropped from a waggon without injury, and fruit packed in them keeps a long while, being excluded from all contact with the air. These packages can be made for half the cost of ordinary barrels."—*Indian Gardner.*—[If cheap barrels, why not cheap tea boxes? Wood not suitable for cuting into dials could he converted into pulp and then solidified.—ED.]

THE DRYING UP OF RIVERS.—Though the belief that forests increase the rainfall has been given up everywhere, except in Forestry Conventions, there is still a clinging to the belief that they regulate the flow of springs. It would be of great value to hydraulic science if some exact facts and figures could be given—facts collected by men trained in geological observation. Unfortunately, the only "science" that we have in the matter is furnished by "some of the oldest inhabitants" in various places, whose verdant memories tell them that "something has gone wrong since they were boys." It is pitiable to see a government report on American forestry sent forth with such "facts" and quoted abroad as if it were the work of an intelligent investigation of the facts involved. If we were to take the views of the "oldest inhabitants' on many other questions, besides those on forestry the only wonder would be that the world altogether had not come to an end long ago. Some of the "younger inhabitants" have, however, some tales to tell. Only "six years ago" an "intelligent" observer at Berlin, New Hampshire, had an "unfailing brook that ran three hundred gallons an hour." Now it is "cut short in summer and in winter by drouth." Another specimen is this: "At Richmond, New Hampshire, in 1865, there was water power for four saw mills all the year. Now the water has wholly disappeared." Now, everyone conversant with geology knows that these things are liable to occur anywhere, even in countries that never had a tree at all. The writer knows of a tract of country in which every well went dry last year, and numberless springs failed. But it was not referred to the cutting away of forests, but to a huge railroad which cut off all the supplies from the spring. Now nature herself often does just what this railroad did, opens new avenues under ground for the hidden streams, and turns them away in other directions. It would be very important to ascertain just what influence forests have on our water supplies, but to give in a government document mere street corner gossip as forest science is putting science in a degrading shape.—*Gardeners' Monthly.*

THE MADRAS AGRI-HORTICULTURAL SOCIETY

is the subject of correspondence, for a copy of which we are indebted to the Madras Government. It will be seen that in the fifty years of its existence the Society has done a large amount of good and useful work:—

Read—the following letter from Joseph Steavenson, Esq., Honorary Secretary, Agri-Horticultural Society, Madras, to the Chief Secretary to Government, dated 16th October 1886, No, 1781:—

With reference to the Proceedings of Government, dated 22nd September 1886, No. 5589, I have the honor, by desire of the Committee of the Agri-Horticultural Society of Madras, to report for the information of the Right Honorable the Governor in Council and of the Government of India, as follows.

The facts set forth in the last triennial report to Government, dated 12th January 1883, No. 28, being true now as then, the Committee think that as this report must necessarily contain much repetition, I cannot do better, for the sake of brevity and convenience, than follow the form then used.

2. Since the report above referred to, which related to the period 1879 to 1882, inclusive, the Society so far from relaxing its efforts to carry out its self-imposed task has materially increased them, as appears from its enhanced receipts in all branches, and more especially from its growing correspondence. The letters recorded in the office books, which may be taken as a fair criterion of the Society's business, have increased from 955 in 1877, when the present Honorary Secretary took charge, to 1,734 in 1885, and promise a still higher increase in the current year.

3. During the years 1883, 1884, and 1885 the Society has introduced, experimented with or distributed large numbers of the plants referred to and particularised in paragraph 2 of the last special report, including many interesting for their curious, ornamental, botanical or economic value, and amongst them two which call for special mention, namely, *Cyphomandra betacea* and *Erythroxylon coca*. Seed of *Cyphomandra betacea*," the tree Tomato," was received from Mr. Morris of Kew, then head of the Botanical Department, Jamaica, and the plant has been established amongst the society's correspondents on the hills and plateaus of Southern India. *Erythroxylon coca* was largely propagated from a single specimen in the gardens as soon as the merits of *Cocaine* attracted public attention, and has been widely distributed amongst planters and others in various parts of the country.

4. The extensive growing and distribution, of fibre plants, valuable timber and fruit trees, rubber, drug and tan producers has continued and increased. In 1883-85 the Society raised and sent out 117,640 rooted plants of *Fourcroya gigantea* alone for fibre-growing experiments.

5. Besides specimens of new and rare plants for garden cultivation, large numbers of young trees and other plants of indigenous or established kinds have been supplied to Municipal Commissions, Local Fund Boards, and other authorities for plantation, avenue and hedging purposes, being often sent long distances where facilities of rail or water carriage sufficiently reduced the cost of convevance.

6. The implements mentioned in paragraph 3 of the last report continue to be distributed; gardeners are obtained for members of the Society and others in Madras and elsewhere, while boys trained in the gardens easily find places; and the services of the Superintendent have several times been lent to lay out the grounds of public institutions in Madras.

7. The magnificent botanical collection belonging to the Society continues to be added to by the liberality of correspondents in many parts of the world, and by the Society's own collectors. The scientifically-arranged botanical garden is in good order and is largely resorted to by students and others.

8. The efforts of the Society to diffuse information have been sustained, the correspondence, as stated above, having largely increased and the monthly proceedings of the committee conti uing to be regularly printed and more and more widely distributed to members, to the press, to kindred societies and bodies, and to persons interested in the various subjects to which they refer.

9. In 1884 a complete and useful list of plants to be found in the gardens and neighbourhood was compiled by the superintendent of the gardens, printed and largely circulated.

10. The Society's library has, with the assistance of a liberal grant from Government, been much improved by the addition of many valuable works of reference, and is consulted by visitors, who are freely admitted, whether members of the Society or not.

11. The gardens are open to the public from sunrise to sunset; botanical specimens are given whenever asked, to local professors and lecturers and to scientific visitors; and the library and botanical garden are believed to be of great service to the students of the various botanical classes.

12. The Society continues to act and be largely employed as an agency through which persons at a distance obtain supplies of fruit, avenue, shade and other trees, plants and seeds; and annually obtains and forwards to all parts of India, and often abroad, large numbers of grafted mango and other trees and seeds of useful plants, such as *Inga dulcis*, casuarina, cotton, tobacco, senna, forage plants, fibres and cereals. In the last number of the "Journal of the Agricultural and Horticultural Society of India," page 325, it is stated by Mr. Maries, a recognised authority on the mango, that "The 'grafts' made by the Madras Horticultural Society are the best I have seen in this country."

13. The Society is often honored by references from Government and the Board of Revenue for information on horticultural and kindred subjects, and is frequently able to be of use, to Commissioners, Collectors, and other authorities in this presidency and distant provinces.

14. On 15th July 1885 the Society completed the fiftieth year of its labours; and to quote from the last annual report——"The half century nobody familiar with the Society's gardens and their very great wealth in exotic plants collected from every quarter of the globe would suggest has been spent in sloth. Horticulturists in Madras are apt to forget, and those who are not horticulturists are probably ignorant, that for many, possibly most, of their handsomest herbaceous plants, trees and shrubs they are indebted to the Agri-Horticultural Society; and that for that reason, as well as others, the Society deserves their support in both subscriptions and contributions. Observers, not scientific botanists, are now so accustomed to the great variety of vegetable life which beautifies Madras and its suburbs, and makes gardens and roadsides interesting, that the time, labor, and money expended in their collection from every country within the tropics, and many without, escape their memories, as do the nursing and propagation by skilled hands in, and liberal distribution from, the Society's gardens. Many of the most useful and commonest plants of the hedgerow now annually sowing themselves and reproducing their kind in spite of never-ceasing cropping and browsing by voracious goats and their hungry owners, but for the Society and its correspondents, would not have wandered here from their distant homes in other parts of India, in Africa, America, or Australia. The Committee think that the past and present members of the Society may look around and congratulate themselves that their first fifty years of association have been well spent."

15. The monthly proceedings of the Committee, which are regularly forwarded to several departments of Government, detail the more important work done; the whole work of each year is briefly stated in the reports annually laid before the general meeting of the Society, the last three of which are submitted herewith.

16. The following table shows the income and expenditure of the Society since the last triennial report to

Government up to the end of last year :—

Years.	Monthly allowance from Government.	Special grant from Government for prizes for special products.	Extra allowance from Government.	Grant from Government to buy botanical books for the library.	Members' subscription.		Sale of seeds, plants, &c.		Total receipts.		Total expenses.	
	R.	R.	R.	R.	R.	A. P.	R.	A. P.	R.	A. P.	R.	A. P.
1883	3,000	500	500	...	2,383	8 0	9,189	14 7	15,573	6 7	14,484	11 2
1884	3,000	500	500	1,000	2,371	7 8	8,636	0 0	16,007	7 8	15,361	11 1
1885	3,000	500	500	...	2,590	0 0	10,901	1 7	17,491	1 7	17,627	7 7

17. The Society continues to have the benefit of the long experience of the Honorary Secretary who has managed its affairs since 1877, and has now, in addition, the able assistance, as Superintendent of the gardens, of a professional gardener who was sent out to Government from Kew in 1870 to conduct experiments in the cultivation of cotton in the Central Provinces; and the Committee believes that its usefulness and the importance and extent of its work is limited only by the funds at its disposal and the small amount of time which the Honorary Secretary is able to devote to it from his other duties.

READ—the following letter from J. Grose, Esq., Acting Director of Revenue Settlement and Agriculture, to the Secretary to Government, Revenue Department, dated Madras, 8th December 1886, No. 2291 :—

With reference to G.O., dated 20th November last, No. 7036, I have the honor to state that the Agri-Horticultural Society of Madras have, on all occasions on which they have been applied to, readily favored this department with their co-operation, and that this department has, whenever possible, freely utilised their services in the matter of procuring, raising, and distributing seeds and plants of great economic value. Besides supplying seeds of *Reana luxurians*, *Divi divi*, and of varieties of well-known foreign tobacco, the Committee of the Society have procured shoots of the edible Cactus from Malta, planted them first in their own gardens, and distributed them to the districts after they had become well established. The Society has also furnished valuable information and suggestions to this department on the subject of grafting the edible Cactus on the common variety and on that of indigenous salt plants for the reclamation of salt soils.

2. All that is stated in the report as to the utility of the Society to the general public of this presidency seems to me well warranted.

ORDER—dated 22nd December 1886, No. 1119, Revenue. The report read above, together with the letter from the Acting Director of Revenue Settlement and Agriculture, will be forwarded for the information of the Government of India with reference to their letter, No 711—1201-A (Revenue and Agricultural Department) of 9th September 1886. Copies of the Society's annual reports for the years 1882—85 will be transmitted at the same time.

2. Throughout the period under review the Society has been in receipt of a contribution of R4,000 from Provincial funds, the former grant-in-aid of R3,500 having been increased by R500 under G.O., dated 8th March 1883, No. 538, Financial. It is satisfactory to learn from paragraph 16 of the report that the receipts of the Society from other sources have also increased considerably during the same period.

The ratio between the amount of the grant-in-aid and the total income of the Society is considerably less than the maximum prescribed by the Government of India in their resolution, No. 7—274-278, of 17th September 1879. In recognition of the flattering testimony borne by the Kew authorities to the good work of the Society, a special grant of R1,000 was, in G.O., dated 16th September 1884, No. 1045 Financial, made to their funds. This sum has been utilised for the provision of a botanical library, which, it is stated, is freely and widely consulted.

3. In his letter read with the above, the Director of Revenue Settlement and Agriculture bears testimony both to the general public utility of the Society and its ready co-operation with the Agricultural Department. Government note with satisfaction that the Society's library and botanical collections are extensively utilised by students and lecturers, and are thus the means of diffusing a knowledge of botany throughout Southern India. Altogether, the period under review seems to have been one of increased activity and usefulness, and Government desire to place on record their sense of obligation to the Honorary Secretary and the members of the Committee, to whose exertions this desirable result is mainly due.

TOMATOES.—An American contemporary states that during the past season there were put up 48,508,248 cans of Tomatoes in the United States, being one-third less than the pack of 1883, the decrease in acreage being heaviest in the eastern States. It is said that a farmer in Salem Country, New Jersey, last season raised 83 tons of Tomatoes on 6 acres of land. The crop was sold in the canning establishment for 7 dollars (nearly 30s.) per ton.—*Journal of Horticulture.*

FORESTS AND RAINFALL.—Prof. Cleveland Abbe in a recent lecture before the Franklin Institute of Philadelphia, attacked the "popular error" that forests had any influence on rainfall. He showed that in eastern Pennsylvania during the past one hundred years there had been a slight increase in rainfall, though the forests had almost wholly disappeared. He explained that the increases or decreases in earth elevations influenced the annual rainfall, and not forests. It is too bad, however, to charge this error to the "popular" side. It is an error propagated by so-called men of science, and has been a pet theme with many a science association,—and it has been the work chiefly of this magazine to show that there was no foundation for the notion that was worthy of the name of science. We have protested against the error with considerable earnestness, because of its injurious influence on practical forestry. It has led to the waste of hundreds of thousand of dollars in fruitless "commissions" and legislative blundering, and prevented the forestry question from standing on its profit and loss foundation, as a commercial undertaking should be—which by this time might have led to profitable results.—*Gardeners' Monthly and Horticulturist.* [This comes to us from the United States. It is common sense and truth. Rain depends on trade-winds, monsoons and mountains. Forests are the effect not the cause of rain.—ED,]

RED SEEDS: ABRUS PRECATORIUS.

A writer in *Science Gossip* gives some very interesting information concerning a plant very common in the neighbourhood of Townsville (Queensland, and in Colombo.—ED.) and which will be readily recognised from his description. He makes a mistake in saying that the root of the abrus precatorius is poisonous. It has a decided flavour of liquorice, and may be unwholesome if any great quantity be chewed; but practically speaking it is not injurious to the human subject:—"Those who have visited the Indian and Colonial Exhibition, or, as it is barbarously called, the Colinderies, will no doubt have noticed in a number of different courts, a curious pea-like seed of a light red colour with a black patch; in our court I noticed a number of caps and ornaments made entirely out of the seed of mimosa glauca and this red seed, which has for its scientific name that of abrus precatorius. But this is not the only name which will be found in the different specimens; some have the name of reglion sauvage, cascarella, jequirity seed, suabre's-eyes—and in fact the names are legion, but they are all applied to the one seed, abrus precatorius, called precatorius because it is much used for Roman Catholic rosaries in some parts of the world. This seed is that of a plant which once had the name for curing certain diseases of the eye, but there is not much foundation for this reputation. The plant is a deciduous climber, and has pea-like flowers of a reddish-purple. A specimen two years old may be seen at Kew, but it has not yet flowered. On chewing the leaves, which are composite and much like those of the acacia, a sweetish liquorice taste will be noticed; it is in fact called the wild liquorice, but must not be confounded in any way with the liquorice plant (Glycyrrhiza) of the British Pharmacopœia, though they both belong to the same group of plants. Curiously, the root of this plant is poisonous and has often been used by the convicts in Mauritius, both by rubbing it on their eyes and chewing it, to induce illness. Another most interesting fact about this plant—or rather the seed—is that the natives of the country in which it lives found out that all the seeds weighed precisely the same (about five grains, I should say), so, as they had no other standard weights, they instituted these seeds as a standard weight, and called each seed in their own language a carat: and this carat is in fact the origin of our carat weight of gold. This fact alone made the seed one of interest to me, and, combining it with the fact, that it belongs to one of, if not the most important order of plants of economic value, makes me think that there may be others like myself, who, ignorant of the above facts, will be glad to know them. —*Townsville Herald.*

JAFFNA CIGARS.

Somehow the trade in Jaffna cigars has received an additional *stimulus* lately, so that the business in the Cigar Boutiques is unusually brisk as one could see on passing One cause is said to be the short production of those varieties of Jaffna Tobacco which chiefly enter into the making of what is called a real "Jaffna." During the month of December 1885, the weather appears to have been rather unfavourable to the lives of the young plants which were then being removed from the nurseries and transplanted in beds. Some thousands of young plants transplanted during a day were found the next morning withered and dried—not indeed by the heat of the Sun's rays; but by some unknown cause. Some few who have tried in various ways to trace the cause of this wholesale destruction seem to have discovered a small worm, which they call "Uluvan" literally *the plougher*, which gnaws away the plant at its root—a single worm going through a whole bed of plants during a night. In this way were the nurseries so thoroughly exhausted, that plantations were not as fully planted as usual. This accounts for the comparative shortness of the Tobacco crop of this year. But the *whole* Tobacco has not suffered so much, as it is usually grown on higher ground and in harder soil than the one in which the Cigar-Tobacco is cultivated. Good prices are now realized by Cigar Boutiques as well as by the hawkers of what are called *street cigars*. But there is yet a good deal that can be done to stimulate the trade and make the Jaffna Cigars the real luxury they ought to be, if properly made and tastefully served up. What are Cigarettes as compared with a good genuine Jaffna Cigar? Of course the dealers in Cigars should first have a taste themselves before they can provide for the taste of others. But they generally calculate on deriving their customers from the general population rather than from the upper classes or even the middle class.

Of Cigars there are 4 sizes.

The 1st size,	12	pkts.	to a lb sells for	10	cts.	the pkt.
2nd do	16	do	do	6	„	
3rd do	24	do	do	5	„	
4th do	30	do	do	4	„	

The price per thousand is as follows:—

1st size	R7	50	per thousand
2nd do	6	00	do
3rd do	5	00	do
4th do	3	75	do

Of course there is an allowance or abatement or discount or whatever you may call it to those who buy Boxes or in wholesale, as it were.

The *Street Cigars* do not come under any of the above rates, they being made of Tobacco of inferior kinds: and generally they have no fixed prices; but they sell for whatever they can get, whether it be high or low. Most of the cigars selling in Colombo are of the *Street Cigar* kind, and they serve in general to bring Jaffna cigars into disrepute. The real Jaffna cigars could be had only at about 10 principal boutiques in Colombo, not any where else. These boutiques profess to supply Negombo, Kaltura, Kandy, Ratnapura, Chilaw, Puttalam and Anuradhapura; but in none of these places is a real "Jaffna" to be had "for love or for money." Another fact in connection with Jaffna cigars deserves to be noted. Each of the 10 Cigar boutiques of Colombo employs about 150 men in Jaffna in the manufacture of the cigars: and about as many more are hawking cigars in and around Colombo. Including the growers of Tobacco, every boutique may be said to maintain about a thousand families, being altogether ten thousand families depending on the trade in Jaffna cigars. *Com.*—"Ceylon Patriot."

SUGAR SOILS IN BRITISH BURMAH.

Dr. Romanis says:—

"These soils are evidently produced by the decomposition of granite or some other primitive rock. In the sample of E I found fragments of decomposing felspar, the constituent of granite that supplies potash to the soil. There is no doubt that this is the secret of the fertility of these soils. Another thing is that soluble potash is higher than usual. They will yield several crops before they show signs of exhaustion."

Canes had been cut on the land from which soil selections were made, the juice tested, and the amount of kyantaga (gur) obtained had been ascertained with the following results:—

Name of soil.		Percentage of sugar in juice according to saccharometer.	Percentage of coarse sugar (gur) in juice according to experiment.
Bilni vallye	A	25·71	15·27
	B	20·00	12·52
	E	25·71	15·27
	D	22·85	14·31
	C	...	...Not cultivated.
	H	22·85	14·31
Thébyu valley	K	27·14	17·00
	M	...	...Not cultivated.

The percentage of juice was, however, taken from the different places at different times and there was a month's interval between the testing of H and that of K. The cultivators themselves stated that the

best kyantaga (gur) was produced by soils A and E' then by H, then D and K, and finally B. They stated that the kyantaga (gur) of B was bad owing to the land being flooded, and that the sugar of K would improve as the land was regularly cultivated year after year.

Comparing the result of the soil analyses with those of the testings of the juice and kyantaga (gur) Dr. Romanis remarks:—

"The order of the productiveness seems to be that of the amount of phosphoric acid the soil contains. Leaving K out of account, as it was more mature when cut, it will be observed that the sugar obtained is very nearly proportional to the percentage of phosphoric acid. According to Ville the phosphate of lime is the predominant constituent in sugar manure, but he gives no experiments to prove it. H is the third in order of phosphoric acid and third in order of productiveness. The great excess of potash cannot be utilized by the plant for want of a sufficient proportion of phosphoric acid. K, according to the natives, comes after D; but D is new land and, therefore, for a year or two many yield good crops; but, if the analysis fairly represents its composition, it cannot last long.

"H is no doubt beginning to be exhausted of its soluble ingredients. What is extracted by hydrochloric acid does exactly correspond to what the plant can extract from the soil. I should say it wants a fallow or change of crop.

"The soil should not deteriorate if nothing is removed from it but pure sugar, the constituents of which are entirely obtained from the air. If the crushed canes are restored to the land in any form, there is no loss, or very little, of mineral matter."

SHALL WE GROW MILLET.

My success with millet has been so marked that I have practically abandoned my meadows as a source of hay supply, and with millet in place of oats, and clover in rotation, depend upon these for my forage; and after ten years' or more experience, have I never been without an ample hay supply. I am, taking one year with another, convinced that oats never paid me as well as the same land would in either corn or millet. Possibly I may yet go to speculating in Bohemain oats, not in feeding them, but raising them to sell to neighbours who go crazy over oats worth (?) ten dollars per bushel. Mem.: Who ever heard of a farmer selling his crop of Bohemain oats for $400 per acre?

For several years I sowed Hungarian grass, but became convinced that German millet was far superior, and now sow it exclusively. Some winters I have fed no other hay, but usually feed clover and cornstalks along with it; but, so far as I can see, I would quite as soon take exclusively millet; for winters I have fed nothing else, not even grain, until the cows began to calve in the spring. No one could ask for stock to do better than did mine on thin, early-cut millet.

The chief objections to millet are that it is thought to be a great exhauster of land, and that it is a hard crop to cure. It is probably more taxing on land than timothy; for millet, besides its great mass of foliage, develops at least forty bushels of grain to the acre. Now millet is what is known as a gross feeder, and needs to be sown on soil filled with vegetable matter, and will attain its greatest perfection on fresh turned clover sod, or a crop of fallow corn, or decayed sod.

Millet should not be allowed to mature its seed to obtain best results as a hay supply; and in avoiding this a great draft upon the soil is prevented; for, if cut just as the heads are developed, and the seeds are forming, the final demand upon fertility to mature this heavy crop of grain is avoided. And I now place millet, when sown in its proper rotation, as one of the medium crops in its demand for fertility. Then its growth is remarkable. In favorable seasons it is ready to cut in seventy days from sowing, and therefore does not "draw" upon the soil like corn, oats, or wheat, that need far longer time, and must of necessity develop their grain.

As a crop to precede wheat, it has no superior; for its dense growth completely shades the soil. It is, therefore, a cleaning crop. And, lastly, it leaves the land mellow, and exceedingly easy fitted for wheat. In fact, with the improved spring harrows, it is often quite as well to prepare the land for wheat without ploughing; but usually it is better to invert the soil, and plough under the great mass of roots and stubble, that upon an acre must aggregate tons in weight, and must, therefore, have a great fertilizing value. Wheat upon millet-stubble often shows superior growth, possibly from the fact that the dense shade during the hot months increases the nitrification of the surface soil.

Millet delights in a dryish summer, and only needs an occasional shower to give it luxurious growth. Last season my millet only had what could be called two rains upon it, and yet its growth was astonishing—nearly six feet in height for the entire fields, and yielded at least four and a half tons of cured hay per acre. This season we have had rains and rains, and invervals of cold cloudy weather, and the yield will not probably exceed three tons per acre the smallest crop in years.

Millet is a tropical plant in its nature, and should not be sown until the hot June days guarantee high and somewhat uniform temperature. This year's seeding chanced to be followed by ten days of cold, rainy weather, and as a result, the millet did not come up evenly; part was, as afterwards proved, drowned out. On the 6th day of July a small field was sown, and, when the fields were cut last week, this piece, sown twenty-five days after the others, was in many respects the finest millet.

In sowing millet a full bushel per acre should be used. Then the hay is fine and choice; and if cut just as the heads are all out in bloom, and cured in the cock—the larger the better—and then stored in the big bay of the barn, it will come down upon the floor in the winter bright and green, and with that attractive fragrance that will cause cattle to eat it in preference to any other hay that may at the time be placed before them.

For years I have fed my work-team upon early-cut millet—not all they would eat, but in proper amounts, and have never noticed any ill effects; but on the contrary, have regarded it as a most excellent ration. For milch-cows it has no superior as a hay ration. With a proper feeding of milk-feed, the March and April messes of milk will fully equal to June flow maintained from the pastures, and in texture and quality leaves nothing to be desired.

The question is, with the advent of ensilage and the demonstrated great growth of German millet, can farmers afford to feed hay grown upon high-priced land, when from a half ton to a ton of inferior hay is the average? But, on the contrary, are not the profits to be rather found in cropping for abundant rations, and thus securing them at the lowest possible cost?—JASON JONES *in the National Stockman.*

THE BANANA.

TO THE EDITOR OF "THE AUSTRALASIAN."

Sir,—"A species of the genus musa, a tropical tree clearly allied to the plantain. The fruit is 5in. or 6in. long, and 1 in. thick, grown in clusters, is very nutritious, and, in some parts, forms a most important article of food," so says the *Standard Pronouncing Dictionary.* Few colonists now but have seen and tasted the banana, and I have, no doubt, endorse the pithy description given of it of being nutritious. The trade between the colonies and the islands is perhaps more than the generality of your readers is aware of; the S. S. "Rockton," having on board 19,000 bunches in one trip to Sydney. This is a larger cargo than is usually brought, but the average will certainly be not less than 9,000, and as there are steamers to New Zealand, Sydney, and Melbourne constantly running and bringing them up there must be, in any case, as many as 366,000 bunches of bananas exported from Fiji every year to Australia and New Zealand, for I am told that quant

ities find their way to Brisbane, although bananas grow there. I have counted as many as 370 of the fruit on one bunch, quite a load for two men to carry on a pole. A Suva paper of last year writing of a Fiji plantation, of 80 acres, the property of Messrs. Armstrong and Huon, part of the article, writing of the culture of the banana, says: — "The superiority of the fruit is attributed to careful cultivation, deep digging, constant weeding, and attention to and careful stripping of each bunch when ready to burst from the blossom, as this exposes the young fruit to the sun, and, besides assisting its development, deprives a grub which infests these plants, and is otherwise the cause of the destruction of thousands of bunches, of a lurking place." To keep these 80 acres in order is the work of 30 Polynesians and two Europeans. How the banana known as the sugar banana got to the South Seas is, perhaps, not generally known, so that I have much pleasure in giving the incident as it occurred.

Many years ago (in 1838) the Rev. Jno. Williams, who was then a missionary in the South Seas, as an agent to the London Missionary Society, left Raiatea, one of the Society Group, for England for the purpose of collecting money to purchase a vessel for missionary purposes, instead of chartering small craft, hitherto done by the Society, to visit the various stations in the South Pacific.

On Mr. Williams's arrival in England he was selected by the Society to travel through England with another Missionary as a deputation to address meetings and collect funds on behalf of the London Missionary Society. Of the great success attending their labours history has already made public, in the shape of a very readable book, entitled *South Sea Missionary Enterprises*. The vessel was purchased principally by the contributions of Sunday-school children, who were limited to penny subscriptions, and she was known as the "Camden" brig, lying in the London Docks. A thorough overhaul was made, and alterations to suit the extra number she had to carry out, as a staff of young men had expressed their intention of accompanying Mr. Williams as missionaries to the Pacific.

The movements of Mr. Williams in England had been watched with great interest by men generally outside the influence of the London Missionary Society. At an interview he had with the Corporation of the City of London, he so convinced them that religion and commerce should go hand in hand that they unanimously voted him £500, on behalf of the Society he represented—a thing unheard of previously. Others, too, took a deep interest in what was being done, and one, probably His Grace the Duke of Devonshire, at Chatsworth, more than the rest.

When Mr. Williams went to England his son John, then a youth of 14, accompanied him, whom the Duke took charge of while Mr. Williams was making the tour of the British Isles. The youth was taken by the Duke to Chatsworth, and these were to be considered the youth's head-quarters. The change was remarkable, from the modest dwelling of the South Sea Islands to one of England's stately mansions. Every comfort was provided for him, and youths about his own age invited to meet him. After a pleasant stay of some months the time came for young Williams to take his departure, and prepare for the voyage. In conversation with the Duke the youth had thoroughly discussed South Pacific topics- the character of the soil, climate, &c, and had given His Grace an idea of what plants were likely to grow of those in the conservatories, the conversation leading to good results. The day before young Williams left Chatsworth the Duke called his manager, then Joseph Paxton (afterwards knighted), and asked him what he thought he had in the conservatory that would benefit the South Sea Islands. After a careful survey Mr. Paxton said he thought he had found a plant that might be of use, and he suggested two of the Musa Cavendishii, or the sugar banana.

The little plants were placed carefuly in a glass case by the Duke assisted by young Williams, the manager (Mr. Joseph Paxton), and the head gardener, Mr. Donald (now the Superintendent of the gardens at Hampton Court). I particularly mention this then small event, but now attended by large results.

The case was shipped on board the "Camden," and, after a long passage of eight months, arrived at Apia Upolu—the Navigator Islands (or Samoa). Here the plants fell into good hands, those of the Rev. Mr. Mills, agent to the London Missionary Society at Apia. On the case being opened, one of the little plants was dead, and the other in a weakly state; grave doubts were manifested that it also might not survive. However, by the care and attention bestowed upon it, and the reviving effects of the Samoan soil, the watchers were soon rewarded; vigorous life set in, and from the Chatsworth plant all the bananas of that description came which now spread over the north and south Pacific.

J. L. E.

THE ECONOMIC RESOURCES OF INDIA.

BY DR. GEORGE WATT, C.I.E.

From lectures delivered before the Society of Arts which we should gladly quote in full, did our space permit, we take the following extracts:—

THE IMPERFECTLY KNOWN, OR MINOR PRODUCTS OF INDIA.

There are food grains that loudly call for more thorough investigation and more extended cultivation. Dyes, tans, and fibres, which betoken fortunes to the industrious persons who will carry to a practical issue the initial experiments necessary to successful introduction. There are minerals and ores in sufficient abundance to admit of profitable competition with the supplies poured in from foreign countries. But above all, there are the thousand and one little insignificant things lying at our feet which, in the hands of the technical expert, will each come to meet a distinct market. To Government, these unimportant industries offer naturally a great attraction, for, without capital and without expensive plant, the poorer natives can participate in the trade done in them. But it would be hopeless to attempt to enumerate, even by name, the multitude of natural or wild products in which trade might be done. Seeds which will yet have a commercial value as ornaments or buttons. Fibres which are likely to be used as useful and cheap substitutes for whalebone and bristles. Palm spathes, which may come into use as natural surgical splints, or be employed as simple mechanical filters. The fibrovascular frameworks of cucurbitaceous fruits, which constitute admirable bath-room sponges. Small pieces of *solah* pith to displace patent corn-plasters, or to be used in place of wax in the preparation of microscopic sections. The employment of pith instead of cork for many purposes, such as for floats to fishing nets. Fungi and pith utilised as substitutes for felt in the manufacture of at least certain parts of hats. The indefinite series of uses to which the bamboo is put in all Asiatic countries, but of which Europe is ignorant. Indeed, the application of the bamboo to European wants seems so natural, that it is impossible to avoid the surprise that in an age of keen competition for novelties, this has not been done long ago. The bamboo is eminently suitable for many details in household fittings. The thicker joints make quaint umbrella stands; the better qualities are so hard that they are used by the natives of India as swords and knives, and these would make admirable and clean paper knives, cheese and butter knives, and, cut up into smaller pieces, might, with great advantage, be employed as pegs by cabinet-makers and shoe-makers. The gums and resins which have each their peculiar properties—properties far better known to the simple and primitive aboriginal inhabitants of the wild forest tracts than to the professional experts of Europe, who often value samples according to a crude standpoint, viz., the colour, appearance, and condition of package demanded by the trade. This standpoint is conservative to established brands, but precludes the possibility of the properties of new products being in-

vestigated. The practice of the simple *Santal* in mending his iron cooking pot by means of the *sal* resin (the resin of *Shorea robusta*) suggests a use for that, at present, valueless substance, as it indicates also a personal acquaintance with its properties. It is not at all improbable that the properties of this and many other little-known gums and resins will commend themselves in the future to persons who may be in search of substances with properties we have not as yet been educated to require. The useless hog-gum (the gum of *Cochlospermum Gossypium*), consigned falsely as tragacanth, has been accidentally discovered by the bookbinder to be invaluable for marbling purposes, and the gum of *Sterculia urens* has been found to restore to tasar silk the lusture removed from it during an improved process of reeling that fibre. Practically, the one requirement for gum in Europe is a strong and useful adhesive mucilage, and although with care in selection and packing, India might easily come to play a much more important part in this trade than it has done in the past, India has, at the same time, gums and resins which possess distinctive properties, each one of which finds in India a market in meeting the demands of some indigenous industry. But I have said enough to indicate the long category of the unimportant products of India. The bulk of these products are, however, unimportant only in a European sense. The people of India are indeed children of nature; they are perhaps far more dependent upon nature than any other community in the same condition of civilisation. Natural or wild products not only form the bulk of their ornaments and their children's toys, but there are few people in India who are not dependent, to a large extent, for food on the plants climbing the village hedgerows, or floating over the tanks which their ancestors excavated. They are herbalists, and their medicinal plants are all gathered from the neighbouring jungles. To the people of India, therefore, the products I have, from a comparison with the trade done in the staples of India's foreign commerce, designated as unimportant, are by no means so. The diffusion of definite and accurate information regarding these substances will, in some instances, extend their use from one province to another, and in others create a foreign demand for them. Indeed, so important are these minor products to the people of India, that they may be said to give the finishing touches to the story of India's productive resources. They not only enter into the everyday domestic life of the people, but, in many instances give that charm to the handicrafts of India which western skill has vainly tried to imitate. Given the raw product which imparts the actual tinctorial principle, and the European dyer fails to produce the desired result because he has overlooked the laborious and apparently meaningless combinations which centuries have taught the Indian dyer to employ. The use of soap in washing the fabric in one case, and the employment of saponaceous nuts for that purpose in another, have as much to do with the beautiful and permanent colours produced as have the complex series of vegetable and mineral mordants.

CLASS III.—FIBRES.

At this late hour it would be useless to attempt to deal with cotton, jute, silk, and wool. There is so much to say under each of these subjects, that it would take hours to deal with them satisfactorily. I cannot, however, pass from the subject of cotton without reminding you that the great cotton mills of Bombay have already given promise that each year the Indian mills will more and more meet the Indian market, until they begin to materially affect the immense import trade in British cotton goods. The imports of cotton goods into India were last year valued at £24,282,628, a large enough trade to invite competition in every direction. The British manufacturer has not so much to fear, however, from native enterprise, at least for some years to come, as from British. Just as happened with the jute trade of Dundee, Englishmen with their capital and machinery may remove to India to manufacture from Indian cotton the peculiar goods required by the people of India. When this is done, there will be a saving in time and of freight charges and agency. The raw cotton, instead of bearing freight to England, and the goods freight back again to India, together with the charges for agencies and brokerages which these transactions necessitate, would be produced and manufactured on the spot, and go direct into consumption. I have endeavoured to show that the difference between the cost of Indian and English labour is not so great as is commonly supposed. The advantage is, however, in favour of the mill-owner in India, and the disadvantage against the hand-loom weaver. To put this matter clearer, the cheapness of Indian labour is not sufficient to enable the hand-loom weaver to hold his own against the power-loom manufacturers; but Indian labour is cheaper than English, and this cheapness is another advantage which the mill-owner in India has over the British manufacturer.

There is no more hopeful future for India than the opening out not of cotton mills only, but of factories of every description. It is impossible for India to stand still. Each year will see her becoming more and more a manufacturing country. The world has, however, grown tired of using cotton, jute, silk, and wool. A distinct demand has arisen for new fibres, and India possesses at least 300 fibres, few of which have as yet received even a passing consideration. At the late Colonial and Indian Exhibition the largest and most complete display of the fibres of India ever shown was placed before the public. These fibres attracted very considerable attention, and experts from all parts of the world were afforded every possible facility in examining them. It will be enough to allude to three of these fibres.

1. *Sida rhombifolia.*—This beautiful silvery white fibre is obtained from the above-named plant—a member of the mallow family. Botanically *Sida* may be said to be allied to jute, and the fibre it affords, in many respects, resembles jute. It may be grown on the same fields, and by the same cultivators. It can therefore be produced at about the same price, for the fibre may be separated from the stems by the same simple process, namely, by retting and washing in water. The only factor that might conduce to make it more expensive than jute is the fact that, in its wild state, it does not attain the same length of stem as the cultivated jute; but *Sida* has not been cultivated as yet, and there is no knowing but that it may even exceed jute in its yield of fibre per acre. It may be accepted, however, that *Sida* fibre is, like jute, a cheap fibre, and one that might be produced with great ease in immense quantities, the supply being as constant as that of jute. Its claims for superiority over jute are very considerable. The fibre is not half as thick as jute, and it is of a much purer quality, and can therefore be spun into finer yarns than jute, and thus come into textile purposes which jute has totally failed to reach. It can take colour with great ease. In fact, *Sida* fibre has been much admired by all the manufacturers who have examined it. It is now being experimented with on both flax and jute machinery; and I am hopeful that, as one of the tangible outcomes of the late Exhibition, this fibre will, in a very few years, come to hold a distinct place amongst the fibres exported from India.

2. *Bauhinia Vahlii.*—This extensive climber belongs to the family of the pea. It abounds throughout all the warm lower mountainous tracts, being the most abundant climber in the mountainous forest of the great tableland of India, and crossing the Gangetic basin, it occurs again in all the forests which skirt the foot of the Himalaya. Mr. Routledge, of Sunderland was, I believe, the first person who within the past few years drew prominent attention to the fibre derived from this plant. Long before even Mr. Routledge's attention was directed to it, however, the late Dr. Forbes Royle spoke highly of it under its vernacular name, and specimens were exhibited at the Great International Exhibition of 1851. The fibre is universally used by the natives of India for the purpose of ropemaking, and it stands high in

their esteem. Mr. Routledge has urged its use in the paper trade; but although the plant is sufficiently abundant to warrant the idea that it might even pay to be thrown into the paper-makers' vat, it seems to possess such merits as a possible textile fibre, that it is more likely to find a much higher place than Mr. Routledge designed for it. The *malu* fibre may be gathered in immense lengths, for the plant is one of those gigantic climbers which, by means of its tendrils, extends its long arms from tree to tree, binding the forest into great clumps. It is, indeed, a source of greatest annoyance to the forester, for it not only injures his trees, but has such a vitality that it is next to impossible to exterminate the plant, and a few months after it has been cut to the ground, its long elegant pendant boughs laden with its great clusters of white flowers, are seen waving in defiance from the topmost branches of the trees. A very large and practically inexhaustible supply might be drawn from the forests of India, but I have no confidence in a large industry depending upon a wild plant. The wide area over which it would have to be collected, and the complete control which the owners of the forests could exercise over the buyer, would be dangerous to success; therefore a tract of country, say twenty miles, of the practically useless stony hill sides would have to be purchased and systematically planted. A forest is not necessary for the plants to climb on; they would trail over the ground and form with each other great clumps. From such a plantation a nucleus of supply could be drawn and depended upon, which would have a good moral effect upon the persons bringing to the planter supplies from the wild source. In this way it is possible to procure a constant supply, and if this can but be secured, the fibre possesses in itself such high merit that it will soon make itself known in the textile world. It is one of the few vegetable fibres that will stand to be dyed, bleached. and worked up along with wool, a property which speaks volumes in itself.

3. *Caloptris gigantea*.—The world has heard so much of the *madar* fibres that it may be viewed as, preaumptuous on my part to desire to go back upon the unfavourable verdicts which experts have passed upon them. It is well known that the stems of this plant afford one of the strongest and finest of vegetable fibres, and one of the most beautiful. The great difficulty is to separate this fibre from the stems, and, indeed, so great is this difficulty that the idea has practically been abandoned. My friend Mr. Cross, by nitrating *madar* fibre, has, however, produced a substance which can with difficulty be detected from silk. It has all the gloss and softness of silk, and would seem so valuable that, in this state, it could well afford to bear an expensive process of separation.

I desire your attention not so much, however, to the possibilities of *madar* bark fibre as to the floss found attached to the seeds. This has been pronounced too short and too light to be worked on machinery. But I have begun to suspect that we can correct these defects to a large extent. The plant is wild along country roadsides in India, luxuriating on every bit of waste sterile land. No person, as far as I am aware, has thought of cultivating it. An important Lancashire spinner has assured me that, even in its present state, he can use any amount of the fibre; all he requires is a uniform and steady supply. We have agreed that this can never be secured from a wild plant which has to be collected by wandering along miles of roadsides. Through the kindness and co-operation of a missionary friend, however, I am at present having a few acres of inferior land cultivated with *madar*, and we are hopeful of being able to prove to the poor Santals of Bengal that this crop would pay them far more than some of the things they and their forefathers have been in the habit of growing. If this can be done, uniformity and continuance in supply may not only be secured, but it may be confidently hoped that, with careful selection of seed, after a few years, we may educate the plant into becoming obedient to man's skill. Our cultivated *madar* may yield a floss that will have none of the defects complained of. If this can be done, I am satisfied my friend will do it, for I know of no more careful and painstaking person in India than the gentleman who has most generously undertaken to pioneer the introduction of this new annual crop.

Class IV.—The Oils and Oil-seeds.

But I have already trespassed too far upon your time. There is much that one might say about the existing crops and the possible new crops of India, that one scarce knows where to begin or what to say first. Speaking of the oil-seeds, however, the greatest possible interest was taken at the late Exhibition in the white form of linseed sent from the Central Provinces. Were it possibe to develop this form to the exclusion of the red, a large trade would be done in it. The greatest danger to the Indian oil-seed trade is the difficulty to induce the people to discontinue their practice of adulteration, or to persuade them to be more careful in rooting up different crops growing in the same field. A comparatively small percentage of rape-seed mixed with the linseed renders it completely useless as a drying oil. Speaking of the rape-seed trade, on the other hand, few persons seem to be aware that there is, practically, no mustard grown in India. The so-called mustard exported from India is in some cases better qualities of rape, or in others the Indian mustard—the small black and pitted seeds of *Brassica juncea*. It seems desirable that this fact should be made more generally known, for should demand arise for *Brassica alba* or *B. nigra*—the true white and black mustards, these might easily enough be substituted for the white and black forms of *B. campestris* or rape seed, which seem to find a market as inferior mustard.—*Journal of the Society of Arts*

THE TESTS ON QUININE SULPHATE.

Although some of the facts to which I propose to refer in connection with this subject do not in themselves possess any great novelty, the special attention they have lately received in various quarters gives them a new interest at the present moment.

Among all the salts of cinchona alkaloids quinine sulphate is undoubtedly the most important in every respect, and therefore especial attention should be given to the means of ascertaining its purity. Quite lately it has been contended, that in regard to this character it is the duty of the pharmacist to enforce upon the manufacturer very stringent demands, and from an ethical point of view nothing can be said to the contrary, especially if it should be decided upon therapeutical grounds that it is desirable to use quinine sulphate in a state of absolute chemical purity. But that is a point to be determined by medical authority, and for the present it will suffice to consider what is to be understood by the term purity in this case as a matter of practical pharmacy. In doing so it will be important to bear in mind that however much we may be in a position at the present time to define the particulars which are evidence of the purity of quinine sulphate, it must be admitted that in regard to this salt the term purity has hitherto had only a relative application. With our present knowledge of the various alkaloids occurring in the material which is the source of quinine, it may be taken for granted that quinine sulphate is not likely to be naturally contaminated with cinchonine sulphate, or, indeed, with any other cinchonine salt as an accidental admixture, and hence, for practical purposes, this impurity may be to a great extent left out of consideration. For various other reasons, true quinidine sulphate may also be disregarded in this respect as being an unlikely admixture, and, in a general way, attention may be confined almost entirely to cinchonidine sulphate as being the impurity most frequently present in commercial quinine sulphate. The intrinsic value of the cinchonidine salt is very much less than that of quinine sulphate. Consequently from this point of view alone independently of therapeutic value, it is very

important to ascertain the presence and amount of this impurity in the quinine sulphate of commerce.

When we call to mind the fact that cinchonidine is almost always associated with quinine in the bark from which quinine sulphate is manufactured, and also the fact that up to the year 1844 cinchonidine was not known as an independent substance distinct from quinine, it will be evident that there is, on these grounds alone, very good reason for believing that prior to the date mentioned the article known as quinine sulphate was really a mixture of the sulphates of quinine and cinchonidine. It would be possible to mention in support of this view many circumstances recorded by trustworthy observers, but I will merely refer to the fact lately made known by Dr. deVrij that the quinine sulphate originally manufactured by Pelletier contained a considerable amount of cinchonidine.

Winckler's identification of cinchonidine, in 1844, was coincident with the introduction of bark from New Grenada, to supply the place of the Bolivian bark that had been previously used for the manufacture of quinine, and the fact that this New Grenada bark contained a much larger amount of cinchonidine than Bolivian bark was, no doubt, the circumstance which led to the identification of the alkaloid. Unfortunately, Winckler gave it the name of "quinidine," and very shortly afterwards the sulphate of this alkaloid was met with in commerce under the name of "quinidine." At the 1851 Exhibition it was shown by Zimmer, of Frankfort, and a prize was then awarded to his firm for its production in a separate form. Probably it had been used long before as an adulterant of quinine sulphate, and as the methods of testing the purity of quinine sulphate in use at that time were not calculated to detect the presence of the cinchonidine salt, there is also a probability that it was often present to a considerable amount in commercial quinine sulphate as an accidental and to a large extent quite unrecognized impurity, originating from the material used. The literature of that period indeed furnishes abundant evidence of this, and several new methods of testing were then suggested for the detection of cinchonidine. None of them, however, were thoroughly effectual, and the official tests given in the various pharamacopœias were all of such a nature that a considerable amount of cinchonidine salt would pass unrecognized. That has, indeed, been the case up to the present time.

It is evident, therefore, that the presence of cinchonidine sulphate in commercial quinine sulphate cannot be regarded as a matter of any novelty, either as an unrecognized accident before 1844, or as a well understood fact since that time; but that, on the contrary, it was a natural consequence of the association of cinchonidine with quinine in all the varieties of material employed for the manufacture of quinine sulphate. The question as to the purity of this salt, apart from actual falsification, has therefore always been a question as to the actual amount of cinchonidine it contained. It is mainly in regard to this particular point that the value and efficiency of the tests applied for ascertaining the purity of quinine sulphate require to be considered, and it is now just ten years ago that I pointed out the defective nature of the test prescribed in the British pharmacopœia of 1867. I then showed that by the application of the Pharmacopœia test a sample of quinine sulphate containing at least 10 or 15 per cent of cinchonidine sulpate could not be distinguished from one of absolute purity, or containing no more than one per cent, and that while there were some manufacturers who supplied the article in a comparatively high state of purity, that obtained from other sources often contained a large amount of the cinchonidine salt. The existence, even in the past, of such differences in the quality of a medicinal agent so important as quinine sulphate, and the possibility of their recurrence, should certainly induced pharamacists to give attention to this matter, and to verify the quality of their supplies by careful examination, not only for the sake of their own protection, but also for the purpose of enabling them to furnish a personal guarantee as to the purity of this article.

The methods of testing quinine sulphate for ascertaining its purity and detecting the presence of salts of the other cinchona alkaloids are for the most part based upon the relative solubility of those alkaloids in ether or in ammonia, and partly, also, upon the relative solubility of the neutral sulphates of those alkaloids in water. As already mentioned, the problem to be solved, under ordinary conditions, is a simple one, and it may be stated in these terms: What is the amount of cinchonidine sulphate present, The ether test was first applied for this purpose in 1852. It consisted in shaking a weighed quantity of the sulphate in question with ether and ammonia in a test tube, and if the alkaloid set free by the ammonia was completely dissolved by the ether, forming a clear solution, the sulphate was considered to be free from objectionable impurity. But the ether test thus applied is not sufficiently delicate for the purpose required. Freshly precipitated quinine dissolves readily in a very small proportion of ether, and the solution remains quite clear if the evaporation of the ether be prevented. Cinchonidine is also soluble in ether, but to a very much smaller extent. Thus, for example, 10 grains of quinine sulphate treated in this way, with 1 drachm of ether and some ammonia, will give a clear solution; but 1 grain of cinchonidine sulpate gives a very different result when so treated, a large portion of the alkaloid remaining undissolved by the ether. The actual limit of solubility of cinchonidine in ether is reached when the sulphate is in the propotion of about half a grain to the fluid drachm of ether. Hence it might be expected, that when this test is applied to a sample of quinine sulphate containing 10 per cent of cinchonidine sulphate, the presence of this impurity would be ascertainable. That is not the case however. When such a sample is tested in this away, the whole of the alkaloid is dissolved, forming a clear solution, and there is no indication of the presence of cinchonidine. The fact is, that an ether solution of quinine dissolves more cinchonidine than an equal volume of ether does. The practical result is that the ether test applied in the manner just described will not in any case indicate the presence of cinchonidine unless its amount is upwards of 10 per cent at least.

It was partly in this respect that the ether test as prescribed in the British Pharmacopœia, 1867, the French Codex, 1866, and the United States Pharmacopœia, 1870, was defective. In each case also there was the further mistake of directing too large a proportion of ether to be used. Half an ounce of ether, the quantity to be used, according to the B. P., with 10 grains of the quinine sulphate to be tested, is capable of dissolving 2 grains of cinchonidine, and the 5 grams of ether to be used with half a gram of the salt according to the Codex, is sufficient to dissolve 0·0386 gram of cinchonidine, these quantities corresponding in one case to about 20 per cent, and the other to 13 per cent of cinchonidine sulphate that would escape recognition by the test. So far, therefore, as those official standards were concerned, it is again evident that the purity of quinine sulphate must be regarded as having had up to within a very recent period only a relative significance.

In the German Pharmacopœia of 1872 Kerner's test was adopted, and it has since been adopted in the United States Pharmacopœia of 1880. It is based upon the fact that quinine is much more soluble in ammonia solution than any other cinchona alkaloid. When a cold saturated solution of neutral quinine sulphate, containing only from 1-700th to 1-800th of its weight of the salt, is mixed with ammonia solution, the alkaloid precipitated in the first instance is readily dissolved again by adding more of the ammonia solution. If a volume equal to that of the quinine sulphate solution be added the mixture becomes quite clear. When, however, a saturated solution of cinchonidine sulphate is treated in the

same manner the result is very different, because cinchonidine is so very much less soluble in ammonia solution than quinine. Here then is a means of distinguishing between these two alkaloids, and the further difference existing between the sulphates of these alkaloids, in their solubility in water at the normal temperature, admits of this means of distinction being applied as a test for the presence of cinchonidine sulphate in quinine sulphate. The way in which this is done may be explained most readily by taking as an example the case of quinine sulphate containing 10 per cent of the cinchonidine salt, and applying the test as directed in the German Pharmacopœia.

One gram of such a salt will contain 0·99 gram quinine sulphate, and 0·01 gram of cinchonidine salt.

The first step is to separate the two sulphates by means of their very different solubility in water.

For this purpose the sample to be tested is shaken with ten times its weight of cold water, and if the two sulphates were taken up in proportion to their respective solubility in water, the cinchonidine sulphate dissolved would be seven times as much as the quinine sulphate, since cinchonidine sulphate is soluble in about 100 parts of water; while quinine sulphate requires about 700 parts for solution.* That is the assumption upon which Kerner's test was founded, and if it were correct, the solution obtained by shaking 1 gram of quinine sulphate containing 10 per cent cinchonidine sulphate with 10 c. c. of water would contain 0·0143 gram quinine sulphate and 0·1 gram of cinchonidine sulphate. If such a solution were really obtained under the conditions mentioned, Kerner's test would be a very delicate one. But that is not the case. The solution of the sulphates is not determined altogether by their respective solubility, and for various, reasons it does not take place at the normal temperature in these proportions so readily as might be expected. The consequence is that in applying this test to quinine sulphate containing cinchonidine sulphate only a portion of the latter salt is dissolved, and the portion which is not dissolved escapes detection. This fact was pointed out by me ten years ago, in the paper which I read at one of these evening meetings; but as the test is described in the German and the United States Pharmacopœias it has not received sufficient attention. Practically considered, the result is that Kerner's test is not much better than the other test already described, although it would be a very delicate one if rightly applied.

It is altogether useless to apply so delicate a test for cinchonidine, unless in making the solution to which ammonia is applied that alkaloid is really dissolved out of the sample to be tested. This is not done when cold water is used. Whether it be due to the slow action of cold water upon cinchonidine sulphate, or to the existence of a double salt, the result is the same, part of the cinchonidine remaining undissolved and thus escaping notice. I may here mention that I think there is some reason for believing part of the cinchonidine may be present in a free state, as it frequently happens that quinine sulphate has a decided alkaline reaction. If this be the case the insufficiency of Kerner's test in such a case would be quite intelligible.

The same test is adopted in the French Codex, and the conditions I have shown to be necessary are to some extent provided for by a slight modification intended to meet the difficulty that has just been mentioned. That consists in warming the mixture of quinine sulphate and water by immersing the tube in warm water, and then cooling the solution to a temperature of 15° C. before adding ammonia to the filtered liquid. It has been found, however, that mere warming is insufficient to ensure the solution of all the cinchonidine salt that may be present in a sample of quinine sulphate, and that consequently the application of the test in this way cannot be relied upon to afford trustworthy indications of the purity of quinine sulphate. For that purpose it is essential that the quinine sulphate tested should either be dissolved in boiling water, or at least heated to the boiling point with nearly enough water to dissolve it at that temperature. It is only in this way that the whole of the cinchonidine sulphate can be dissolved and brought into a condition to be recognizable on the subsequent addition of ammonia.* The Commission appointed by the Pharmaceutical Society of Paris to inquire into this subject has, after some months of investigation, also arrived at the same result, and therefore recommended that the mixture of quinine sulphate and water should be heated to the temperature of 60° C. But that is not sufficient to ensure the detection of all the cinchonidine salt that may be present, nor do I think that it is in any case, from an analytical point of view, a mode of procedure sufficiently precise to furnish trustworthy results as to the actual amount of cinchonidine sulphate. For various reasons, economical or therapeutical, it may be advisable or expedient to recognize a certain limitation of the purity to be demanded in quinine sulphate; but that would be most appropriately done by specifying the amount of cinchonidine salt that is to be allowable. Such a practical regulation of the matter does not, however, constitute any reason for making analytical methods less precise and analytical results less accurate than is consistent with the knowledge at our command. Any test that provides for overlooking some portion of a substance to be detected must be distrusted as unsafe.

In the present British Pharmacopœia the facts that I have previously pointed out have now been taken cognizance of and in accordance with them an improved modification of the ether test is adopted for the testing of quinine sulphate. Here the impossibility of obtaining correct results when operating directly upon the sulphate to be tested is overcome by having recourse in the first instance to a fractional solution of the salt by heating it with water to the boiling point, and then, after cooling and recrystallization of the quinine sulphate, applying the ether test to the cold mother liquor. By this means the greater part, if not all of the cinchonidine salt will be dissolved, while the proportion of quinine sulphate remaining associated with it in solution will be so minimized as to admit of the presence of cinchonidine being detected by the formation of a crystalline deposit either immediately or after the lapse of some hours.

Taking a sample containing 10 per cent of cinchonidine, boiling 10 grains of it with 5 fluid drachms of water, then cooling to 60° F., and filtering, such a solution is obtained. To get a good result the solution should be evaporated to about one-fifth its volume before being shaken with ether and ammonia, and then the presence of cinchonidine will be distinctly indicated. Even 1 per cent of cinchonidine sulphate can be detected in this way with certainty,† and it is very easy to tell whether any sample of quinine sulphate comes within the limit of purity fixed by the Pharmacopœia of "not much more than 5 per cent."

In regard to the testing of quinine sulphate the British Pharmacopœia is now decidedly in advance of other pharmacopœias. The ether test as there

* The solubility of neutral quinine sulphate is given somewhat differently by authorities, and it is not always quite the same for different samples. Taking the range of variation above-mentioned the quantities contained in 10 c. c. of the solution will be as follows—

For a solubility of 1 part in	10 c. c. of the solution will contain gram
700 parts of water at 60° F.	·0143
755 " "	·0132
800 " "	·0125

* Even then more than one recrystallization will generally be requisite.

† When the amount of cinchonidine is small it is requisite to leave the closed tube for twelve hours or longer for the formation of the crystals to take place.

applied is more to be relied upon than Kerner's ammonia test, even when a boiling temperature is applied in making the solution, because the manipulation is more simple, and the cinchonidine can be actually weighed instead of being estimated from the quantity of ammonia solution required to dissolve it. There are also possible sources of error in the ammonia test which do not apply in the other case. Perhaps the best testimony to the excellence of the modified ether test is, however, to be found in the circumstance that very shortly after the reading of my paper here it was adopted and specially recommended by so high an authority on this subject as Dr. Hesse, who published with that object a paper in the *Archiv der Pharmacie*' describing a mode of applying this test which has been commonly referred to since as Dr. Hesse's test.

But to return to the test of the British Pharmacopœi. So far as concerns the details hithero mentioned the principles to be observed are correctly applied; but I think it is unfortunate that the addition of acid should have been directed in making the solution, for except in so far as perfect neutralization is concerned, every drop of acid added proportionately invalidates the result by introducing into the mother liquor so much the more quinine, and thus, for the reason already mentioned, reducing the delicacy of the test for cinchonidine. Another objectionable feature of this test is the treatment of such a large volume of liquid with ether and ammonia. Five ounces of the solution will dissolve at least half an ounce of ether before there is any separation of ether to dissolve the alkaloid, and in that way a liquid will be produced which is itself a solvent of cinchonidine to such an extent as to interfere with the indications of its presence. The proper mode of operating would be to evaporate the mother liquor of the crystallization to a small bulk before treating it with ether and ammonia, and then the result of the test would be much more distinct and accurate.

2. Determination of Caffeine.

The method adopted for this purpose, and described in the *Pharmaceutical Journal* a few weeks ago, by myself and Mr. Cowuley, has since then been applied to the examination of a number of different samples of coffee from various sources, and we have found that in accordance with the view we then suggested as being probable, the amount of caffeine in coffee berries is a tolerably constant quantity. For the samples examined, we are indebted to the kindness of Messrs. Patry and Pasteur, who very obligingly provided us with material representing the produce of different countries where coffee is grown upon the large scale. In these further analyses, for carrying out which I am indebted to Mr. Cowuley, the coffee berries have first been dried at 212° F., since it was found very difficult to reduce them to powder when in the air-dried condition. The figures in the following table, therefore, apply to the dried raw berries, and the results previously published, have been corrected so as to allow for the amount of moisture in the berries.

Kinds of coffee.	Moisture per cent.	Caffeine. Berries dried at 212° F. per cent.	Air dried berries. per cent.
Coorg	8·0	1·20	1·10
Guatemala ...	8·6	1·29	1·18
Travancore ...	10·0	1·29	1·16
Liberian	8·0	1·30	1·20
Liberian	8·0	1·39	1·28
Rio	9·1	1·20	—
Santos Brazil.	9·0	1·29	—
Manila	6·6	1·20	—
Ceylon	6·2	1·24	—
Perak	7·3	1·22	—
Costa Rica ...	7·2	1·24	—
Pale Jamaica..	8·7	1·21	—
Mysore	8·0	1·28	—
Jamaica.....	9·0	1·23	—

It is evident from the results quoted in this table that the discordant statements hitherto published in reference to the amount of caffeine in coffee must be ascribed to defective methods of analysis, and that, in reality, the determination of the amount of caffeine in a sample of coffee by the method we have described would be one of the most conclusive data to rely upon in any question as to the adulteration of coffee.

3. Cocaine Hydrochlorate.

In a recent number of 'Ephemeris,' Dr. Squibb has put forward a statement in reference to the condition in which this salt should be employed in medicine and pharmacy, that may be considered rather remarkable as coming from him. He proposes that the cocaine as extracted from the coca leaves should be converted into hydrochlorate, and that this salt should be reduced to a dry state by evaporating the solution with constant stirring until a granular crystalline mass remains. Such a product would probably always contain a certain proportion of uncrystallizable material, which Dr. quibb thinks is physiologically equal to the crystallizable portion, and he recommends that the whole should be mixed together for use in medicine, because the separation of the uncrystallizable portion would entail considerable loss. Having lately had occasion to operate upon a large quantity of crude cocaine, as it is now imported from South America, my experience of this article has led me to disagree with the opinion expressed by Dr. Squibb, as to the propriety of allowing uncrystallizable hydrochlorate to be mixed with the crystallizable salt. I find that there is no difficulty in obtaining the salt in a finely crystalline condition, quite colourless and quite free from odour. It is, indeed, produced in this condition by several manufacturers, and for many of the purposes to which it is applied this appears to be the only suitable form of the salt.—*Pharmaceutical Journal.*

DISCUSSION.

Coffee Husks and Catha Edulis.

Mr. Allen said he had been entrusted by Mr. Redhouse with two specimens. That gentleman had for many years resided in Turkey and other parts of the East, and he had continually evinced his desire to improve their knowledge of eastern Materia Medica. A short time ago Mr. Redhouse wrote to his friend the Consul at Jedda, with regard to coffee and another matter, and in reply he had received a letter from the Consul in which occurred the following passage:—

"I send you by this mail per sample post, a bag containing a small quantity of the dried 'gisher' or shell of the coffee berry, so largely consumed both here and in the Yemen for coffee. Also, by same means, a quantity of the dried 'quat' so much chewed in the Yemen. This last has been forwarded to me by our Vice-Consul at Hodeidah, who says:—'In Yemen they always chew gat green and fresh, but whenever they proceed to the Hedjaz for Haj, or go to some other place where gat is not obtainable, they do not fail to provide themselves with a quantity of the gat herb previously dried. The Arabs of the Yemen never make nor have made a decoction from gat to drink.'"

So far as he (Mr. Allen) could find there was no record of the coffee husks being used as a beverage. It was a singular thing that the Arabs should discard the seeds altogether, and use only the husk for drink. There was no aroma in the husks. He found that the "kat" had been described in an interesting paper by Mr. Hanbury, in the *Pharmaceutical Journal*, [1], xii., p. 269. The "kat" was really the *Catha edulis*. The top shoots were probably cut off in a fresh state and brought to the market. They were very eagerly bought by the natives, both rich and poor. The men went into the bazaars or exchanges, and drank water and energetically chewed the herb, and thus got into a pleasant state of exhilaration. It would be interesting to ascertain whether these leaves contained an alkaloid or glucoside. In most text-books it was stated that the *Catha edulis* was used for making a drinking decoction as well as for chewing, but in the consul's letter it was distinctly stated that the Arabs do not make decoction from it. He had found in the text-books mention made of a coffee which was

made from the external parts of the berry. This was called Sultan's coffee and was never imported into the West.

Poison Cabinet.

Mr. Abbot exhibited a model of poison cabinet, which he said was of American invention. Its working was partly mechanical and partly electrical. The cabinet was so constructed that only one bottle could be out of place at one time, and the first bottle taken out must be restored to the shelf before another bottle could be removed. The invention, he said, had been recently perfected and patented in America.

Mr. Passmore asked wherein this cabinet differed from one brought forward by Mr. Young, of Warrington, at least fifteen years ago, and described in one of the early volumes of the present series of the *Pharmaceutical Journal.** That appeared to be practically the same invention as the present cabinet.

Mr. Abbott said that he had not heard of the invention to which Mr. Passmore referred. American patents were not granted until the patent authorities had thoroughly investigated whether the invention had been in any degree anticipated, and if it had been so anticipated a patent was refused. He would make it his business to see whether the invention of fifteen years ago was similar to the present one. Of course, it was possible that this idea had been anticipated.

Specimens Exhibited.

Dr. Paul called attention to a sample of margosa oil recently brought to England from Bombay, and sent for examination by Mr. Charles Christy. It was remarkable for being exceedingly bitter. The soil was obtained from the seeds of the nim tree (*Azadirachta indica*) one of the drugs of the Indian Pharmacopœia, and was valued as an anthelmintic.

Mr. Holmes said that the remarks made by Mr. Allen suggested some important points. The physiological action of coffee undoubtedly differs from that of tea in several points, yet the value of these beverages is generally attributed to the caffeine they contain. He believed that the leaves of *Catha edulis* had been examined by Professor Schorlemmer, but he had not been able to procure a copy of his paper on the subject. He had been informed, however, that caffeine had not been found in the leaves, and the exhilarating properties of the leaves must therefore be due to some other principle. If this were the case with *Catha edulis*, the cause of the differences between coffee and tea appeared to him to be worthy of further investigation. With respect to the margosa oil, it possessed a remarkable alliaceous odour which he had not observed in the bark of the tree, specimens of which were in the collection of Hindoo Materia Medica in the Museum of the Society. In reference to the specimens which he had placed before the meeting, the tree trunks at the back were those of cinchona tree, from Ceylon, principally *Cinchona officinalis*, *Cinchona succirubra* and a cinchona hybrid, apparently between the *C. officinalis* and *C. succirubra*. Some of the specimens showed that bark had been renewed by shaving it off instead of removing alternate strips.

NILGIRI BEES AND CURIOUS LEAVES.

A meeting of the Nilgiri Natural History Society was held in the Herbarium, on Monday last, March 7th, Mr. Lawson, President, in the chair. Mr. F. D. Short of Vercaud, was elected a member of the Society.

Mr. L. Morgan sent a paper to be read on "the Bees of the Nilgiris." It showed that there are three distinct honey producing Aphideæ on these hills, *Apis dorsata*, *A Indica*, and *A Florea*. The first is the largest and fiercest. Its hives are found in crevices of precipitous rocks, and in trees, particularly the kil, and always well protected from wind and damp. The shape of the comb is semi-circular, one and a half to two feet in diameter, and about two inches in thickness. The average yield of honey is from 15 to 30 pounds from each hive. These bees were numerous last year on account of the strobilanthus in flower. Their honey is dark, golden-brown, and peculiar in taste. The *Apis Indica* is the commonest Indian bee. It is very difficult to hive, always preferring natural holes in trees, and they invariably consume all the honey they gather. Their hives are kept very clean, and they are very cautious in selecting the site, as they have many enemies to contend with in the mice, rats, honey-bazzard and even the jackal and sloth bear. The *Apis Florea* is found in the lower valleys especially about Badaga cultivation, with their hives usually in some thorny bush. The hive is elongated and surmounted by a dome containing all the honey about 2 to 3 pounds. They never stay long in one place but keep moving about according to the flowering season.

Mr. D. Hooper next read a paper entitled "an examination of the leaves of Gymnema Sylvestre." These leaves when chewed have the peculiar property of destroying the taste of sugar and all saccharine substances. On taking some powdered sugar after masticating a leaf or two it appears to be as tasteless as sand in the mouth. A chemical examination was made of these leaves to ascertain the constituent to which this peculiar property was due. The paper gave the result of this examination, describing the different principles and their manner of extraction. The leaf was found to contain chlorophyll and two acid resins soluble in ether. An organic acid allied chrysophanic acid and containing the anti-saccharine property was discovered and named by Mr. Hooper, *Gymnemic Acid*. Other principles of the leaf were tartaric acid, a neutral bitter principle, gum, glucose, carbohydrate, cellulose, pararabin, and oxalate of calcium. The last was in the form of crystals in the leaf, known to botanists as conglomerate raphides.

Votes of thanks were passed to the authors for their papers and the meeting terminated.—*Nilgiri Express.*

AGRICULTURAL ENTERPRISE.

To the Editor of the "Bombay Gazette."

Sir,—I see that the question has been raised in Madras whether the example to agriculturists of successful private enterprise is more potent than that of Government farms. I confess that I do not see much analogy between the two, as the object of each is entirely different. That of the latter should be the encouragement of agricultural improvement by the economical expenditure of capital and of practical skill, and in such an institution one of the last considerations should be that which is essentially the first object of private enterprise, viz., profit. A Government farm should be an example farm, it is true, in the sense of being an experimental one, but as encouragement to capitalists to put their money in the land instead of underground, I would prefer the example of a successful private undertaking carried out on conditions open to all possessing a fair amount of capital and energy.

Allow me, therefore, again to ask for space for a short account of Mr. Bomanji A. Dalal's Farm (near Bahadarpur), the prospects of which have improved since my last visit, a short notice of which you were good enough to publish two years ago. The farm covers 3,500 acres, 1,300 of which are this year under cultivation. Of these, 400 are under wheat; 300 under tur (with rice as a first crop); 150 under winter jowari; a small area under oil, gram, and tobacco; and the remaining 300 acres under a mixed crop of a somewhat unusual kind, viz., rice and cotton. This I have never seen elsewhere, but it appears that the "besur" soil here is so rich that cotton sown alone runs to wood and leaf. Whether an exhausting crop such as rice should be used with cotton appears doubtful, but it is not easy to suggest a substitute which would be harvested early enough not to interfere with the growth of the more important crop.

Pharm. Journ., [3], vol. i., p. 870.

Four years ago Rustumpura contained only a single family, cultivating about twenty acres; it has now a population of nearly 500, attracted here by the liberal terms offered by the proprietor. A school and a post-office have already been established. The water-supply is not good as yet, but Mr. Bomanji has spent a good round sum on the village, well, and tank, and hopes for sympathy and assistance from the local board. The food grains produced on the farm are not more than sufficient for the consumption of the colony, and exports are confined to cotton and oil seeds. The station of Bahadarpur is only six miles distant, but the road is very bad, and even more disheartening than the road, is the transit duly taken by His Highness the Guicowar on all produce carried by his own railway! It is melancholy to see agricultural enterprise and every branch of trade handicapped by these obnoxious duties, and the policy is as short-sighted and suicidal as it is barbarous. I rode this morning over a very large extent of waste land belonging to His Highness, still nearer to the railway than Rustumpura, and with equally good soil. A few roads, a few wells, and the abolition of these duties would soon turn this bare plain into a valuable cotton-producing and revenue-paying district.

Mr. Bomanji has found time for a few experiments, having given some attention to Nankin cotton, linseed, safflower, and white wheat. With tobacco he has done well, and his crop of red "hansotia" wheat looks excellent. Mr. Bomanji himself is an Honorary Magistrate, a member of the Local Board, and a most hospitable gentleman, very well worthy of the success which, I feel sure, you, sir, will join me in hoping is before him.—G. F. S.

THE MANUFACTURE OF SCENT.

This is the time of year most perfect on the Reviera: the sky is serenely blue, the sea rolls lazily as if overburdened with warmth, the scent of the orange-blossom still lingers undisturbed by wind upon terraced hills, the air is gently bracing, and everyone is in a good humour.

With the advent of the new year, the wild flowers begin to bloom, violets coming first in great abundance, soon followed by hyacinths, blue-bells, narcissus, and all their sister train of light and colour; but in February the aspect is changed, the mistral sweeps along the land, curling over the olive leaves, till the country becomes silver-grey instead of sombre-green, driving clouds of dust before it, and penetrating everywhere like a thorough scavenger. A period of restlessness then commences; the invalid loses ground, and is weary of the proximity of the sea, from which there is only one escape to a quiet, old-fashioned Provençal town called Grasse, lying under the shelter of the Basses Alps, with fresh, invigorating air, and having for its chief attraction the important business of manufacturing scent. The position is very pleasant, at an elevation, of 1,100 ft. on the side of a mountain guarding off the North, and about ten miles by rail behind Cannes, so that there is a full Southern aspect which tempers the atmosphere, and renders possible a great cultivation of flowers. Owing to the height, the wild flowers are a little later than those of the true Riviera; but acres of violets are privately grown, with innumerable beds of hyacinths, jonquils, and narcissus; while long before it is necessary to leave, the May blooms upon the hedges, and the tender Star of Bethlehem brightly gleams everywhere, in pleasant contrast to the green of spring. During this season the factories work to their full extent, though the treatment is so slow, and in some instances requires such constant repetition, that flowers are only received twice a week. If, however, one should happen to visit a factory on a receiving-day, one will find the floors of the reception-rooms covered, perhaps, with a mass of violets, upon which probably recline two or three young ladies, enjoying the perfume and delighting in the reality of an imaginative dream. Every flower, before arriving at the perfumery, is removed from its stem, when, according to its nature, it undergoes one of the three processes,—distillation, submersion in hot grease, or absorption by cold grease, all utensils used in the manufacture being made of copper.

The first is the costly but ordinary method of the retort, placed over a small furnace, carrying the vapour as it condenses into a receiver, with glass tubes on the outside to catch the essential oil. Verbina, geranium, and lavender are treated in this way. The second is very curious, and seemingly, ought to be disastrous. Flowers in certain proportions are flung into good-sized kettles of hot pork and beef-grease, kept warm by placing the vessels in boiling water; they are well stirred together, and left still hot for twelve hours, after which the mixture is heavily pressed. The flowers are then thrown away, and the operation is repeated with fresh ones, until the liquid grease is sufficiently charged with odour, when it is placed in a cold receiver half-full of spirits of wine, which in a few days becomes impregnated with the perfume, and is drawn off for sale. If the grease is not subjected to the spirits of wine on the premises, it is sold in its congealed state to the London scent-makers, who treat it at their leisure. Roses, orange-blossoms, and violets are some of those requiring this method. The third, to the eyes of a novice, does not appear so hopelessly destructive or so wilfully barbarous; yet the sacrifice of beauty is the same. A layer of olive-oil or cold grease, carefully prepared, is placed upon a frame, the flowers being dotted over it face downward, and remaining for twenty-four or thirty hours. The process is very tedious, requiring to be repeated with the same grease many times, after which the perfume is absorbed by spirits of wine, as in the previous manner. The delicate scents can only be caught in this way,—will only give out, so to speak, their exact selves according to Nature. It is no extraction, but literal absorption, the catching of sweetness freely imparted to the fresh air of native hill-sides. Jessamine, tube-rose, jonquil, and others not of tough formation, must be submitted to this treatment. The industry is of great value; there are upwards of fifty perfumeries; and though the London market is the best outlet, yet their products are being gradually shipped to almost all parts of the world. There is no toil about the work, no grinding poverty no din or rattle of machinery, no emaciated children everything is quiet and peaceful; in fact, if it would not be a paradox, one might call life in these factories the Nirvana of labour. The manufacture being a very profitable one, the perfumers are naturally the men of the place, and besides possessing good means, are large owners of property at Cannes and Nice, as well as at Grasse.—*Spectator.*

QUEENSLAND SUGAR-GROWERS are by no means so depressed as might have been supposed at the prospect opening out before them. A splendid growing season, with a slightly better price for their sugar than was previously calculated upon, has cheered them considerably; and, but for the fact that the labour difficulty remains unremedied, and that operations on the plantations are either brought to a standstill or reduced to a minimum, there would be little in connection with sugar to grumble about. Beet sugar growers have more reason to feel concerned at their prospects than have growers of the sugar-cane. Fruit-preserving and jam-making are the stars of hope for the sugar manufacturer; and here it is that beet sugar is a miserable failure. It is not generally known that beetroot sugar decomposes fruit, while cane sugar preserves it. Those who contemplate the making of preserves should take this fact into account, for it will prove a false economy to use beet sugar for that purpose. Out of this fact arises the query: Can a sugar that decomposes fruit be properly nourishing to the human frame? Value is not by any means in proportion to price. For saccharine and preserving properties, if cane sugar stands at 100 per cent, beet sugar is no higher than 65 or 70, and if cane sugar is worth 3d. per pound, beet sugar, notwithstanding its bright and granular appearance, is not worth more than 2d. The fight between these powerful rivals is resulting in favour of Nature's best article—cane sugar; and a few years will probably be efficient to establish the cane sugar industry on a better and more satisfactory basis than it has ever before rested upon.—*Queenslander.*

Ginger-beer Powders.—Mix ½ oz. of bruised ginger, ¾ oz. cream of tartar, and 4 drops of essence of lemon with as much powdered sugar as will make the packet a presentable size. Direct that the powder be added to 1 gallon of boiling water, containing 1 lb. of lump sugar. When nearly cold float a piece of toast on the liquid, on which place 2 or 3 tablespoonfuls of good yeast, and set in a moderately warm place to ferment for a day or two; strain and bottle.—*Chemist and Druggist*

Preservation of Flowers.—The *Chronique Industrielle* states that flowers may be preserved, with all their brilliancy and freshness, in the following way:—In a well-corked bottle, dissolve six drachms of coarsely cracked, clear gum copal, mixed with the same weight of broken glass, in 15½ ounces (by weight) of pure ractified sulphuric ether. Soak the flowers in this mixture, take them out slowly, and expose them to the air for ten minutes; then immerse them anew, and again expose them to the action of the air. Repeat this operation four or five times. The flowers thus treated will keep for a long time if care be taken not to handle them too much.—*Journ. Royal Micros. Soc.*

The Saltpetre Solution is a well-known remedy for the cut worm; but not everybody knows how to apply it. We therefore give in the following method of a correspondent of the *New England Homestead*, even if a little out of season. We might forget, you know. One year ago I had a patch of beans entirely destroyed by cut worms. I planted it over; as soon as they came up, the worms began again. I dissolved half a pound of saltpetre in three pints of water, mixed that thoroughly with one-half bushel of dry ashes, and I sprinkled the ashes on the beans just as there was a shower coming up, and the rain washed the ashes all off into the ground. I had no more trouble with the worms, but had a good crop of beans.—*Southern Planter.*

Pepper Adulteration.—A. Hilger, in the *Archiv. der Pharmacie*, states that adulteration of ground pepper by means of broken pepper has lately been very frequent. A sample of broken pepper was taken, and on careful inspection was found to contain an admixture of broken pericarps of chillies. The microscope proved that pressed seeds of the oil palm (*Elaeis guinensis*, Jacq.) were also present. Complete analysis showed the so-called "broken pepper" to consist of.—

	Per Cent.
Shells of pepper	50
Flour of oil-palm seeds	30
Dust of pepper	15
Mineral substances	4
Pericarps of chillies	1

—*Chemist and Druggist.*

Peach Growing in America.—As to pruning, let them alone the first year. Cut the lower limbs off the second year, but not too much. Cut more in the third year, and then direct the form of the tree; but avoid, in all stages of tree, too much pruning. Let them grow low; don't let the limbs crowd and press each other; keep the tree erect, or inclining a little to the south; don't let the sun shine on the bodies. Use judgment in pruning. Some trees require it often; other sorts hardly at all. Prune in latter part of May or June. Don't cut your trees in winter or fall; it is ruinous to them, and there can be no necessity for it. Save the soap-suds after clothes washing, and wash down the bodies of your trees, young and old, or get some other wash—carbolic soap, or something else. Rub some axle-grease on the bodies of your young trees in the fall, to prevent hares and mice from girdling them in the winter. For the first time in my memory, the hares were very destructive to young trees in this section during the last winter. I had a lot of young apple trees, one and two years from the nursery, and saw, on the 1st of December, that something was biting them; three were already girdled. I gave a man a box of axle-grease, and had him rub it on with his hands, the whole lot, from the roots to the limbs, and they were not touched afterwards, while hundreds were destroyed at other places where they were not thus treated. This is the first time that such a thing has occurred here that I know of, but it may not be the last.—*Southern Planter.*

Cement Wash.—Take of fresh cement three parts, clear sand one part, and mix them thoroughly with fresh water. This will give a grey or granite colour, dark or light, according to the colour of the cement. If a brick colour is desired, add enough venetian red to the mixture to produce that colour. The cement, sand, and colouring matter must be mixed together. If white is desired, the walls, when new, should receive two coats of cement wash, and then whitewash. After the work has received the first coat, a single coat every three or four years will be sufficient. It is best to thoroughly dampen the wall with clean fresh water, and follow immediately after with the cement wash. This course will prevent the bricks from absorbing the water from wash too quickly, and will give time for the cement to set. Care must be taken to keep all the ingredients of the cement wash well stirred during the application of it. The mixture must be made as thick as it will admit of to be conveniently put on with a whitewash brush. —*Rural Australian.*

The Future of the Date Palm in India. By E. Bonavia, M. D., Brigade-Surgeon I. M. D. (Thacker, Spink, and Co., Calcutta.) A considerable experience and study of the date palm has convinced Dr. Bonavia that it is the best of all trees, "either for fuel or as a help in times of famine," in India, and he has done well in giving his views to the public on the subject in this small volume. He has been at considerable pains to collect information through Government and private sources, and gives some general rules for the cultivation of the date palm in India, "and a scheme for extensive date-planting in tracts where its presence in large numbers would be most desirable." There are, as he points out, two objections to the planting of date palms—viz., dampness of the atmosphere and soil during ripening time, and the depredations of wasps. To meet the first objection he contends that, as he proposes the date palm as a protection against the failure of ordinary crops through scarcity of rain, consequently at the season when the dates would be most wanted the dampness would not arise to ruin it. As to the wasps, he thinks that there would be no difficulty in contriving a wasp-trap which would capture the bulk of them. As to the financial question, he says, "Any expenditure on such a scheme, which would at the outside be only required for ten or fifteen years, would be capital well invested. Not only would the foundations of an alternative ample supply of food be laid, but means would be provided of pushing population into tracts of country which are now lying waste for want of labour, and sufficient labour will not come without the fruit of some tree which requires little labour and a minimum of water.—*Home News.*

Ginger.—As a rule, spices grow above ground, but this is not the case with ginger. This product is a root, and grows beneath the surface. It is one of the most valuable spices, and its uses are more numerous and varied than anyone of the others. Ginger was first found near the Red Sea, and very early found its way to Greece and Rome. Like many other commodities, it was first used as a medicine, and held in high esteem. Soon after the discovery of America the plant was transferred from Asia to the West Indies and the tropical regions of the Spanish possessions of the new world. It is now cultivated as an article of commerce in Cochin, Bengal, Africa and Jamaica. It can probably be successfully cultivated wherever the coffee tree grows luxuriantly. The ginger of Jamaica has gained so high a reputation that the impression is made on many credulous minds that more ginger is grown, cultivated and exported from that island than from any other part of the world. In 1876 there were exported from Jamaica more than 1,600,000 pounds, valued at $144,000, or nine cents per pound; but the reports of exports vary so greatly that it is not easy to believe them correct. In 1867 the exports of ginger from Jamaica were reported at 1,728,675 pounds; in 1872, five years later, they fell off to 599,786 pounds, and then four years later, 1879, they again run up to 1,603,764 pounds.—*Grocer and Canner.*

THE OFFICIAL CALABAR BEAN is the seed of *Physostigma venenosum*, a large perennial climber found near the mouth of the Niger Old Calabar, and in Western Tropical Africa generally. Lagos and Gambia, for example, contributed specimens to the Colonial and Indian Exhibition. The plant has also been successfully cultivated in Ceylon, [By the Messrs. Frasers, near Matale.—ED. C. O.] and good specimens of the seed from that island were shown at the exhibition, and are now deposited in the Pharmaceutical Museum. —*Chemist and Druggist.*

TEA CULTIVATION IN CEYLON.—We are indebted to Mr. Rutherford for the ready transfer to us of the returns he has been getting of the tea acreages in the several districts with a view to arriving at the total planted in 1886. These returns will be carefully compared with those furnished for our Directoy. Meantime we may mention that Mr. Rutherford makes out 152,000 acres under tea at the end of 1886, and although our information is not yet forward sufficiently to enable us to check these, yet we believe, the total is very close on the actual state of the case.

NORTH QUEENSLAND.—After an interview with a journalist, who is also a planter of considerable experience in India, we were gratified in finding that our convictions with reference to the adaptability of the Johnstone River country for the cultivation of tea, cocoa, and rice were substantially confirmed. In India land suitable for rice does not favour the tea plant, for the latter is best on hill sides, where the drainage is good; and the same is equally true of the *theobroma cacao.* The Johnstone soil is unsurpassed for fertility anywhere, and the climate is sufficiently moist for tea wherever the land is high enough to allow of good drainage. The swampy portions would grow rice to perfection, and the back country rising about Herberton into a lower temperature would be the very thing for cinchona. The sugar industry there is working with fewer hitches than elsewhere, and so far as that district is concerned it would be, comparatively speaking, an easier matter to bring in a satisfactory substitute for it than in any other agricultural district in the North. All that streteh of country including Port Douglas, Cairns, the Johnstone River, and back to Herberton is included in the above remarks, and has a great agricultural future before it.—*Queenslander.*

VINE DISEASES.—The various diseases which affect vines, formed the subject of conferences held in last October in Florence, where an exhibition was also given of anticryptogamic and insecticide apparatus for combating those diseases. Mr. Consul-General Colnaghi sends a short summary of the conferences. The diseases discussed were *Peronospora Viticola* (a mildew; *Anthracnosis* (Black rot); *Mal Nero* (Black sickness); and decay of the roots. The characteristics of these are generally known. In the first case, milk of lime and unwashed sulphur have proved successful antidotes, but those remedies containng sulphate of copper have been found most efficacious —the latter having drawbacks owing to its deleterious effect on the fruit. In the second case, the preventive used with most success has been the treating of the branches and stems of the plants with acidulated sulphate of iron. For the third disease there are not yet any known remedies, nor has the cause of the malady been ascertained with certainty. Cutting away and precautions against humidity of soil are recommended. The fourth disease is not peculiar to the vine, and may be produced by a variety of causes, among which are: stagnant humidity in the soil, want of proper aëration, damage produced by frost, and parasites. As a remedy, the causes indicated must be removed, and the decayed parts of the plant destroyed. It is proposed to renew the conferenee this year, at which reports will be presented on various experimental tests. (Miscellaneous Series, 1887, No. 27.)—*Chamber of Commerce Journal.*

SARSAPARILLA —A short time ago a correspondent wanted to know about the cultivation of this product the notes from a reliable source may be of service. In cultivation, the plant is reproduced from the vine or stem, which is lifted clear from the ground. The soil is then loosened, the vine is buried slightly into it, roots freely, and forms new stock with new roots. Were the plant once established in open scrub land, its nature and habits induee us to believe that it could be made a valuable produet with comparatively little trouble. It is also propagated from the seed which fall around the parent plant in great numbers when they fall in loose and rieh soil. This seed is enclosed in a fruit or globose envelope, which hangs in branches from the vine like grapes. Each berry eneloses a pit of the size of a pea. It turns black upon falling and its envelope is red. Each plant bears twice a year Sarsaparilla can also be made to root by cuttings. This method is more prompt than by the seed. According to the trials which have been made with it, the roots by this method attain full size in two years; by the seed three years are necessary. Sarsaparilla, cultivated with skill, would give a yield of twice what it does in its wild state. It is estimated that if on the space of an acre, one had a thousand plants, whether from seed, from cuttings,or from sprouts the result would be from four to six thousand lb. of dry sarsaparilla, of the quality most esteemed in eommerce. When the roots are ripe they are dug and exposed to the sun until they are quite dry; in some cases the roots are washed before drying. They are then tied up in bundles, weighing from 12 to 20 lb. each, for export. The bundles of South America are packed in bales weighing from 80 to 100 lb. or more, and imperfectly covered with skins. In the interior of the bundles are often found roots of inferior quality, rhizomes with adherent stems, stones, chunks of wood, &c. The roots are furnished with a few rootlets. The general color of the roots is dirty grayish or reddish brown. The cortex is very mealy, and the meditullium or central cord is thinner than in the Jamaica sort.

CHEAPER CHARGES ON TEA.—We learn that the Indian Tea Districts' Association are carrying on an animated correspondence with the representatives in this country of the great steamship lines running between Calcutta and London, and also with the associated inland companies, with a view to the obtaining of a reasonable reduction of the rates of freight hitherto charged on tea. We hear also that the question of cheaper rates for storing and warehousing teas in bond is also under the consideration of the Association.—*H. & C. Mail.*

M. PAUL BERT ON TONQUIN INDUSTRIES: BANANAS.—M. Paul Bert, late Resident-General of Tonquin, forwarded to the Minister of Commerce and Industry the following letter, which he had addressed to the Chambers of Commerce at Mines and Clermont-Ferrand, on the advantages offered by the preserving of bananas in Annam :— HANOI, 22nd September, 1886.—Annam produces in abundance the best bananas; it is said that in quality those of Singapore are much inferior to them. At Singapore there are a large number of houses engaged in the preserving and sale of bananas for export. I think it right to bring this fact to your notice as your town possesses a large number of well known fruit preserving establishments with a large connection. I think that at least one of them might work the bananas of Annam. I would do all in my power to assist in its establishment.—*Hongkong Daily Press.* [If really the preserving of bananas for export is a paying industry at Singapore, it surely ought to pay in Colombo. The fruits split in two, lengthways, could be spread on mats and dried by solar heat, under protection of wire netting. Or they could be baked and packed in jars or tins, like figs. The Dutch preserved plaintains by solar heat and many Ceylon children in school in England were made happy by a present of a tin of preserved plantains from the Rev. Mr. Thurstan's Industrial School. The latter were, we think baked and a little white sugar scattered over the layers,—ED.]

COCONUT PEARLS.

A trade journal appearing in Java, gives the following particulars regarding a peculiar kind of pearl found in this part of the world :—It is well known that pearls have been met with within oysters and mussels. Sometimes even trees yield pearls. In the Proceedings of the Boston Society of Natural History, there is a paper by Mr. J. Bacon regarding a kind of pearls often found within cocoanuts. The specimens shown have been bought at Singapore. They are said to be so rare in the East Indies as to be highly prized by the native rajahs, and worn by them as precious stones. Mr. Bacon himself possessed a small pearl of this sort. It is said that, when allowed to grow, they will reach the size of cherries. This pearl resembles the common variety in smoothness, whiteness, and scant lustre of surface. It is harder than it, and almost as hard as feldspar or opal. The common pearl varies in hardness, but is never harder than feldspar. The coconut pearl consists of carbonate of lime, with very few organic substances remaining after treatment with acid solutions. This organic matter is insoluble, shows no trace of vegetable substances after microscopical examination, and seems to be akin to albumen in structure. In the common pearl there is also found an albuminous substance, but the latter remains unchanged in appearance and lustre even after the calcareous constituent parts have been dissolved away. In other respects, microscopical research has brought out the fact that the coconut pearl is formed of concentric layers without any nucleus. The whole mass is made up of layers of fine crystalline fibres. Professor Bleekrode, in commenting on the former in a Dutch scientific periodical says that Rumphius, the famous botanist, had in his *Herbarium Amboinense* given full particulars of this petrifaction in the coconut. Rumphius has even illustrated his account of it by accompanying drawings of the two forms in which this kind of pearl is met with—pear-shaped and round, either of uniform appearance or with red edges. Hardly one in a thousand coconuts on the average displays this strange peculiarity. The formation of the latter is always a remarkable phenomenon hard to account for from the water in the nuts generally lacking the chemical substances favouring abnormal growth of the kind. Rumphius states for a fact that coconuts from Macassar yield more pearls than those from other places. This scientist, in 1682, sent, as present to the Grand Duke of Tuscany, a ring in which a coconut pearl had been set. Similar pearl-like formations are met with in other East Indian fruits, such as the waringin, the pomegranate, and the kechubong.—*Straits Times.*

[During our fifty years' residence in Ceylon we have never heard of any such concretion in the coconut. If any of our readers have been more fortunate, we shall be glad to hear from them. There is the story of the Sinhalese King who, to try a sage, asked him if there was any water which did not contain fish. The sage replied "none." The King triumphantly ordered a coconut to be split, when lo! out jumped a fish! The pearl story seems as probable. But if, as is stated, Rumphius described, figured, and sent as a present a coconut pearl, scepticism must give way. Who will refer to Rumphius for us?—Ed.]

PEARLS AND PEARLING LIFE.

Pearls and Pearling Life. By Edwin W. Streeter, f. r. g. s. (London : George Bell and Sons, 1886.)

The book before us, according to the preface, and as far as we are aware, is the only work in the English language which is entirely devoted to the history of pearls. The introductory chapter is immediately followed by one which gives a brief historical account of pearls in connection with India, China, Persia, Palestine, Egypt, Ancient Greece and Italy, and Europe in the Middle Ages. This is succeeded by a *resume* of the ancient ideas respecting the origin and supposed medicinal qualities of pearls, and by a few words on "breeding" pearls. The next chapter treats of the different kinds of pearl-forming mollusks, both marine and fluviatile. The writer then gives an account of the true mother-of-pearl shell, describing its geographical distribution, the different varieties, its structure, the parasites found within the shells, and their external enemies, their method of getting rid of extraneous substances (stones, small shells, &c.) accidentally introduced within the valves of the shell, and the uses to which the mother-of-pearl is put. The sixth chapter, although headed "The Origin and Formation of Pearls," also refers to the different kinds, such as *bouton* pearls, *baroque* pearls, and *coq de perle*, the mode of life of the oyster, the positions in which pearls are found, &c. It also treats of the qualities which regulate the value of pearls. The next chapter gives a short account of the Sooloo Archipelago, the natives as pearl divers, and their method of dredging. Then follows a good description of the fisheries of North-West-Australia and Torres Strait, and this is succeeded by an interesting chapter entitled "Pearling Life at the Present Day," which is practically descriptive of pearling expeditions made by Mr. Streeter's vessel, the *Sree Pas Sair*, from Singapore to the North-West Australian coast and the Sooloo Archipelago. Chapter XI. is devoted to a condensed account of the pearl-fisheries of Ceylon and Southern India, and this is followed by a *resume* of what is known respecting the fisheries in the Persian Gulf, the Red Sea, on the west coast of North America, and at the West Indies. Pearls produced by shells which inhabit the rivers and lakes of Great Britain and foreign countries are described in Chapter XIV., and the artificial production of pearls by the Chinese is also here referred to. The different kinds of coloured pearls, and the mollusks which produce them, are then treated of. In the succeeding chapter the most famous pearls of both ancient and modern times are recounted, and the immense sums at which some of them were valued are stated. Chapter XVII. gives the history of the remarkable cluster of pearls known as "the great Southern Cross pearl," which was exhibited in the West Australian Court of the Colonial and Indian Exhibition, and valued by the owners at 10,000*l*. The next and concluding chapter is devoted to the value of pearls, and shows how their worth has varied in this country at different periods from 1671 to the present time.

A map is then introduced showing the principal pearling regions. In an appendix, the works bearing on the subject which have been consulted by the author are enumerated, and a full index completes the volume.

Mr. Streeter has brought together a large amount of information which will be of interest to the general reader, for whom especially, and not for the scientific, the work has been written. The most original material is comprised in the part extending from the seventh to the tenth chapter. The chapter devoted to the Sooloo Archipelago contains some details which, although interesting in themselves, are rather foreign to the subject of the work.

The same observation applies to the account of the constellation *Crux Australis*, or Southern Cross, introduced in the seventeenth chapter.

As far as we have noticed, the various opinions and statements set forth in the work are mostly accurate. It may, however, be questioned whether "there is perhaps no instinct implanted in the human breast more powerful than the of love admiration," for is not that of self-preservation supposed to reign supreme? We would point out that the term *Lamellibranchiata* is now superseded by that of *Pelecypoda*, and with good and sufficient reasons is adopted in the latest and best manuals on conchology. The bathymetrical range of bivalves far exceeds the stated limit—200 fathoms—specimens having been obtained by the *Challenger* and other deep-sea exploring expeditions in depths ranging as low down as 2900 fathoms.

The book is printed in good legible type upon toned paper, but the pictorial portion mars the rest. The plates illustrating the *Malleus*, the *Meleagrina*, the *Unio*, the *Pinna*, the *Strombus*, and the *Turbinella* are simply execrable. They are printed upon a fearful black ground (one almost expects to see "Sacred to the memory of," &c.), inclosed by a thin white line with ornamental corners, and seem to us to have a most common appearance. We cannot see one redeeming feature in them, the drawing and colouring of the shells being equally bad. If another edition is called, for, fresh and accurate illustrations should be provided. E. A. S. —*Nature*

[The pearl shells are beautifully engraved in Tennent's Natural History of Ceylon.—Ed.]

INDIAN TEA AND TEA COMPANIES.

We reproduce from the Calcutta Commercial Correspondence of the *Pioneer*, a series of summary reports on a long array of Tea Companies. The experience of the past year, in the case of our Indian neighbours, cannot fail to be full of interest and instruction to Ceylon planters. The profits made in some cases must be considered exceedingly good: indeed, fair, if not handsome, dividends are the rule; but there are some exceptions; and we may be thankful in Ceylon, although we have drawbacks—as the present droughty season shows—that it is almost impossible for us to have to chronicle such an experience as that of the Holta Tea Garden where 30,000 lb. of tea were lost in one hailstorm! We quote as follows:—

Tea.—The report of the Directors of the Bolasun Tea Company discloses an outturn of 1,054 maunds against an estimate of 1,000 maunds, which sold at an average of As. 10-8 68 per lb. against As. 13 9 per lb. in 1885. The gross revenue was R56,552 and the expenditure R42,287, leaving a profit on the working of R14,265, and after one or two small adjustments the amount at credit of Profit and Loss is R14,122 A dividend of 5 per cent. has been declared, and it is now proposed to pay a final dividend of 2 per cent. and carry R122 forward. The dividend last year was 10 per cent. The estimates for 1887 provide for 1,000 maunds of fine tea at a local cost of R27,500.

The report of the Managing Agents of the Goomtee Tea Company shows that the outturn was 862½ maunds against an estimate of 750 maunds, the average price realised being nearly 8 annas per lb Last season the outturn was 700 maunds and the average price As. 11-2 per lb. The revenue account shows receipt of R34,516 and an expenditure of R30,577, leaving a profit on the season's work of R3,939, but the loss of a shipment of tea in 1885 fell to be adjusted in these accounts, and the result is a credit balance at profit and loss of R1,207, which is too small for division.

The estimates for 1887 provide for an outturn of 750 maunds at a total expenditure of R30,000 Last season the dividend paid was 13 per cent.

The report of the Managing Agents of the Hopetown Tea Company shows an outturn of 621 maunds against an estimate of 500 maunds, and an outturn in 1885 of 435 maunds. The average price realised was, however, As. 9-5½ against As. 13-2 per lb. last year. The revenue account shows receipts of R29,982 and an expenditure of R31,684, resulting in a loss of R1,702 on the season's working. The amount at debit of Profit and Loss is R1,113. This coming season the Manager hopes to make 650 maunds of good tea.

The report of the Managing Agents of the Indian Terai Company shows that the outturn was 140,010 lb., being 24,010 lb. in excess of the estimates and 22,120 lb. more tea than was made in 1885. The gross average price, however, was As. 8-1 per lb. as against As 10-9 for the crop of 1885. The receipts for the year were R69,375 and the expenditure R53,014 leaving a profit on the operations of R16,361, and the net balance at Profit and Loss is R16,599. A dividend of 5 per cent. was paid in September, and it is now proposed to pay a final dividend of 5 per cent. and to carry R1,599 forward. The dividend last season was 17 per cent. The estimates for the current year are for 132,000 lb. at an expenditure of R52,503.

The report of the Managing Agents of the Kornaful Association shows that the outturn was 3,948 maunds, or 198 maunds more than estimated, and 166 maunds in excess of 1885. The average price obtained was As 10-1 per lb. against As. 11-4 obtained in 1885. The revenue account shows receipts of R1,99,328 and an expenditure of R1,42,848, leaving a profit of R56,480; this amount is reduced by payment of interest, commission, and sundry instalments for new cultivation and machinery to R29,135 as the net profit for the year, and adding the amount brought forward from 1885, the balance at credit of Profit and Loss is R44 672. This sum the Managing Agents recommend should be carried forward as in the present position of the Company it would not be desirable to declare a dividend, though if sufficient capital were subscribed to pay off the Company's debt, a dividend might be paid out of the accumulated profits. This subject will be discussed at the general meeting on 9th proximo. The estimates for the current season provide for an outturn of 3,920 maunds at an expenditure of R1,73,000 The report of the Directors of the Teesta Valley Tea Company shows that the outturn was 1,716 maunds, against an estimate of 1,500 maunds and an outturn in 1885 of 1,523 maunds. The average price realised was As. 9-3 per lb. net, against As 11-10 in 1885. The revenue account shows receipts for R86,112 and an expenditure of R66,013, leaving a profit for the season of R20,099. But the loss on a shipment made in 1885 reduces this amount to R17,552. An *ad interim* dividend of 5 per cent. has already exhausted R16,000 and the balance of R1,552 will be carried forward. For 1887 the estimated outturn is 1,800 maunds at an expenditure of R63,000. Last season the dividend declared was 10 per cent. The report of the Directors of the Dehra Doon Tea Company shows that the outturn for 1886 was 384,492 lb., or 57,879 lb. more than in 1885,, the percentage of first-class teas being 51 against 45 in 1885. The revenue account shows receipts of R1,59,316 and an expenditure of R1,04,233, leaving a profit of R45,083 and adding the balance from 1885 the amount at credit of Profit and Loss is R47,087. A dividend of 5 per cent. is recommended, carrying forward a balance of R3,187. Prices have ruled unprecedentedly low, but the increased outturn and more economical working has admitted of the same dividend being paid. Messrs. Devenport and Co. have been confirmed as Secretaries to the Selim Tea Company on a salary of R500 a month, which is to include office allowance.

The report of the Managing Agents of the New Terai Association shows that the outturn in 1886 amounted to 183,130 lbs., or 23,130 lbs, in excess of the estimate and 17,045 lb. more than the crop of 1885. It was sold at an average of 9½ annas against As 11-11 per lb. in 1885, The revenue account shows receipts of R1,10,093 and expenditure of R68,516, leaving a profit of R41,577, and adding the amount brought forward from 1885, the sum at credit of Profit and Loss is R45,314. An *ad-interim*

dividend of 5 per cent, has already been paid, and a further dividend of 17½ per cent has been declared or 22½ per cent in all, leaving a balance of R1,814 to be carried forward, which will provide for the cost of a new Excelsior roller and meet the cost of improving the water-supply. The estimates for 1887 provide for an outturn of 2,100 maunds at an outlay of R74,000. The balance in the hands of the Managing Agents on the 31st December was R69,990, and bankers have been since appointed to the Company. The garden extends to 410 acres and the block stands at R1,83,015. The report is in the highest degree satisfactory, and Messrs. Schoene Kilburn & Co. are to be congratulated on these good results. The dividend last year was 20 per cent.

The report of the Managing Agents of the Ring Tong Tea Company for the season of 1886 shows that the estimated outturn of 1,200 maunds was exceeded by 127 maunds, but unfortunately the average price realised was only As. 9-9·14 per lb against As. 13-2 for the season of 1885. The revenue accounts shows receipts of R65,137 and expenditure of R63,963, leaving a profit of R1,174, which is reduced in the Profit and Loss account to R934, which will be carried forward. The dividend last season was 7 per cent. The estimates for the current season provide for an outturn of 1,200 maunds at a local expenditure of R37,000, which includes the upkeep of the 75 acres put out in 1884.

The report of the Managing Agents of the Singbulli and Murmah Tea Company shows that the outturn was 2,364 maunds against an estimate of 2,050 maunds, and 696 maunds in excess of the season of 1885. The quantity of the tea was, however, much below the average, selling at As. 9-6·65 against As. 13-9·95 in 1885. The revenue account shows receipts of R1,13,932 and expenditure of R91,256, leaving a profit on the season's operations of R22,676, and adding the balance from 1885 and some unclaimed dividends, the amount at credit of Profit and Loss is R23,420. An *ad interim* dividend of 5 per cent has already been declared, and it is now proposed to pay a final dividend of 2 per cent, making 7 per cent for the season, to transfer R2,000 to Reserve Fund and to carry the balance forward. The dividend last year was 9 per cent. The estimate for 1887 has been kept down to an outturn of 2,000 maunds, with a view to better quality, at an estimated local expenditure of R65,765. The area of the gardens is now 711 acres.

The report of the Directors of the Holta Tea Company shows that 121,000 lb. of tea were made against an estimate of 125,000 lb. A severe hail-storm on the 28th May destroyed not less than 30,000 lb. of tea, or the results would have been very different. The average price of tea has, however, been barely maintained; but, estimating the unsold portion of teas retained for retail trade, the average will be not less than As. 11-1¼ per lb. The local retail trade has continued to make steady progress, and is receiving the closest attention. The revenue account shows receipts of R85,217 and expenditure R68,383, resulting in a profit on the season of R16,835, and adding the balance brought forward from 1885 the amount at credit of Profit and Loss is R17,514. A dividend of 5 per cent is proposed, carrying forward R14. The heavy pruning necessitated by the hail-storm will not permit of a higher estimated crop than 20,000 lb. for 1887 at a local expenditure of R17,000. The dividend last year was 11 per cent.

The report of the Managing Agents of the Springside Tea Company shows that the outturn was 855½ maunds against 800½ maunds in 1885 and 780½ maunds in 1884. The average price realised was As. 10-8 per lb. against As. 13-8 in 1885, and As. 11-10 in 1884. The revenue during the past year was R45,634, and the expenditure R35,991, leaving a profit on the season's operations of R9,643, and adding R1,442 brought forward from 1885, the amount at credit of Profit and Loss is R11,085. An *ad-interim* dividend of 3 per cent. has already been paid, and a further dividend of 3 per cent is now recommended, carrying forward R1,005 to this year's accounts. Arrangements have been made to lease 49 acres of tea adjoining the Company's gardens. The estimates for the current year provide for an outturn of 1,000 maunds at an expenditure of R41,987, showing at an average of 10 annas per lb. a profit of £8,013. The area of the Company's gardens is 358½ acres.

The report of the Managing Agents of the Singell Tea Company shows that the outturn was 226,330 lb., against 202,970 lb. last season. The tea sold in Calcutta averaged. As. 8·81 per lb. and that in London As. 8·60 per lb. Last year the average was As. 11·01. The gross receipts were R1,24,073 and the expenditure R1,02,970, leaving a profit of R21,123, which is increased in the Profit and Loss account to R26,379, or equivalent to 4 per cent. on the capital. The dividend for 1885 was 5½ per cent. The estimates for the current season are for 2,900 to 2,950 maunds of ten-anna tea.

The report of the Managing Agents of the Teendarrea Company shows that the outturn was 74,756 lb. against 60,822 lb. in 1885. The tea sold in Calcutta realised an average of As. 7¼ per lb. and that in London As. 8¾. The average last year was As. 9¼. The gross receipts were R35,434 and the expenditure R32,950, leaving a profit of R2,484, and adding the balance from 1885, the amount of Profit and Loss is R3,022 or a little over 2 per cent. The dividend last year was 3 per cent. The estimates for 1887 are for an outturn of 1,000 maunds.

The report of the Directors of the Central Cachar Tea Company shows an outturn of 395,813 lb., which sold at As. 8-2⅛ per lb. against 296,562 lb. in 1885, which however sold at As. 10-4 per lb. The revenue account shows receipts of R2,03,785 expenditure of R1,69,085, leaving a profit on the working of R34,700, and adding the balance from 1885, the amount at credit of profit and Loss is R34,989. An *ad interim* dividend of 3 per cent has been declared, and it is proposed to carry forward the blance of R4,989. The estimates for the current year provide for an outturn of 432,000 lb. at an expenditure of R1,70,000. The estimates for the past season were for 400,000 lb. tea at an expenditure of R1,55,000. Last year the dividend was 5 per cent.

The report of the Directors of the Phœnix tea Company shows that the outturn was 327,513 lb against an estimate of 309,600 lb. and an outturn in 1885 of 279,670 lb.—being in fact the largest crop on record. The average price realised was As. 7-4 per lb. against As. 10-7 in 1885. The revenue account shows receipts of R1,51,362 and an expenditure including depreciation on machinery of R1,40,824, leaving a profit on the season of R10,538, and adding the balance brought forward from 1885, the amount at credit of Profit and Loss is R24,708, which would admit of a dividend of 4½ per cent but the report is silent on this point. The season's profit, it will be observed, is barely 2 per cent. The estimates for 1887 provide for an outturn of 330,400 lb. at a total cost of R1,35,700, or As. 6-7 per lb., so that, unless prices improve, the outlook is not very encouraging. This garden has paid no dividend now for two years.

Colonial Fruit.—At the meeting of the Royal Colonial Institute on February 8th, Mr. D. Morris, Assistant Director, Royal Gardens, Kew, read a paper on the fruit trade of this country, pointing out that the home country imports fruit from foreign countries to the extent of more than £7,500,000, much of which might as well be obtained from colonial sources. Mr. Morris then gave details at great length as to the present state of the fruit industry in the various British colonies. By means of special cool chambers for the storage of fruit on board ship the prospects of the trade in fresh tropical and subtropical fruits would be greatly improved.—*Gardeners' Chronicle.*

A Good Whitewash.—Gardeners more than most men, except builders, use whitewash—in pits, greenhouses, bothies, and the various structures found in gardens, both private and market. We give a recipe for whitewash, extracted from the pages of our contemporary, the *Irish Farm, Forest and Gardens*, of January 15:—"Get half a bushel of freshly burned

lime; slake it with boiling water: cover it during the process to keep in the steam. Strain the liquid through a fine sieve, and add to it 7 lb. of salt, previously well dissolved in warm water; 3 lb. of ground rice boiled to a thin paste and stirred in boiling hot; ½ lb of powdered Spanish whiting, and 1 lb. of clean glue which has been previously dissolved by soaking it well, and then hanging it over a slow fire in a small kettle within a large one filled with water. Add 5 gal. of hot water to the mixture. stir it well, and let it stand a few days covered from dirt. It must be put on quite hot. For this purpose it can be kept in a kettle on a portable furnace. A white-wash made after this fashion will last for years." Such a holdfast whitewash as these compounds would make might be entrusted to entomb insects and their eggs more effectually than that usually compounded from lime alone.—*Gardeners' Chronicle.*

MAURITIUS NEW INDUSTRIES.—Mr. Horne, the Director of the Public Forests and Gardens of the island, has furnished an elaborate report on the industries which it is desirable to foster in the present depressed state of the sugar trade. Mr. Horne does not doubt but that in the future, as in the past, the cultivation of the sugar-cane must be the principal occupation of the agriculturists of the island, but he points out that many other resources are open to them, and recommends, moreover, the appointment of an agricultural chemist to advise in matters connected with Sugar-cane growing and its management. Mr Horne suggests, in addition, the extended cultivation of coconut Palms, Cacao, or Chocolate, Coffee, Tea, Dates, oil-nuts, Elais, Betel-nuts, and other Palms, various cereals, starches, Indigo, Anatto, oil-seeds of various kinds Bananas, Pine-apples and other fruits, Ginger, spices, fibre-plants, Cotton, silk, indiarubber, Tobacco, dyewoods. and a variety of other plants and their products—a list which will give some idea of the resources that are open to the cultivator in the tropics if other circumstances be propitious. Cinchona does not prosper in the island.—*Gardeners' Chronicle.*

KEEPING POTATOES.—It may not be generally known that Potatoes can be kept sound and well-flavoured until next year's crop comes in. The following is the method (said to be a French one), which I closely followed with the best results:—A large boiler of water, the water being kept up to the boiling point. The potatoes when well washed (avoid breaking the skin if possible) are placed in small baskets or nets, which are then rapidly thrust under water and there retained for about four seconds. The tubers in each batch on being withdrawn are spread out on the flooring to dry; when dry they are stored away in a dry dark room as nearly air-tight as possible. The potatoes by this process will have lost all tendency to germination.—*Journal of Horticulture.*

CANKER IN FRUIT TREES.—To be brief, my opinion, and it is a firm one, is this—Gardeners, as a rule, spoil their fruit trees by too much kindness in two ways: first by digging and manuring annually; secondly, by a too frequent use of the knife, commonly called pruning, but which in many cases is simply cutting into some shape agreeable to the eye. This has more to do with canker than many will admit. The remedies used here were not in any way elaborate. Lifting and root-pruning were adopted in most cases, in others all cankered wood was cut out carefully, the latter and syringing with petroleum mixture being purely out of respect to Mr. Hiam's insect theory. Might I be allowed to "blow my horn" I would say that if given healthy trees to start with (healthy trees should have stock and scion of an equal growth without rupture or blister) a moderately firm soil with good drainage, the roots being kept to the surface by mulching, and I venture to predict that canker would be a thing of the past.—C. L. RITCHIE, *Redhills House, Belturbet, Cavan. Ireland.—Journal of Horticulture.*

THERE are hundreds of fruit trees affected with "what is known as canker," but which is really ulceration. This is caused by the punctures of insects. Some years ago I had more to do than was pleasant with a number of young Apple trees, not a dozen or two of a few varieties, but hundreds, covering many acres of ground, embracing all the most useful varieties in cultivation. The trees were planted for commercial purposes, and perhaps no better could be had. The soil, too, appeared of the best—a reddish brown, sound, yet free-working, loam, 18 inches or more deep, and naturally drained by the gravelly brash on which it rested. The proprietor of the trees felt certain they would eventually be very profitable. For a time they grew well, producing sturdy wood that was well ripened, but in the course of four or five years canker appeared on the branches. They were fine trees then, with heads 4 to 6 feet in diameter. They were pruned, the branches doctored with strong insecticides, the soil over the roots dressed with manure, but still the scourge spread. Some we dug up, root-pruned, and replanted, but the improvement resulting was only of a temporary character. It became evident a cure was impossible. The trees were ruined, and the land sold. It was purchased by a company for extracting the abundance of iron it contained. It was full of iron, which glistened in the stones excavated. The trees I had to remove, or at least the few considered worth removal. The worst cankered roots and branches were cut away, and the trees replanted in suitable soil. They were dressed with no insecticide, yet they "grew out of the canker," and have since borne many a good crop of fruit. It was an excess of iron in the soil, and not minute insects on the branches, that caused the destruction of that great and once healthy collection of young trees. It was a lesson never to be forgotten of the importance of making sure of the real condition of the soil and subsoil before planting fruit trees extensively.—[I wonder if there is much iron in the soil where canker in Cinchona was worst.—COR.] To return to the insects. There is only one way in which these, if they had "caused" the canker of the trees in their old position. did not injure those removed to the new—namely, being shaken off in transit, and I have yet to learn that fruit tree pests can be "shaken off" so easily. I have been managing and mis-managing fruit trees for nearly thirty years. and have been able to trace canker to other causes, but never satisfactorily to insects. I have seen them in cankered portions of apple tree wood under the microscope, as I have seen others marvellously like them in the decaying wood of a gate post; but as I was not able to regard the mites as the cause of the collapse of the post, I could not consistently regard them as the originators of canker in the tree. This is my response to Mr. Hiam's invitation, and his reply shall have my respectful consideration, as though at present I must dissent from his views, his researches are fully appreciated.—*Journal of Horticulture.*

EARLY BEARING COCONUTS.—Mr. W. H. Wright, with whom we communicated on the subject of our Veyangoda correspondent's letter, was good enough to call on us with the information that the trees in bearing in his garden could not have been more than a year old when he put them down three years ago. Four years is an exceptionally short time for coconuts to bear in especially in Colombo; but the late Mr. Nathaniel Cooke had a young Estate 3 or 4 miles from Chilaw, three years old, on which we saw more than one tree throwing out spathes. The trees were close to the huts of the Goiyas who were on the land, and had probably been watered in dry weather; but they proved the early age at which coconuts can be made to bear.—Local "Examiner."

THE VOLATILITY OF CAFFEINE.—Sir, I should feel indebted if you will correct the erroneous statements attributed to me in last week's issue concerning the presence of caffeine in the sublimate obtained in coffee roasting. The statement I made was that I had never failed to detect the presence of caffeine in these sublimates, thus showing that a loss took place. This you will find is diametrically opposed to the printed matter in the Journal.—WATSON WILL,—Ossory Villa, Ossory Road—*Pharmaceutical Journal.*

Correspondence.

To the Editor of the "Ceylon Observer."

COFFEE PROSPECTS IN BRAZIL.

The Scottish Trust and Loan Company of Ceylon, Limited, Ingram House, 165, Fenchurch Street, London, 2nd February 1887.

Dear Sir,—I enclose a Brazilian Coffee Circular, and you can polish up your French translating it. There is no doubt of a very short crop both in Brazil and Java, but whether Messrs. Berlas' ideas are correct or not I cannot say, but I am curious to learn your own and your planting correspondents' views as to the nature of the disease alluded to; and whether any such has been experienced in Ceylon.—Yours faithfully,

THOMAS DICKSON, *Managing Director.*

COFFEE.

(Translated for *Ceylon Observer*, from *Messrs. Berla & Co., Rio Janeiro & Santos.*)

The *Journal de Commercio* in its issue of January 8th, 1887, writes thus:—"It is generally known that a prolonged dronght and after that frosts and severe cold have done considerable damage to the coffee harvest of 1887-88. The information which we have collected with the greatest care will not allow us to estimate the coming harvest at more than 2½ to 2¾ millions of bags for Rio de Janeiro. If, later on, unforeseen circumstances oblige us to modify this estimate, we shall inform our readers.

The "*Etoile du Sud*" a commercial, financial and maritime review for the Empire of Brazil, writes on the same subject:—"The news which, so far, reaches us from all sides is unfavorable, hence we give with all reserve the information that has reached us up to the 31st December 1886. According to this the West and North of the province of San Paulo will not offer the third of last year's harvest, which was already reduced, since it will not yield, for the port of Rio only what we had foretold, namely 4 million bags.

"The region of Campinas is especially tried and in the western ports of the province where there is something to hope for, the plantations are all young.

The letters that reach us from Minas-Geraes also inform us that it is only the new coffee that gives any hope, the old, though very green and fine, has not blossomed.

"It is the same in the province of Rio Janeiro. For the sake of those of our readers who know the centres of production, we give the sources of our information; it comes from S. Simão, Cravinho, Ribeirao Preto, Campinas, Ipiabas, Miracema, Pindamonhangaba, Guaratingueta, Campo-Bello, Rezende, Rochedo, S. Joao Nepomuceno, Cataguazes, Providencia, Cantagallo, etc.

"As we said, we publish this with all reserve, for supposing it to be correct, it would allow us to estimate the coming crop at 2½ millions of bags for Rio and 1½ bags for Santos only. Our chief editor has started for the provinces of Rio and S. Paulo, and will soon verify all our information.

In the same journal is a letter from M. A. Glaziou, Director of the Imperial gardens, a botanist celebrated throughout the learned world, who for many years had occupied himself with the Brazilian flora and who anticipates preconise in this letter, a remedy for the coffee-leaf disease. The letter written in Portuguese is too long to reproduce and would interest only Brazilian planters, but it accompanied a paper on the coffee disease which, adds the "*Etoile du Sud*," seemed a serious threat when the first symptoms were noted, and which justly alarmed the centres of production in the province of Rio.

"I will give you an extract from this paper. M. Glaziou attributes the disease to a parasitic animal of the genus *Anguillula* which lodges itself in the hairy roots of the tree and there deposits its thousand of eggs. ..... It is owing to this scourge that the coffee tree fades, becomes yellow, loses its new leaves at the tips of the branches and lets its fruit drop, already dried (*atrophiés*) by the deviation of the sap which the organs of the nutrition had elaborated in the ground for the benefit of the normal life of the coffee-bush. Thus attacked, the tree soon dies, bequeathing (*léguant*) to the soil, the whole of the mischief, which caused its own ruin. From what precedes, it is evident that the mischief is really greater than is generally believed in Europe, and you know that since the publication of the *Journal de Commercio* telegraphic information has reduced the total crop 1887-88 in the two provinces of Rio and Santos to 3,500,000 bags.

"In communicating these facts to you, I have wished to put you on your guard against the manœuvres of those interested in the fall, and to enable you to base your operations on reliable documents. I hope they will be useful to you and remain.—Yours, &c., &c.,

J. B. Berla."

"*P. S.*—As we go to press, a telegram from Santos reduces that estimate to 1,250,000 bags."

PINEAPPLES IN BADULLA.

Badulla, 3rd March 1887.

Dear Sir,—In re Irvine and his theory of probabilities of fruit traffic from here by the long-waited-on railway, what think you of a pineapple weighing slightly over (eleven) 11 lb. which I had presented to me by one of our workmen last night? It was grown in a garden not far from Badulla: it smells deliciously as well as looks big. Is it out of the common?—Yours,

INQUIRER.

Unusually good we should say.—Ed.]

COCONUT AND ARECA CULTIVATION UNDER TANKS: A GOOD SUGGESTION.

March, 7th 1887.

Sir,—Referring to your article on coconut cultivation and irrigation, I must express surprise that no one has, as far as I am aware, planted coconuts under a Government tank. Mr. Akbar has to raise water from the Maha Oya at a great expense, both for plant and working, while in the other case almost the only cost would be the annual water-rate of one rupee per acre. The advantages would be:—

1st. Saving the expense of hand-watering the young plants; 2nd. Quicker arrival of the tree at maturity; 3rd. Larger crops.

I believe that under a tank in the Puttalam District there is a large quantity of land that has already been surveyed and only waits for purchasers. I presume that the purchase money for this land would as usual in such cases be payable in four annual instalments, *i. e.*, that the coconut trees would almost be in bearing before the whole of the purchase money would be paid.

The arecanut being a still more thirsty palm than the coconut, all that is said above applies with greater force to the cultivation of that tree.

E. H.

TEA FROM THE UVAH COMPANY'S ESTATES.

Glen Alpine, Badulla, 8th March 1887.

Dear Sir,—In your issue of 25th February last, under the heading "Ceylon Produce in the London Market," the following appears:—"Glen Alpine makes a great show with 25 packages orange pekoe and pekoe at 1s 5d, probably expressly prepared for the report of the Directors of the Ouvah Company and a sample of what the province may be expected to do shortly in the way of producing tea."

The small break of tea referred to was not "orange pekoe and pekoe" as described, but unassorted tea.

It was in no way "expressly prepared" but manufactured in the ordinary way, rolling being done by hand, and firing over choolas.

The Directors of this Company have never directly or indirectly, expressed a wish to have produce "expressly prepared" for any of their reports, and I cannot even guess your motive in assuming that they should have done so in this case. Kindly give this publicity in an early issue. —I am, dear sir yours faithfully,

JOHN RETTIE, *Manager.*

[For the description "orange pekoe and pekoe" —which led our paragraphist to suppose the parcel was specially prepared—not the *Observer* but Messrs. Wilson, Smithett & Co., are responsible, as Mr. Rettie can see on referring to their circular. We are very pleased to see unassorted teas from Uva ranking so high.—ED.]

CEYLON JUNGLE-FOWL REARED IN CAPTIVITY AT NUWARA ELIYA.

Galle, 11th March 1887.

DEAR SIR,—Referring to your enquiry in the *Observer* of the 8th March, I may mention that I saw atNuwara Eliya years ago in an aviary or large cage several jungle-fowl that had been hatched and reared by Mr. George Hawkins from eggs found in a nest in the jungle.

I was struck by this, because at the time the value in England was £50 per pair. I remember this was the statement of Dr. Buckland in a contribution to some periodical.

I refer, of course, to Stanleyii. There is a more beautiful species in South India, much more difficult to tame, of which I secured a male specimen; but it hurt itself in its struggles in the small cage in which I was obliged to put it whilst travelling, and died. It strongly suggested that our domestic fowls represent *two* species, one of which is our Stanleyii, if we except also the Rumkin fowls, of which a few years ago I had one specimen, and which we do not now see in domestication, though it originally existed in Ceylon, and appears to have been carried to the Cape. I have seen a large cock of this species near the Galle market, which was said to have come from the Cape; but this, perhaps, is only a variety of one of the species.—Yours truly,

N.

II.

DEAR SIR,—I am sorry that I cannot give you very recent information; but about a dozen years since there were specimens of the jungle-fowl of Ceylon living in the Zoological Gardens of London, and were in capital health, quite acclimatized. It is probable that they were the same taken home by Mr. Holdsworth, for he took every care possible to get them home alive. At that time living specimens were exceedingly rare and valuable in England.

I have kept them in an aviary with proper treatment and plenty of room. They, no doubt, would breed in confinement, as other jungle-fowl have done so.

ZOOZOO.

To another correspondent we are indebted for the following:—

"In the 'Life of Frank Buckland' there is a para. anent birds &c., in the Zoo in 1874, which runs as follows:—'Another very beautiful and interesting bird, in excellent health, is Stanley's jungle-fowl; its home is Ceylon; these birds are worth £50 per pair. A collector, who did not know their value, procured seven of them alive at Trincomalee, and had them cooked for dinner—rather an expensive feed, three-and-a-half pairs of fowl of the value of £175.' So, you see, one jungle fowl at least has gone 'home,' a fact which ought to answer your query of the other day."

A superior waterproof paper, transparent and impervious to grease, is made by saturating good paper with a liquid prepared by dissolving shellac at a moderate heat in a saturated solution of borax. Such a mixture may be colored by the addition of various aniline dyes.—*American Cultivator.*

THE CULTIVATION of the tea plant is being rapidly prosecuted in the Transcaspian Province. The chief experiments have been made on the estates of Messrs. Tchelokaieff, near Douchak, of the Brothers Barkalaieff, at New Sarakhs, and of M. Metodieff, near Zugdigi. So far those of Messrs. Barkalaieff have succeeded best. There are also tea plantations near Lake Van.—*British Trade Journal.*

AN EXAMPLE TO CEYLON.—Cannot the Ceylon Director of Public Instruction follow the example set in South Australia?:—

TREE PLANTING BY SCHOOL CHILDREN.—The Hon. Dr. Cockburn, having become impressed with the beneficial results likely to follow the planting of trees in the grounds of State schools, has caused to be issued a circular to Boards of Advice, which contains the following:—"The Minister wishes to bring under the notice of Boards of Advice the advantage of tree-planting in school grounds. The Minister has, with much satisfaction noted the efforts made by some of the Boards in this direction, and feels sure that the portion of their funds so expended could not have been better applied. With a view to promote a general interest in this subject, and as a means of imparting many useful lessons to the children, the Minister proposes to set apart a suitable day during the winter months to be devoted to the planting of trees around those schools where the ground has been properly prepared. No ordinary lessons would be given on this day, but the attention of the pupils would be directed to be benefits of forestry, and, when practicable, the trees would be planted by them under the superintendence of the teachers. The operations preliminary to planting, the process of planting, and the after growth of the trees so planted would afford an opportunity to those teachers able and willing to avail themselves of it to give a series of object lessons on forestry, which would be of lifelong value to the children and of ultimate benefit to the State."—*S. A. Register.*

SUGAR.—The Berlin *Deutsche Zucker Industrie* of the 4th instant recommends to the special attention of its readers a letter, which it publishes from a Java Sugar Planter. The writer urges that the German Government should invite representatives of all Sugar-producing countries to a Conference, for discussing a method for a general restriction of production. The Java Sugar planter is sanguine enough to believe that some practical plan would be the outcome of such a Conference, and he thinks that if the German Beet Sugar Association would take the matter in hand, the fall in prices would be arrested. Perhaps the best demonstration of the Utopian nature of such a scheme is to take a map of the world, and note in what diverse places and under what diverse conditions and interests Sugar is grown and manufactured. The false economical steps which have landed the Industry in the present crisis can never be remedied by the equally false economy of creating an artificial scarcity. There are mouths enough in the principal Beet Sugar countries to consume far more than all the so-called over-production which now weighs down the Sugar market. But the people who are willing and ready to eat it are prevented from doing so by the price being artificially raised by their governments. In this direction lies the remedy. Continental nations might enjoy the abundance which is at their doors by freeing Sugar from restrictive and prohibitory taxes; and there would then be no more talk of over-production or of impracticable and unnatural schemes for creating, in the midst of plenty, an artificial scarcity, for the fancied benefit of a few, while the many suffer.—*Produce Market's Review,*

SOME OF OUR COLONIAL WOODS.

BY ALLEN RANSOME.

Ceylon.

With the exception of satin wood, which is already well known in the English market, none of the timbers of Ceylon are likely to find a sale in this country, for although there are many varieties, which from their fine figure, and diversity of colour, are adapted for ornamental furniture and cabinet work, they are, generally speaking, of small growth, and are not found in sufficient quantities to be advantageously imported into England. Moreover, some of the larger descriptions of trees which are worked up by natives of the colony, contain a great quantity of very fine grit, which quickly blunts the tools, and would render them very costly to work at the high wages paid to our skilled workmen. For the reasons just mentioned, I do not propose to describe further such Ceylon timbers as were submitted for trial.

Victoria.

Blackwood (Acacia melanoxylon).—This wood is higly prized in the colony. Being close-grained, heavy, strong, and flexible, beautifully marked, and richly-coloured, it is much used by cabinet-makers, coach-builders, coopers, and by railway carriage and agricultural implement makers. Samples of both old and young trees were sent for trial; the former were made into joiners' specimens, the latter into casks. The figure of the old growth wood was very fine, and the surface left by the cutters all that could be desired. The casks also proved a complete success. It is stated that timber of from ten to twenty years' growth is the most suitable for coopers' work, and as the tree is readily propagated, the supply could be made to keep the pace with the demand for this purpose. Large quantities of this timber are found in Tasmania as well as Victoria. The wood, which seasons well, has already being imported into England in small quantities, and sold at the docks at from 2s. to 3s. per cubic foot, at which prices it would certainly be worth while to import it much more largely.

Blue Gum (Eucalyptus globulus).—This is a hard light-coloured timber of great strength, tenacity and durability. The tree, which is found in Tasmania as well as Victoria, attains a colossal size. By way of testing the samples sent, a sleeper was adzed and bored, and a panel planed. Both experiments proved very satisfactory, the latter especially so, as the wood was found to plane as well against the grain as with it. Being plentiful, it is largely used in the colony for beams and joists in buildings, and also for railway sleepers, piers, and bridges.

Red Gum (Eucalyptus rostrata).—This is a very hard, compact wood, of a reddish-brown colour, and is found throughout the colony, along river flats and open valleys. It is largely used for fencing posts, and is well adapted for engineering works and buildings when required to withstand a vertical pressure, although, on account of its short grain, it is not considered trustworthy to support a heavy transverse strain. It has the reputation of being the best of all the gums for railway sleepers, being almost indestructible in damp soil.

South Australia.

Blue Gum (Eucalyptus leucoxylon).—This wood, which is also found in the colony of Victoria, where it is known by the name of "iron bark," is considered one of the most valuable woods in the colony, the trees growing to a height of 100 ft., with an average diameter of 3½ ft. It possesses great strength and tenacity, and has a close and straight grain, on which account it is largely used by the coachmaker and wheelwright for shafts and spokes. It is also extensively used for railways sleepers and piles.

The experiments on this wood were in every case most satisfactory.

Western Australia.

Farrah (Eucalyptus marginata.)—This timber abounds in the south-Western portions of the colony, and the best grows on the iron-stone conglomerate hills, the finest quality being, as a rule, found at the highest elevations. Stems have been found measuring as much as 80 ft. to the first branch, with a circumstance of 32 ft., a height of 5 ft. from the ground.

Visitors to the Colonial Exhibition cannot fail to have observed a fine log of this timber, 5 ft. in diameter, which, with its polished end, of a deep claret colour, was quite a centre of attraction in the Western Australian Court.

The jarrah timber is hard, touch, and durable, and being proof against the ravages of the teredo, and white ant, it is highly esteemed for piles, dock-work, and ship-building purposes, as well as for railway sleepers and building constructions.

To retain the valuable properties of the jarrah requires a somewhat special process of seasoning; and it is above all important that it should not be felled during the rainy season.

The system of seasoning jarrah, which is found to give the best results, is as follows:—About four or five weeks before the tree is to be felled, it is girdled; thus effectually preventing any fresh sap from rising, and as the leaves continue to draw the sap out of the tree it becomes partially seasoned before it is cut down, as much as 3 lb. of water per cubic foot, being extracted from the standing log in this manner. When the leaves have withered the tree is felled, and at once removed to the saw mill, where it is converted into scantlings or boards of the sizes required, which are then stacked, and entirely covered with saw-dust until properly seasoned.

If not treated as above described, jarrah will remain imperfectly seasoned for many years, and if the heart is allowed to remain in the log, it cracks and splits to such an extent as to render it almost useless, while, on the other hand, if seasoned and converted in the above manner, it yields very sound boards and scantlings.

A portion of a jarrah pile which was taken out of Perth Bridge, over the River Swan, after having been for 35 years and 9 months between wind and water, was exhibited, and shows no sign of decay, nor trace of the ravages of the teredo; and a short piece of same wood, also exhibited, which has served as a tram-rail on the jetty at Bussleton for 42 years, shows how very little it has suffered from the constant wear of the wheels upon it during that period.

Jarrah is frequently very handsomely figured, being shaded, or mottled with dark waves and veins, and notwithstanding its density and hardness, it is easily worked by machinery. it takes a very fine polish, and might be used to advantage for shop front fittings counter-tops, and cabinet work. Its greatest uses, however, will undoubtedly be for sleepers and piles for harbour work, and as it can be imported and sold in this country for £6 per load of 50 cubic feet, it will probably, when better known, to a great extent supersede greenheart for dock gates, and other work for which the latter is now generally employed.

Karri (Eucaylptus diversicolor).—This timber also grows in great abundance in the south-west portion of Western Australia, and when sawn up and partially seasoned, so closely resembles jarrah in appearance, that anyone not conversant with both timbers, would find it difficult to tell them from one another, although in many points they differ materially. The karri grows to an enormous size, some trees being no less than 300 ft. in height by 60 ft. in circumference.

Energetic steps are now being taken to introduce both karri and jarrah largely into this country, and those interested in karri claim for it all the attributes and advantages of jarrah, and it must be admitted that it stands a great transverse strain than that wood; but while its suitability for internal work is well established, it is open to question whether it will last as long as jarrah in contact with the ground, or for marine structures.

Karri timber, in the shape of squared logs, flitches, and planks of various sizes, can now be bought at the docks at from £7 to £8 per load of 50 cubic feet.

Samples of both jarrah and karri timber, converted into straight and circular mouldings, matchboarding, spokes of wheels, and barrels are exhibited, and although both of these woods were readily worked by all the machines, the jarrah in every case left the cutters with a smoother surface than the karri.

The treatment above described for seasoning jarrah, is found advantageous in the case of karri, and it may be taken to apply to most, if not all, varieties of the eucalypti, in which our Australian colonies abound.

Tuart (*Eucalyptus gomphocephala*).—This is another valuable timber tree, found principally between the Bunbury and Busselton districts. It is of straight growth, and yields logs up to 46 ft. in length, by 24 in. to 30 in. square.

The wood is of a yellowish colour, hard, heavy, tough, strong, and of close texture, and for large scantlings, it will be found a most valuable wood, especially where great strength is needed. The tuart shrinks very little in seasoning, and does not split while undergoing that process. It also stands exposure to all vicissitudes of weather for a long time without being affected by it.

The experiments showed that this wood is well suited for wheel work, but its chief value would doubtless be for heavier purposes, such as the under framings for rolling stock, ship-building timber, piles for piers, and supports for bridges, and also as backing for armourplated ships, as no ordinary shock or rebound will cause it to split; and as it can be sold in this country at from £7 to £8 per load of 50 cubic feet, it is probable that it will frequently be used in place of teak.

Raspberry Jam Wood (*Acacia Acuminata*).—This is a dark, reddish-brown wood, close-grained, hard, and having a fragrant scent, from which it derives its name. The tree, which is small, abounds in extra tropic Western Australia; it is easily worked by machinery, and leaves the cutters with a very smooth surface; and as it takes a fine polish, and can be purchased in this country at the low price of 3s. 6d. per cubic foot, it should find a ready sale among cabinet makers and others interested in ornamental wood work.

Discussion.

Mr. D. Morris being called upon to speak on the woods of the West Indies, said Mr. Ransome had very properly confined his attention to the new woods brought forward at the Exhibition. The horse-flesh mahogany from the Bahamas was a very excellent wood, tough and enduring. The tree at the Exhibition was presented to Kew, and they were at first disinclined to take it, because they were unable to determine its botanical character; but on appealing to the Government of the Bahamas, some specimens were sent over to show that it was closely allied to the *bragiletto* wood, which was very highly esteemed in the West Indies, though it was only a small tree. The timber of British Honduras best known was mahogany, and the cedar used for cigar boxes. As in the Straits Settlements, most of the valuable timber within reach of the rivers was already cut down, but if railways were opened into the country a large quantity could be brought down. It would be useless to import any very heavy, tough kind of timber, as there would not be a sufficient demand to make it remunerative; there were excellent timbers in the West Indies which could be easily brought if the price offered would justify it. The paper was very valuable, as suggesting to Colonists what sort of timber to plant, in the manner pointed out by Sir Charles Mills. The yellow wood of the Cape, for instance, being applicable to so many purposes, should be developed; he had seen it growing in Saint Helena, and had introduced it into the West Indies, where it grew very well. The straight-grained cedar, which he had already referred to, was easily worked, and it might be grown in any part of the West Indies, at elevations of from 1,000 to 4,000 feet. In many of the Colonies there were extensive tracts, once occupied as sugar estates, which could very well now be planted with timber, such as the yellow wood or cedar; and there was no doubt the time was coming when reafforesting must occupy more attention in all the Colonies. The forests were cut down, and the land used for other purposes, and when it was exhausted by cultivation, it was often left to go to bush or jungle, when it would be much better to plant timber. In different parts of the world trees could be found adapted for any waste places, some for clay, others for rocky soil, and so on, and cedar, for instance, would grow well in a limestone soil. It often happened, too, owing to the change of climate arising from cultivation, that trees from elsewhere did better than those which were originally indigenous. Australian and Cape trees did better in the West Indies than those which originally grew there.

Mr. G. N. Hooper said, as a carriage-builder, he had not had much experience of these woods, but he left much indebted to Mr. Ransome and to the Society of Arts for initiating this discussion, which would tend more than anything else to achieve the result desired by the Colonies of finding a market for these timbers. There had been too much laxity in preparing some of the specimens sent to the Exhibition; for instance, he heard that those from Canada were collected in a short space of time, so that the necessary care could not be given to them. In 1862, being on the jury on the carriage department at the Exhibition, he had to examine woods sent for some of the Colonies, and published a list of those suitable for carriage purposes; but for twenty-five years nothing came of it. Meetings of this sort were a much more practical way of bringing the matter before manufacturers and those interested in the trade. Manufacturers required full information with regard to any new wood as to its qualities, and the proper method of seasoning, without which a good article might be unfairly condemned; they also required to know the price at which it could be delivered, and if the supply could be depended on, for it did not do to introduce a material and then have to use something else. Various new processes for seasoning timber were coming into use, and he had seen in America, at the Pullman works, a process which was then new to him, but which, he was told, was being introduced here. Large sheds were used, in which the timber was stacked and steamed for so many hours, after which it was exhausted by a fan, and hot air blown in. The result seemed very good, judging by the work turned out, which was first-rate, both in material and finish. The cold air system spoken of by Mr. Ransome seemed to succeed well, certainly, if the period of seasoning could be curtailed, it would lead to immense economy. He could bear testimony to the excellent quality of some of the woods at the Exhibition which were worked up. Those in the South African wagons were very fine, and the workmanship was also good, and he was informed that one of those wagons had been made by Kaffirs, under English superintendence. He would also draw attention to the excessive waste of timber in some of the Colonies. He had been painfully struck by it in Canada, some of the waste being accidental and some wilful, but the destruction of good material was most lamentable. Two Committees of the House of Commons discussed the question of founding schools of forestry, for up to the present young men trained for the Indian Forest Department had to go to France or Germany for instruction. Much good had already been done in India in this way, and there was no reason why equally good results should not follow in England and Scotland, and especially in the Colonies, from attention being paid to the forests. He thought there should be schools of three grades, one of the actual working men, one for the superintendents, and a high school for proprietors of forests and those who worked them commercially. It occurred to him that as all kinds of garden produce were improved by cultivation, so it must be with trees. Much of the timber in this country, oak, ash, and elm, was unsurpassed in quality, it being grown under conditions

of semi-cultivation, whereas, in a wild forest, for every fine tree there might be 50 or 100 very inferior. If partial cultivation had been so successful, more careful cultivation would be more entirely so. After all, the most important point was to encourage the growth and import of timber from our own Colonies, in preference to depending on foreign countries, as we now did so largely.

Tests of the Breaking Strains of some Colonial Wood.

Name of Wood.	Deflections at 2 cwt.	Deflections at 2 cwt. 1 qr.	Broke at
Billian, North Borneo (*a*) ...	¼″	5-16″	5 cwt. 96 lb.
Karri, Westernn Australia (*b*)	¼″	5-16″	4 cwt. 18 lb.
English Oak (*c*)	⅜″	7-16″	3 cwt. 95 lb.
Teak (*d*)	¼″	9-16″	3 cwt. 67 lb.
Yellow Deal (*e*)	⅜″	7-16″	3 cwt. 50 lb.
Russock (*f*)	⅜″	13-32″	3 cwt. 49 lb.
Mirabou (*g*)	⅜″	7-16″	3 cwt. 46 lb.
Jarrah (*g*)	½″	⅝″	3 cwt. 7 lb.
Kauri Pine (*h*)	½″	1″	2 cwt. 67½ lb.
Serayah (*i*)	⅝″	¾″	2 cwt. 55 lb.
Douglas Fir (*j*)	¾″	1″	2 cwt. 42 lb.
Best Pine (*k*)	1⅜″		2 cwt.

Remarks.—(*a*) Good breaks, 12″ long. (*b*) Very fibrous but somewhat short break. (*c*) Long fibrous break. (*d*) Short sudden break. (*e*) Good break, 6″ long. (*f*) Very fibrous break, 4″ long. (*g*) Good break, 7″ long. (*h*) Very short break. (*i*) Fibrous but somewhat short break. (*j*) Short break. (*k*) Very short.

All samples were sawn from plank, planed 1″ square. Bearings 2 ft. apart.—*Journal of the Society of Arts.*

PEPPER AND GAMBIER IN JOHORE.

The great industries of Johore are the growth of pepper and gambier, to which the Chinese cultivators direct their attention. Both these industries pay well, but the profits, as a rule, find their way back to Singapore, which had to make the advances in the first to the cultivators. Tapioca is also successfully grown, and a little tobacco. During the last few years Europeans have appeared on the scene, and have devoted their energies to growing coffee, both Arabica and Liberian, tea, cocoa, tapioca, and tobacco. The concessions granted by the Government were very liberal, and the industries went off with a big flourish of trumpets. Unfortunately all these ideas have been dissipated, and in consequence planting in Johore—like tin mining in Perak and Selangore—received a bad name. "Give a dog a bad name, and you may as well hang him;" others besides those who had essayed would have made a venture, but were less bold than the pioneers, and awaited results. Mistakes were made and heavy losses incurred, many people in China being involved to a considerable extent. Experience has now been gained, and I feel certain that money is to be made out of the European culture of both coffee (Liberian) and tea. But the errors of the past must be avoided. People are for the moment afraid of embarking anything, but when more results are obtained, say in one or two years' time, they will, I think, show that profits are to be obtained under judicious, proper, and experienced management. I have seen several gardens and estates, and the look convinced me that money can be made. Liberian coffee, on properly selected ground, may, I think, be now written down as a success. (The Sultan himself has an estate now seven years old, which must pay very handsomely, to judge by the berries one could see on the trees. His brother, Tunkoo Mahjid, also possesses an estate which pays well. If Malays, who are not as a rule given to over-exertion in matters of this sort, can obtain good results, Europeans should also be able to do so). Tea is hardly as advanced as coffee, and is still in a more or less experimental stage. Good samples have been forwarded home and been favourably received and reported on in the "Lane." An attempt is also being made to work the leaf up like a Formosa Oolong, so as to fit it for the American market, but complaint so far is that it is hardly pungent enough for the American taste, which requires something of an extraordinary strength, such as is provided by Formosa teas. A difficulty will also be experienced by the fact that tea grown tropically produces a larger leaf than that grown farther north, and consequently cannot be made to look, and roll up, so neatly as its present competitors in China and India. To reduce it to the standard demanded by the New York Produce Exchange it would have to be broken, which spoils the appearance even more. These are small difficulties, however, which further experience will probably overcome. Cocoa seems to do badly, and does not appear to be worth attention. Enormous care is required to get it over its critical stages, and when passed more or less successfully, the trees are poor, weedy, seedy, and undersized. It is not worth the attention of Europeans. Coffee (Liberian) and tea seem to be the products that will pay. The Arabica plant appears to be a failure, for though its cultivation has been pursued for some years on the slopes of Gunong Pûlai, nothing worth speaking of has yet been achieved, and the prospect for Arabica does not seem to hold out many inducements. Would-be planters had better turn their attention to Liberian, to tea or to pepper, the last of which is at present monopolised by the Chinese, but in which a good field exists. The present districts where European planting industries are carried on are Johore Bâhru, Tebrau, Batu Pahat, Pantie, Pûlai, Panggerang, and Puloh Kobob.—*London and China Express.*

PROSPECTS OF CINCHONA.

The Mannheim firm of quinine manufacturers, Messrs. Böhringer & Co., have recently issued a report on the cinchona trade of the past year, as well as a notice of the various alkaloids prepared by them from this bark. I have not succeeded in obtaining a copy of this document, and must, therefore, be content to give you the contents of a rather brief *resumé* which has appeared in a medical journal. The Messrs. Böhringer point out that, with regard to the trade in, and price of, quinine, the almost sole factor is the importation of cinchona. They believe that the consumption of quinine is steadily increasing, and is capable of enormous, extension, the chief reason for arriving at which conclusion is that this alkaloid is without a serious rival; for, although various substitutes have been brought forward from time to time, they have invariably been found to be devoid of some essential quality or too high in price. They go on to say that "the world's consumption of quinine was estimated at 3,510,000 oz. per annum in 1879, and afterwards at 4,237,000 oz., but it is probably much larger. At the conference of American wholesale druggists last year, the consumption of quinine in the United States, formerly estimated at 100,000 oz., was put down at 2,600,000 oz per annum, or about 1 oz. for every twenty-three inhabitants. The demand for quinine is certain to gradually increase in other feverstricken parts of the globe. A large outlet is particularly looked for in the rice-growing provinces of the Chinese Empire, where fever is never absent, and where quinine might advantageously supplant opium to a certain extent. Among the minor alkaloids of cinchona bark, cinchonine, cinchonidine, and quinine are still largely used in extra-European countries, although they have fallen out of use in Europe. Quinidine, the action of which most closely resembles that of quinine, occurs only in very small quantities in the present manufacturing barks, and its extraction no longer pays." I have since discussed the above statements with Dr. Paul, the cinchona analyst, and am bound to say that he does not by any means concur in the sanguine anticipations as to the future consumption of the alkaloids, nor as to its present use. In his opinion the

United States is the only country in which the consumption of the article has increased, and he freely admits that, owing to the opening up of new land in the Far West and on the banks of large rivers, where fever largely prevails, the consumption has gone up by leaps and bounds; and is now probably about three millions of ounces; but owing to improved drainage and other means of sanitation, he thinks that throughout Europe fever has declined; and added to which we must not ignore many new febrifuges which have come to the front of late years, though not permanently. Of course it is rather difficult to deal with general statements such as appear in the summary of the Mannheim report, and, until I succeed in obtaining a copy of the original document, I fear I cannot pretend to reconcile the conflicting opinions of the authorities I have quoted. Dr. Paul regards Ceylon soils, and, indeed, the generality of soils, as not capable of yielding cinchona of a high analysis for any length of time without the aid of manure, and he gave me to understand that he is now engaged in conducting a series of experiments with manured and unmanured barks for South American and other growers, the results of which I am to obtain when completed. Dr. Paul assures me there are very few barks from Ceylon which can compare in quinine analysis with the cultivated cinchonas from Bolivia, though the produce from Sir, Glenlyon, Amherst, and one or two other Ceylon estates, continues to hold a high place in public estimation. He assured me that the finest Bolivian barks seldom come on the open market, nearly all being disposed of privately to a few continental druggists, who give quite fancy prices for what they want. Another scare in the quinine market was recently created by an announcement in the *Lancet* of some very successful trials of a new substitute for the cinchona alkaloid in the form of *picrate of ammonia*, a combination of the alkaline base with *picric acid*. This has been largely tried, and the medical journal tells us that quinine is doomed! But we have heard this so frequently that I was led to institute enquiries as to the *cost* of the new fever remedy, when I learnt, as I fully expected, that the "new quinine" is nearly double the price of the old article; but then people declare that this is only a temporary dearness owing to the enormous demand for *picric acid* by the French Government, this same chemical entering into the composition of new war explosive of which large quantities are being produced in anticipation of an outbreak of hostilities.—*London Cor.* Local "Times."

DUTCH *V.* ENGLISH COLONISATION.

It is universally admitted that the two great colonising Powers of the world at the present day are Great Britain and Holland. I do not mean by this Powers whose sons and daughters go to swell the population of alien flags, as in this respect Germany can probably show an annual emigration to the United States equalling if not exceeding that of either of the Powers in question to their colonial possessions. But in acquiring and retaining colonies both the Dutch and ourselves now take the places once occupied by France and Spain, and it is curious to note the different ways in which we arrive at the one end of governing Asiatic, or other races, so as to combine fairness to them with advantage to the alien lords of the soil. Tersely put, the most striking difference to the chance visitor to Netherlands India is that, whereas British administration is almost needlessly unsympathetic with the Asiatic, and social amalgamation the exception rather than the rule, the Dutch system is that of living down to the Asiatic standard, and disclaiming, except for official purposes, that assumption of social superiority so characteristic of ourselves. In saying that our rule is unsympathetic I do not mean that it is intentionally unjust. We are apt, indeed, to push ideal justice on behalf of parties accused of crime to an extent which, to the Asiatic mind, savours of decided injustice to complainants. But though we are honestly credited with a desire to do absolute justice between man and man, it is felt that we do not make sufficient allowances for the utterly different modes of thought and reasoning which distinguish the governed from the governors. We insist, for instance, on an absolutely incomprehensible oath being taken in our courts, because British law provides it. We give prisoners the benefit of a doubt at our assizes, because a couple of Asiatic witnesses are utterly unable to detail—without serious discrepancies—certain minor matters bearing on the case. It is in vain to point out that perfect agreement on the part of Eastern witnesses, *i.e.*, the perfect agreement expected from educated European witnesses—is to the experienced magistrate or judge the surest sign of concocted testimony. And so with a vast number of other matters. We punish gambling in an open space of ground, where nobody is inconvenienced, as if it were a crime, and are powerless to deal with clubs (Chinese) started really for the express purpose. A newly arrived coolie, who has never seen a watertap before in his life, is arrested for "wasting water," while his slow mind is revolving the question how best to stop the running. We give a few months' (it may be weeks') imprisonment for crimes which, under native government, would ensure death or lengthened captivity. We are not saying that all this is wrong; we are merely putting the Asiatic point of view. Some of the matters complained of are doubtless more trifles, but they are deemed very irritating, and lend colour to the assertion that we are "unsympathetic" in our administration.

The Dutch, on the other hand, seem to us—especially as regards social matters—to go to the opposite extreme. Their municipal and conservancy rules are less harassing and the native scale of punishment is more closely followed than with us. In many cases this bears far more hardly on offenders than with us. But it is not so much the defendants as the complainants in our courts who criticise our administration, and compare it unfavourably with that of the Dutch possessions. And beyond all, the Dutch follow local customs to an extent which gains native good will, though holding out no example of a higher life. In fact in many of these matters, they leave the natives at precisely the same point as they find them. Slovenliness of dress, an absence of punctuality in small matters, a tendency to sleep much during the working hours of the day, and similar habits, proclaim to the native that the white man makes no affectation of superiority in those directions which supplied the basis of his former victories over indolent Asiatics. Another social custom—that of temporary marriages between Dutch and Javanese has immensely lowered the prestige of the former in native eyes. It is quite true that the latter regard the marriage tie from a different point of view to that held here, and that these *pro tem.* arrangements involve no local discredit to the woman. Sociologically there is much to be said for them, as worse results invariably follow the interning of large bodies of troops at Eastern stations. But the natural effect is to deprive European life of any claims to superior purity in the marriage relation, and morals are apt to run low.

On the other hand a non-interference policy of legislation as regards the Chinese population is bearing evil fruit. The secret societies throughout the Dutch territories are assuming a position which threaten danger to the Government, and the Java papers have, of late, drawn attention to the fact. It is becoming increasingly evident that unless some strong means be taken to regulate them, the eventual alternatives will be either suppression at the cost of probable bloodshed, or riots which may threaten the very existence of the Government itself. I would strongly advise the Dutch authorities to establish a "Protectorate" of Chinese and Registry of Secret Societies similar to that in force in the British Straits Settlements, and I concur with the Singapore Press in thinking that such a measure is probably the most prudent that could be taken. Even now the difficulties of bringing the societies under control would be a task of no small difficulty, but the difficulty will increase with each year if they be left unmolested. An additional argument is also found in the fact that other troubles exist at present in Java. Taxation has been pushed by the authorities to its utmost verge, and combined with bad crops and depreciated prices of produce, have produced consider

able disaffection in the native mind, which the authorities would do well to watch carefully. Not by shutting up newspapers which report any facts, but by meeting those facts where they are substantiated by properly devised measures.

Reverting to my original theme, it is not sufficient for the Dutch to say that in most instances the lower standard is sufficient for the natives, who are lazy and indolent, and do no more than they are obliged to do to obtain a subsistence. And it is to this level the Dutch bend rather than to elevate the natives not right up to the European standard, but at all events in that direction. It is what is demanded in the latter half of the nineteenth century from a nation which would maintain its *status*, and Holland may possibly be called on ere long to take considerable measures in Java to maintain its position.—*London and China Express.*

VEGETATION: NOTES OF A NATURALIST IN AUSTRALIA.

By Dr. J. E. Taylor, F. L. S., F. G. S, &c.,
Editor of "Science Gossip."

The most remarkable thing about the wild roses in Australia is that they are acquiring the same trick which the ancestors of the orange learned years ago, and transmitted to their descendants—that is to say, I found them many a time bearing flowers and fruit at the same time, and this was taking place in June and July, corresponding to December and January in England. Evidently the more equable climate has affected its habits in this respect. I observed also that its foliage was not dropped—at least, not to any remarkable degree. Is the wild rose making up its mind to become an evergreen shrub, or rather, to have descendants which shall be, like the orange tree? The degree to which plants and animals will alter their habits, and become modified in their structures, is only just being taken up by naturalists. Nowhere can this department of practical Darwinism be better studied than in Australia. I say practical, because there is a great deal, not only of knowledge, but possibly also of commercial benefit, to be gained by attending to these matters; and I hope that the scientific societies of your colonies will take up the subject. Let them put on accurate record the exact degree to which the imported animals and plants vary, as well as all the conditions under which the tendency to variation occurs. It strikes me that *variation* (due to ready *adaptation*) will be found very frequently to take place quicker than many geologists and naturalists have hitherto imagined. They have hypothetically formulated millions of years as necessary; but in most cases careful tabulation of observed facts will reveal to us how responsive many animal and vegetable organisms are to the conditions under which they leave. Look, for instance, how quickly the European deciduous trees imported to the Australia learned to adapt the time when their leaves should fall to your Australian winter. They made a muddle of it for a few years, and most of their leaves fell off during your summer; but this was because of that acquired ancestral experience we denominate *instinct*. Year by year this grew weaker in comparison with the newly-acquired *individual* experience with the new conditions of their leaves revealed to them. And now they are as well adapted to Australian seasons as if they had always been Australian trees.

Let it not be supposed that I have anything to say against the mere act of drawing upon the "Bank of Time" for due explanations of natural phenomena. Time by itself can do nothing at all—although people speak of its "tooth" growing and eating away rocks, &c. It is the number, intensity, &c., of the events which take place in time which makes the latter of value.

The Australian trees transplanted to India, California, and elsewhere have had to reverse the ancestral experience handed down to them from that of their northern representatives in the Indian botanic gardens all of their individual and infantine uncertainties in respect of the changed seasons have been duly chronicled.

Sydney and its suburbs are truly wonderful as regards the ease with which all warmth-loving forms of vegetation are induced to grow there. The old notion concerning the geographical distribution of plants seems to have been based on pretty much the same kind of principle as that of *classes* in English society—that all men "should be content with that station of life in which it had pleased Providence to place them!" It was imagined that the reason why certain animals and plants were found in certain places and not in others was that the localities where we found them were the *best* for them. This teleological conclusion barred out any further questioning.

For almost every Melbourne, Sydney, and Adelaide garden of any size (and indeed, of all size) demonstrates this. Each is a kind of "Noah's Ark," in which we find gathered together (as if, also, it was a kind of representative "Little room in Jerusalem") all the "tribes, families, and tongues" of the vegetable kingdom.

What is more to the point is—such plants are doing better than they would in their original homes. Every human colonist will recognise the importance of this fact, but the arm-chair naturalist, who is as much chocked when the wild roses out in Australia behave after the Darwinian fashion as he would be if he saw too much "white stocking" in the muddy streets of Paris, is unable to appreciate the point.

Thus, next to the oranges, lemons, and citrous (besides varieties of each) which grow hereabouts as if it were their natural home, we have loquats, bananas, peaches, plums, and a host of other fruit native to every part of the globe. They attain a larger size here than they do in their native *habitats*—a plain proof that the old teleological doctrine of their being found where it was best for them to grow is not correct. The loquat shrubs are especially numerous in all the gardens of the Sydney suburbs, and their fruit is extensively eaten—at which I was surprised, considering how abundant is the choice. Grenadines also are grown, and appear on every table dessert: but they were too much like coarse green gooseberries for me to try them more than once.

Driving out from Manly along the capitally-made and well-kept road which runs to Broken Bay, and more or less skirts the coast the entire distance, one sees much both to admire and study. Within a mile or two we get into the forest—and such a forest! I had not seen anything in all my Australian rambles to compare with it for number and variety of plants. The solemn monotony of the ubiquitous gumtrees has had to give way to the healthy survivals of even more remarkable types of the Australian flora. Banksias of several species, she-oaks or *casuarinas*, abundance of the native pine (*ferneléa*), numerous species of uncommon gumtrees, native cherrytrees (*exocarpus*), and a few solemn and stately and rare Australian palms formed the arboreal vegetation. The ground was occupied with a bush of myrtaceous plants (*melaleuca* chiefly), and thickets of ti-tree. In places it was quite ablaze with pink and scarlet *Epacrics*, and the wild indigo plant (*hardenbergia*) climbed and twisted its stems over and within the wiry bush vegetation, and flung its abounding spikes of brilliant purple flowers about with botanical recklessness. Here and there the tall, blackened stems of the grass-tree (*Xanthorea*) rose from amid the bush to the height of ten or a dozen feet, and their clusters of terminal foliage looked as if they had earned for the tree a very appropriate name.

In one of the many richly-clad dells leading to Broken Bay, I came across a sight which gladdened my eyes. It was what I may call a forest *Zamias*. They grew in numbers, and in places occupied the entire ground, in company with maiden hair and other ferns. I had never seen these plants growing in a state of nature before, and I examined them carefully. Some of them were bearing fruit, and the oldest of them had the turnip-shaped and scarred trunks (not much unlike pineapples). These remarkable plants may be regarded as intermediate in their botanical relationship between the ferns and the pines. I regarded them with unusual interest, for they are the southern survivors of a once cosmopolitan group of plants. As far back

as the beginning of the secondary period in Europe which cannot be much less than from 15 to 20 millions of years such yamias grew in England. They are among the most characteristic forms of the fossil flora of the Lias and the Oolitic formations; and in the celebrated "Dirt Bed" at Portland, in Dorsetshire, their scarred and dumpy stems (all petrified) are so common that the quarrymen call them "crow's nests." I have seen them in the fossil state, just as they grew years ago, many a time—now I was looking upon the lineal descendants of the same group in the uncleared part of an Australian forest. My readers will understand how in this way, many of the Australian plants possess an interest for the geologist second to those of no other country in the world, inasmuch as numbers of them are the survivors of a flora which has been crushed out of existence by new-comers, and whose remains are therefore only found in the fossil state in the old world.—*Australasian.*

ABOUT GREEN TEA.

To the large majority of modern English men and women green tea is probably little more than a name, calling up, it may be, vague visions of old-fashioned tea-parties and elderly ladies in turbans, and wheezy lap-dogs and card-tables. It is certainly true that in England the day of green tea, with its mysterious subdivisions, Twankay, Hyson-skin, Young Hyson, and Gunpowder, is over. Possibly it has succumbed tardily to the prejudice which in the last century denounced tea-drinking as a pernicious habit, leading inevitably to dram-drinking and to other ills more numerous and more deadly than those which Mr. Arthur Arnold attributes to tobacco. The effects of green tea upon the nerves are known to be more powerful than those of black tea, and for this reason it may have attracted to itself the bulk of the odium against tea-drinking, which has proved quite powerless to impair the influence of its sturdier brother. Another explanation for its decline in favour may be found in the fact that green tea is much more the subject of adulteration than black tea. The latter is by no means always above suspicion. We read of a horrible confection prepared out of the refuse of tea and the decayed leaves and twigs, which is pressed into moulds, and, with a little sheep or ox blood added to stiffen the mass and perhaps make it palatable, is sold as brick tea. It is some consolation to learn that this variety is chiefly consumed in Northern China and Thibet. Then, again, there is a highly-prized commodity known by the name—given to it with an admirable candour by the Chinese—of Lie-tea. This consists of the sweepings and dust of the tea warehouses, cemented together with rice-water and rolled into grains; and its peculiar mercantile value lies in a certain pliability whereby, at the will of the operator, it may be converted into either black or green tea, as may be required.

Nor are these the only ways in which the ingenuity of tea adulterators has shown itself; black lead, turmeric, and mica; leaves of the beech, elm, horse-chestnut, plane, willow, poplar, hawthorn, and sloe, with the humbler harvest of the hedgerow; all these and more have been freely spoken of in connection with black tea. But though black tea may have its foibles, green tea has long been the established and recognized medium for introducing into the human system such substances as Prussian blue, China clay, and talc. Adulteration is far more common in green than in black tea; in fact, it may almost be said that whereas adulteration in the latter case is exceptional, in the former it is universal, and that practically no samples of green tea are brought into the market which have not been artificially coloured. The blame for this (if blame there be) lies, in a great measure not with the manufacturers, but with the public. For some reason mankind, when they like green at all, have been found in all ages to like it greener than nature has made it. This being so, the tea manufacturer steps forward with his spoonful of indigo and soapstone, and supplies the deficiency. Tea which is not treated in this way would not be looked at by the dealers, who know the public and its tastes. After all, the adulteration is a very harmless one; even in the bad old days, when Prussian blue and sulphate of lime were used, it is questioned whether the minute quantity employed can have had any injurious effects upon tea-drinkers; and in the present day there is certainly nothing to be feared from the materials used in colouring the tea for the market.

The principal market for green tea is the United States. Having fallen rather into disrepute in the Old World, it has established itself in the New World, where it is largely consumed and known as "tea" simply, in contradistinction to "English breakfast tea," by which name the black teas are designated. The reason for its popularity is no doubt in a great measure due to the intercourse with Japan, where green tea alone is manufactured, and which every year sends enormous cargoes across the Pacific In the making of tea, as in everything which this curious people do, the Japanese have a way of their own. It would startle an Assam planter to see them in picking time squatting down before the trees and stripping the branches of the leaves, instead of scientifically selecting only the young undeveloped leaf, the first leaf below that, and half the second, from which would be evolved respectively "Orange Pekoe," "Pekoe," and "Souchong." Any one accustomed to the elaborate machines for "rolling" and "firing" the leaves, which are in use on European plantations, might be amused at the Japanese method, where the workers roll and squeeze and twist the leaves in their hands on a parchment stretched over a charcoal fire. Very fine teas are nevertheless manufactured by the Japanese, and in the celebrated district of Uji rumour tells of tea worth 16 dols. per pound, though it is not definitely stated whether that price has ever actually been paid for it. Moreover, in the case of teas intended for export, only so much work is done upon them as will enable them to be sent to the "tea-firing godowns" of Yokohama, where they are worked up for the market before being shipped.

As is now well known, the difference between green tea and black lies in the fact that in the former fermentation has been arrested by "firing," the colour of the leaf being in this way partially preserved and fixed with the latter by a much longer process; fermentation up to a certain point is permitted, and the leaves are not "fired" until they have become oxidized by exposure to the air. In Japan the leaves, after being picked and "withered" by a short exposure, and fired in the way described above sufficiently to stop fermentation, and in this partially cured state are sent to the European tea-merchants, by whom they are again "fired." In the "godowns" of Yokohama hundreds of women can be seen at work turning the leaves over and over and round and round in large basins built over a charcoal fire. The colouring or "painting" is also done at this period by means of a spoonful of indigo and powdered soapstone put into each basin, and thus disseminated through its contents. But in Japan tea is not grown for export only, but is the chief article of home consumption; and these domestic teas as procured in the country are probably the only samples of unadulterated green tea which Europeans are likely to meet with. They produce a beverage which is refreshing, quite harmless, and which, notwithstanding the way in which it is prepared, can after only a short residence in the country be readily distinguished from hot water. —*Lewis & Co.'s Tea Trade Circular.*

"A NEW INDUSTRY," the *Garden* says, "had just been started in East Kent—that of growing crops of lavender and peppermint for the purpose of extracting the oil and supplying it wholesale. A large breadth of land at Grove, near Canterbury, has been planted with lavender and peppermint by way of experiment, and the result has proved in every way satisfactory. It has, therefore, been determined to establish extensive works on the spot, in order to carry on the process of extracting the oil from these plants, neither of which, it is stated, has ever been cultivated before in Kent."—*Australasian.*

THE RELATION OF HEARTWOOD TO SAPWOOD.

It is a common and rather loosely held opinion that the formation of sapwood into heartwood in trees is not a gradual and concurrent process, but that it begins at a certain age in the same species invariably; modified only in a trifling degree by the differences of soil and climate as they may affect the growth of individuals. Thus the larch, for instance, must attain a certain age, no matter what the differences of soil and climate under which it is grown, before it begins to form heartwood. It matters not whether the growth be rapid or slow, heartwood must appear at or within a brief period of its arriving at a certain age, varying only in point of time in propotion to the difference of soil and climate as exerted on the individual during its period of growth. In a colloquial sense, it may be admitted there is a general foundation of accuracy in this commonly recognised opinion. No doubt the indivuals of a species, such as the larch, or any other grown in the same soil and other circumstances, on attaining a certain age will present relative proportions of heartwood to sapwood sufficiently close to establish the general conclusion. But this is merely stating in other words the fact that it takes so many years to bring the individuals of a particular species to maturity. What is really meant by the statement that heartwood begins to form at a certain age in any tree is simply that it has become visible, and presents a marketable quantity in relation to the sapwood out of which it is formed. But this is a totally different thing to what is implied by the statement, and also as to what really takes place in the growth of the tree. The formation of heartwood, like that of sapwood, begins with the birth of the tree. The exercise of the functions leading to the building up of sap and other vessels which form the structure of the newly-born plant, is the point at which the formation of sapwood and heartwood alike begin, and the processes go on concurrently season after season. Not perhaps with invariable results in even the individuals of the same species; certainly not in all species alike. Some species are slow to exhibit the same relative proportion of heartwood to sapwood that others do. And this may, as a general rule, be taken as an index of the longevity of a species; those, such as the oak, which are slow in forming heartwood being longer-lived than most of the species of coniferæ which form their heartwood more rapidly, or in other words, arrive at maturity earlier. But the process of the formation of heartwood goes on concurrently with that of sapwood from the first development of the plant from the seed, whether growth be slow or rapid, whether maturity be arrived at in a few years or after many years. Briefly, the conversion of sapwood into heartwood is accomplished by the thickening and indurating of the walls of the sap vessels, and by the deposition in them of the peculiar secrections of each species, such as gums, resins, etc., resulting from functional action, by which they eventually become filled up, and their original use as channels for the upward flow of the sap ceases. The time required to complete the process varies in different species, and even in individuals of the same species, according to circumstances already alluded to as affecting comparative rapidity of growth.—*Journal of Forestry.*

THE GROWTH OF LICORICE IN EUROPE:

ITS CULTIVATION IN SICILY.

Report by Consul Woodcock, Catania.

Licorice grows to the height of 2 or 3 feet. It bears a small yellow flower. Its leaves are pinnate. The roots grow from 6 to 20 feet in length.

The valley of the river Simeto (ancient Symæthus) in this consular district is rich in vegetation. Here not only all the cereals grow to perfection under the rude culture of the rustic Sicilian husbandman, but the wild plants with which the farmer has to contend, spring up spontaneously. Among the latter may be classed the licorice plant.

In response to a question asked of a Simento Valley farmer, if the licorice plant grew upon his farm, he replied, "God forbid, for of all wild vegetation it is the most difficult to subdue."

If any particle of the root is left in the ground, it grows and sends up shoots. It is not cultivated in this district; it grows in a wild state. In the fields where it grows are cultivated not only the various grains, such as wheat, oats, barley, &c., and vegetables, but also oranges, lemons, and the various other fruits of this climate. Of course this plant is injurious to the grains and fruits, but the thorough digging of the soil for the roots of the licorice is beneficial to the production of crops.

The agriculturist here uses the most rustic of implements. His plough is that of the old Romans, consisting of an iron point which simply scratches the soil without turning a furrow. In digging for the licorice root, the soil is thoroughly turned over, and is dug to the depth of from 1 to 3 feet.

There are two species of the licorice plant here. The one sends down a main root the depth of from 3 to 6 feet with but few lateral roots; the other does not sink so deep into the earth, but creeps beneath the surface a ta depth of from 6 inches to 2 feet.

The latter plant is most productive, and is the most highly prized.

Doubtless if the licorice plant were cultivated it would yield larger results. The people here think its culture will not pay, hence they are satisfied to collect it as produced by nature in its wild state. There is no use made of the stem except for fuel.

The licorice plant grows most luxuriantly in the valleys adjacent to streams of water. It is, however, found among the foot hills of the mountains, but here grows less luxuriantly. It requires a moist soil consisting of a clay loam. The climate must be warm, such as is adapted to the growth of oranges, lemons, and the other semi-tropical fruits. It cannot endure frosts or cold high altitudes.

The root continues to grow for four or five years, when it is considered in the best condition for gathering. The root will continue to grow for ten or twelve years longer, but it is not considered so rich in juce-yielding quality.

The crop is gathered from the same ground once in four or five years. On the average 100 pounds of the root produces 16 pounds of licorice paste. During the months of June, July, August and September, and the first part of October the root is not disturbed, for the reason that it is then in full vegetation, and for the further more important reason that the ground is dry and hard baked by the sun, and it is with much difficulty and great expense that it can then be dug.

As soon as the autumn rains set in, in sufficient quantity, to saturate the ground the root harvest commences.

During the months aforesaid the manufactories of licorice are idle, doing little or nothing in the way of manufacture. In Catania there are some seven manufactories of licorice, which employ from twenty to forty hands each, and are capable of manufacturing 750,000 pounds of the root. There is also a factory in Paterno; another in Caltogerone, and another in Terranova, in this district.

When the roots are taken from the earth they are bound in bundles, and upon the backs of mules transported from the fields to the factories. Here they lie in store for a time in a state of seasoning.

When the roots are sufficiently cured, men and women with hatchets, cut them in bits of from 3 to 6 inches in length. These are then plunged into a vat of water and thoroughly washed. They are then crushed in a mill of rude construction. It consists of two circular stones of lava. The one is in horizontal position; the other, perpendicular, rests upon it. Through the centre of the upper stone is an axle, to which is attached a mule, which revolves it slowly in a circle (cart-wheel

like) upon the lower stone. A workman with a wooden shovel is constantly employed in keeping the roots beneath the revolving stone. When the roots are sufficiently crushed they are placed with water in kettles and boiled for twenty-four hours. They are then removed from the kettles and placed beneath a screw-press, and all the juice is thoroughly squeezed out, which runs into a cistern beneath. This juice is pumped from the cistern and passed through a sieve into kettles and the boiling resumed. The sediment from the strainer is again pressed.

The contents of the boiling kettles is a second time filtered. When boiled to the proper consistency it is removed to a broad, shallow kettle over a slow fire, where workmen with spades continue to stir it until it becomes dense enough for paste. Then it is removed and placed in wooden moulds of the size they wish the cakes, or by workmen worked into little rolls or sticks. When cold and hard the cakes are wrapped in paper and boxes for export.

The little rolls or sticks of licorice are placed upon shelves to dry. When they become perfectly dry and hard they are packed in laurel leaves in boxes.

In preparing the root for market, women with knives scrape off the bark and then cut it into bits of one half inch or longer in length, as the purchaser may wish. These are then dried in the sun and placed in bags for export.

In response to my question a manufacturer answered that licorice paste may be adulterated with starch, rice flour, wheat flour, flour of the carraba (locust bean), or even wood ashes; but he expressed the opinion that the manufacturers of Catania could not be so recreant to honesty as to resort to these base methods.

The Chamber of Commerce of Catania report that in the year 1883, 440,920 pounds of the root were prepared by the manufacturers and exported to the United States, in value amounting to $11,580, and that 79,126 pounds of the root were manufactured and exported to France, in value amounting to $2,079, the total export for the year being 520,080 pounds of the root manufactured, valued at $13,659.

As shown by my records for the year 1884, there were exported to New York of licorice paste 112,746 pounds, valued at $14,965·85, and of the root 14,047 pounds, valued at $567·24; the total value of the article exported for the year being $15,533·09.—*Chemist and Druggist.*

AGRICULTURAL EXPERIMENTS AT SHIYALI.

The very interesting report by Mr. Krishnasawmy Mudaliyar, of Shiyali, recently published by the Madras Government, shows that that gentleman continues his public-spirited efforts to induce his fellow-countrymen to improve their agricultural methods. Mr. Krishnasawmy Mudaliyar engaged his labourers permanently, but the cultivation of rice on single crop land affords employment for only a portion of the year, so that it became necessary to introduce some crop which would allow of a more economical distribution of the work of men and cattle. The crop selected was sugar-cane, and, to begin with, an experiment was made with an acre and-a-half, which was planted in the season of 1882-83. A three-roller Beheea mill was purchased, and the canes, in due course, were cut and crushed. Owing to several causes, chief among which was deficient drainage, and want of experience in the process of crushing and converting into jaggery, the experiment was scarcely a success, although the rate of profit is said to have been a little above the average gained from rice cultivation. Mr. Krishnasawmy Mudaliyar accordingly determined to repeat the experiment, and this time he selected a larger area, with greater natural advantages for drainage and irrigation. The land was ploughed to a depth of five or six inches, and was manured with 175 cart-loads of farmyard manure. The planting out was completed by the middle of May, and, after a particularly fortunate season, the cutting and crushing were commenced in the following February. The average yield of stripped cane was a little over 16 tons per acre. This yield is poor compared with the 22½ tons which is the average yield for the Presidency as a whole, while in Lower Bengal, an acre of good land is said to yield 25 tons of stripped canes. The proportion of juice expressed to the cane crushed was about 50 per cent, and this again cannot be considered satisfactory as compared with the 64 per cent obtained at the Saidapet Farm. The proportion of jaggery obtained to cane crushed was 9¼ per cent which compares favourably with the Saidapet Farm results of only 8¼ per cent. The average yield for the Presidency, however, is believed to be about 10 per cent, and this is obtained with the native wooden mills, which are much inferior to the three roller iron mill used by Mr. Krishnasawmy Mudaliyar. It is only fair to mention that none of the canes of the best of the three varieties grown at Shiyali were crushed, as they were required for seed. When the results of the present season's crop are known, we may fairly expect a higher percentage of jaggery. We would suggest, as one means of improving the yield, a change in the manures used. An analysis of the juice of the sugar-cane shows that it consists very largely of potassic salts. It is obvious, therefore, that the manures to be used in sugar-cane cultivation are those which are rich in these salts. We would recommend Mr. Krishnasawmy Mudaliyar to make a few experiments with bone-dust and saltpetre. The latter might, with advantage, be used as a top-dressing. We would also commend to his notice the trench system of sugar-cane cultivation, which is followed in the West Indies, and which is the most economical both of water and manure. It has, we believe, been adopted with the best results by Messrs. Thomson and Mylne, of Beheea.

Turning now to the financial aspect of the experiment we find that the total cost of cultivation, including the subsequent manufacture of the cane into jaggery, was R136-5-3 per acre, while the value of the outturn is given as R168-12-0, leaving a net profit, after payment of all charges, of R31-11-0 per acre. We are not sure, however, whether the jaggery was actually sold for the amount stated above, or whether that is simply the value placed upon it by its owner. The point is an important one as hypothetical valuations are apt to be misleading. We observe that a few canes were sold for seed, and that the rate per acre realised from this source was R350, or more than double that obtained for jaggery, with the additional advantage of a saving of the expense of crushing and boiling. Here is indeed matter for the consideration of the political economist. The supply, compared with the demand, is practically unlimited. Yet custom, that element which so constantly disturbs economical theories in India, is stronger than the laws of supply and demand, and we find an article fetching in its raw state a price more than 100 per cent greater than that which can be obtained for it when manufactured. The profit yielded by 6 acres of sugar-cane was greater than the whole of the profit derived from 124 acres under rice crop in the same village. The season was particularly unfavourable for rice cultivation, and the conclusion to be drawn from these results is, not that rice is a worse crop than sugar-cane, but that the ryot would be well advised to cultivate more than one kind of product, and not place all his eggs in the same basket. It will frequently happen that one season is favourable for one kind of crop and unfavourable for others, and the farmer who would insure himself against risks of this nature should so distribute his capital and labour that failure in one direction will be compensated by success in another. Mr. Krishnasawmy Mudaliyar's example has already been followed to a considerable extent, and we consider that this fact affords the best possible evidence of the financial success of the experiment, for, opinions to the contrary notwithstanding, the ryot is very quick to appreciate what is likely to lead to his own advantage. The Board of Revenue, however, knows better than Mr. Krishnasawmy Mudaliyar, or the ryots who have followed his example, and it considers tha sugar-cane is quite unsuited to Tanjore. It appear

to have failed to grasp the object with which the cultivation of this crop was introduced, viz., to afford employment to men and cattle when they were not required for paddy cultivation. Sugar-cane, it is true, is a crop which takes from ten to fourteen months to mature, but it does not require labour throughout the period it is in the ground, as the Board seems to suppose. Nor should the suggestion of the Board to use copper instead of iron evaporators be accepted simply because the Coimbatore ryots consider the former superior. Messrs. Thomson and Mylne recommend pans made of sheet-iron, and their experience is quite as valuable as that of the Coimbatore ryots, and iron pans are much cheaper than those made of copper. The report concludes with a brief account of an experiment made to test the advantages of preparing rice land in the dry state, instead of on the usual puddle system. The experiment was successful, but the advantage was slight, and there are several obstacles to the general introduction of the new method.

We cannot close this notice without offering our congratulations to Mr. Krishnasawmy Mudaliyar upon the success which has attended his public spirited experiments. District Agricultural Associations rise and fall with the advent of each new Collector. They excite but little interest, and the ryots have little confidence in them. It is to gentlemen like Mr. Krishnasawmy Mudaliyar, then, that we must look for the spread of agricultural knowledge, and we wish him that success in the future which has so signally crowned his efforts in the past.—*Madras Mail.*

VEGETABLE PRODUCTS AND THEIR CULTIVATION.

If there were was one thing more than another which struck the thoughtful visitor to the Indo-Colonial Exhibition of last year, it was a feeling of surprise at the vast resources afforded by the vegetable kingdom. Even those more or less familiar with vegetable products of various kinds from different countries were compelled to own that they had never before so completely realized the immensity and diversity of the means at our command. At a time when botany, or one portion of it, is falling into disrepute, as witnessed by its recent partial exclusion from the curriculum of the Medical Schools and of the Universities, it is worth while calling to mind the fact that it is to botanists, and to systematic botanists in particular—to the very class whose labours just now are held in relatively little esteem—that we are indebted for a knowledge of these resources; not wholly, of course, but mainly so. Witness what was done for economic botany in the past by the Roxburghs, the Wallichs, the Wights, the Royles. Call to mind what has been done by the Hookers, father and son; by Lindley, by Ferdinand von Mueller, by Hanbury, by Markham, and many others that might be mentioned. Think what is being done now by Dyer, by Morris, by Watt, by Duthie: and it will be seen that the botanists of what is now called the old school have been the chief agents in bringing to light, identifying and developing, those products, the importance of which has been so forcibly brought home to us. Consider, too, for a moment on the one hand the depressed state of agriculture, and on the other the host of matters awaiting development, and for which development increased knowledge, botanical, chemical, and cultural, is demanded, and it will surely be seen that this is no time to depreciate the study of systematic botany. We cannot, however, stop to discuss this part of the question. It may aid others to do so, it may promote the extension of profitable knowledge, if we make passing allusion to some of the various conferences and lectures delivered relating to vegetable products, and which are the more or less direct outcome of the Exhibition. Reports on special subjects—such, for instance, as on fibres for textile purposes, for paper-making, and for mats, ropes, and basket-work, have appeared. During the discussions that took place many interesting facts came out on the uses of the products under notice; thus, on the question of vegetable fibres suitable for substitutes for silk, a sample of Jute was exhibited by Mr. Cross which had been subjected to a chemical process, the effect of which was to reduce the fibre to its ultimate fibrils, and at the same time to increase the durability of the substance. "This chemically treated Jute," it is stated, "was much admired, the more so as it was almost impossible to distinguish the fibre from Tasar silk."

Amongst substances suitable for paper-making the bark of Bauhinia Vahlii was considered the most hopeful, and it seems that since the Conference a number of paper makers and textile manufactures have applied for and obtained samples of the Bauhinia fibre; and it seems likely that, as a direct outcome of the recent Exhibition, this will become an important one for a number of applications.

On the subject of perfume-yielding oils, the otto of Ilang Ilang (Cananga odorata) is said to have been the first ever exhibited from India; while the tubers of Cyperus rotundus, and the oil prepared from them were pronounced quite new to Europe. The substance is said to be largely used in Upper India to perfume clothes, and an essential oil is prepared from the tubers.

Of oils suitable for candle and soap making, that from the seeds of the Mahwa (Bassia latifolia) was thought to be the most hopeful; it was stated to be harder than Cocoanut-oil—a fact, in the candle trade, that would make up for its slightly inferior quality: Messrs. Price & Co. report it to be worth £35 per ton. It is believed that is has never been, to any great extent at least, experimented with for the purpose of the European soap trade, although the people in Guzerat and other parts of India make soap largely of it. With reference to dye products, it is stated by Mr. Mu Rharji, that the Charila of the Punjaub (Parmelia Kamts-Chadalis) is employed in India to a considerable extent in calico printing, but with the object of imparting a peculiar perfume, and a very pale rose-tinge to the fabric.

Perhaps one of the most important of the Conferences was that on Tobacco and cigars. "Most of the samples of leaf exhibited were pronounced almost unsaleable from being packed too hard, having a bad smell, and being often perforated, and even broken, and indeed in many cases almost rotten, due to imperfect curing. . . . A few samples were, however, much admired, and one or two brokers were authorised by the manufacturers to take steps to procure large quantities if the price was found suitable." It was strongly urged that the leafstalks should be cut off at the base of the blade and never exported to England. It was pointed out that about 75 per cent of the Tobacco cut for the pipe is sold in the shape of shag at 3*d.* an ounce, retail. The manufacturer sells this at 3*s.* to 3*s.* 2*d.* a pound; so that, taking the average cost of Tobacco at 6*d.* and the duty at 3*s.* 6*d.*, the article is being sold at considerably below cost price. This is due to the fact that the raw Tobacco comes into manufacturer's hands in a dry state, and the profit is made on the increased weight due to moisture absorbed. A Tobacco must, to use the technical expression "drink well" to be profitable, but if the importer has to pay duty upon a heavy section of the parent stem dangling at the end of a long and heavy leafstalk it is impossible that he can make a profit. Indian native leaf is also very injuriously coated with sand and dirt, which, apart from the trouble of cleansing which this necessitates, greatly increases the duty by raising the weight. England is, one might almost say, well enough supplied with Tobacco without the aid of India, and with numerous disadvantages it is scarcely likely that India can take an important place in the supply of Tobacco unless radical improvements are effected. Tobacco on importation should contain not more than 10 per cent of water, for although the duty is raised when there is less than 10 per cent of water, it is not lowered when there is more. This is a most important consideration, and one that cannot be too forcibly urged, for, as has been stated, the profit in the Tobacco trade is due to water, but it is fatal if the importer has to pay duty on the latter.

Regarding Indian cigars, though there has been a considerable sale of Trichinopoly and Burmese cigars of late, it was stated at the Conference that they could never compete with those produced in the best cigar producing countries, and their only competition would be with those of British make. Indian cigars are described as being too hard filled and that instead of being packed in a bunch-like manner the filling of Indian cigars went through the entire length: this makes them heady and difficult to smoke. It was "urged that every consideration should be subordinated to the effect on duty, since it is the heavy import duty that kills the Indian cigar trade, and therefore light weight was of primary importance.

Since the Exhibition closed Mr. Morris, the energetic Assistant-Director of Kew, has read an elaborate paper on "Fruit as a Factor in Colonial Commerce." It occupies many closely printed columns of the *Colonies and India*. Its length, however, precludes us from reprinting a paper which is of the highest practical interest. It must suffice to say that Mr. Morris called attention to the possibilities of our colonial empire as a source of a large supply of fruit, illustrating his subject by reference to the display made in the colonial market throughout the whole duration of the Exhibition from various colonies, the most remote as well as the nearest. Mr. Morris shows how most of the fruit consumed in this country, that is not home-grown, is derived from foreign countries. The value of the fruit in round numbers is £8,000,000 sterling per annum. This might equally well be earned by our fellow-countrymen in the colonies, who are able to supply us with the fruits of tropical as well as of temperate regions. Mr. Morris alluded to the inter-colonial fruit trade, and to the supply of the American market from Jamaica and other West Indian Islands. Of Apples, the home country imports barrels to the value of £700,000 annually, the larger portion of which comes from the United States, Canada only supplying fruit to the value of £91,000 annually. Mr. Morris then passed in review the fruit-producing capabilities of the several colonies, and showed how much their resources might be increased by attention to fruit culture and exportation. Mr. Morris' labours for the development of so-called minor industries in Jamaica and elsewhere, as a means of alleviating the trade depression which prevails in some colonies are so well known and appreciated that his remaks were listened to with much attention; and as an illustration of the practical character of his address it may be mentioned that an important section of it was devoted to the proper means of packing and shipping.

Another exhaustive paper was read lately before the Society of Arts by Dr. George Watt on the "Economic Resources of India." Here, again, the importance of "minor" products was dealt with as only a botanist could deal with them. The paper is published in full in the *Journal of the Society of Arts* for February 18, to which we must refer the reader, merely saying that the greater part of the paper is taken up with the discussion of products, the European trade in which is capable of greater extension, or of products practically unknown in European commerce, but which promise to be of very considerable importance. The products are classed under the heads of foods, drugs, fibres, and oils. Dr. Watt's remarks illustrate forcibly the waste of resource that arises from imperfect appreciation and want of application of the knowledge acquired by the botanists.

Another paper of great interest in the same number of the *Journal of the Society of Arts* is that on Colonial Woods, by Mr. Ransome. Our readers will remember the magnificent samples of various kinds, many of which were alluded to in our reports at the time, and they will be glad to have in a convenient form the record of the experiments made by Mr. Ransome to test their value for different purposes. One great defect in the consideration of woods arises from their faulty or defective nomenclature. In many cases the botanical source is not known, in others the indiscriminate and most inappropriate application of such terms as Cedar, Cypress, Iron-wood, &c., is a real bar to knowledge.

We would not in any degree impute blame to the authors of the papers we have mentioned, that they did not specially treat their subjects from the point of view of cultivation; but we must point out here emphatically that this question of cultivation is all-important. Cultivation is imperative, if the resources we have alluded to are to be continuously developed; otherwise, we run the greatest risk of destroying what we ought to be propagating and developing. The necessity for cultivation is of course greater in some cases than in others—in many cases it is prospective rather than actual—but it is none the less imperative. The first thing is to know thoroughly, we mean not superficially, what our resources are, and this is work for the botanist; the next thing is to know how to develope them to the best advantage, this is the work of the cultivator, and he requires not only practical skill and experience, but extended knowledge of vegetable physiology, the conditions under which plants grow, and how they may be modified and adapted to suit our requirements. He must grow the best, and he must grow them in the best way. The merchants must do the rest.—*Gardeners' Chronicle.*

FRUIT AS A FACTOR IN COLONIAL COMMERCE.

One important result arising from the recent Colonial and Indian Exhibition is the great interest awakened in the possibilities of our Colonial Empire as a source of a large supply of fruit. In the Colonial Market attached to the Exhibition there was shown a succession of rich and rare fruits from all parts of Her Majesty's possessions. The Dominion of Canada and the West India Islands, Cape of Good Hope and Natal, the Australian Colonies and New Zealand, Fiji, Straits Settlements, Mauritius, Cyprus, and Malta, all were represented by produce in fruit, which, for diversity of form and of representative character, probably surpassed anything previously seen in these islands.

The shipments of fresh fruits from the southern hemisphere were, in many cases purely of an experimental character; but the results achieved were certainly striking and suggestive, and will doubtless lead to a trade in fruit between the Colonies and Mother Country of benefit alike to both producer and consumer. At the present time we import into this country raw and preserved fruit to a large amount annually. Most of this fruit is supplied to us by foreign countries. But within the area of the British dominions is included a fruit climate as extensive as the world itself. We have all the fruit climates of the north temperate and tropical regions, and we have also the fruit climates of the southern hemisphere, which latter can turn winter into summer, and supply fruit in abundance just at the time we want it most.

As compared with many subjects brought forward and discussed at meetings of the Royal Colonial Institute, the subject which I have the honour to bring before you to-night may seem at first sight of small importance. But having regard to the interest and charm which has always surrounded the subject of fruit, the mention of which "never fails to inspire thoughts of classic form, artistic hue, fragrant delight of palate, and healthful service to the body," and having regard also to the possible expansion and the development which the fruit trade, not only between the Mother Country and her Colonies, but also between the Colonies *inter se*, or between the Colonies and neighbouring States, is capable of attaining, there are few subjects that deserve more careful and exhaustive treatment at our hands.

The fruit trees that are now cultivated in England and yield such stores of luscious food have travelled here during the slow progress of centuries from Eastern countries; and, after improving them by scientific culture and skill, we have sent them forth like our sons, to people the orchards of the South. From these sunny lands, where our sons and daughters have

made their homes, we shall draw the future supply of fruit in quantity and quality probably exceeding that of any fruit industry that the world has ever seen.

I believe it is Leigh Hunt who has drawn attention to the beauty as well as the agreeableness of a well-arranged group of fruit. He says:—"Here are the round piled-up oranges deepening almost into red, and heavy with juice; the apple with its brown red cheek as if it had slept in the sun; the pear swelling downwards and provocative of a huge bite in the side; thronging grapes, like so many tight little bags of wine; the peach, whose handsome leathern coat strips off so finely; the pearly or ruby-like currants, heaped in light long baskets; the red little mouthfuls of strawberries, ditto; the larger purple ones of plums; cherries, whose old comparison with lips is better than anything new; mulberries dark and rich with juice, fit to grow over what Homer calls the deep black-watered fountains; the swelling pomp of melons; the rough inexorable-looking coconut, milky at heart; the elaborate elegance of walnuts; the quaint cashew-nut; almonds, figs, raisins—in short,

'Whatever Earth, all-bearing mother, yields,
Rough or smooth rind, or bearded husk or shell.'"

It will not do however, to spend time over the mere question of beauty or attractiveness in fruit. We have to-night to discuss the practical and economic aspects of fruit and to express sympathy with a young industry which will afford such a confederation of interests as will be mutually beneficial to our Colonies and ourselves.

In spite of a fairly large home industry in the cultivation of fruit, and to which we are naturally prepared to give due sympathy and support, the fact is established that we are very far from supplying our wants. Whether we wish it or not, we are compelled to import annually fruit raw and preserved, as will be shown below, to the value of nearly eight millions sterling. There is, I believe, plenty of room for an extension of fruit industries in the United Kingdom, if only in apples alone; and farmers would do well to turn their attention to the cultivation of choice fruit as a means of supplementing their returns from other produce. But, for many kinds of fruit, such as oranges, lemons, pine-apples, dates, figs, grapes, consumed during the winter months, we must depend largely upon warmer and sunnier lands; and here it is that our tropical and sub-tropical Colonies have the opportunity to come forward, each with its special production, and seek a share in what foreigners look upon as the best fruit market in the world.

I mentioned just now that the United Kingdom draws supplies of fruit from abroad to the value of nearly eight millions sterling per annum. The actual figures as given in the trade returns for 1885 are as follows:—

Kind	Value
Apples, oranges, &c.	£3,619,788
Nuts, almonds, &c.	701,910
Currants, raisins, figs, &c.	3,265,825
Total	£7,587,523

I have taken the trouble to analyse carefully these returns of imported fruits, and I find that not quite 4 per cent of such fruits are received from British Possessions. The bulk is produced and supplied to us by foreign States. The exact proportions in respect of each class of fruit will appear from the following table:—

RETURN OF FRUIT IMPORTED INTO THE UNITED KINGDOM IN 1885.

(Published by the Custom House, May, 1886.)

	From foreign countries.	From British Possessions.	Total.
Apples, raw	£623,319	£93,712	£717,031
Oranges and lemons ...	1,474,191	6,819	1,481,010
Fruit, raw (unenumerated)	1,370,743	51,004	1,421,747
Fruit, dried and preserved	488,020	70,757	558,777
Nuts, used as fruit	368,275	79,020	447,295
Almonds	254,524	91	254,615
*Currants	1,458,182	1	1,458,183
*Figs	187,895	8	187,903
*Plums, prunes, &c. ...	94,738	4	94,742
*Raisins	965,237	983	966,220
Total ...	£7,285,124	£302,399	£7,587,523

Fruits from British Possessions equal about one-twenty-fifth of the whole, or 4 per cent nearly. The second of the above tables shows very clearly what a large proportion of our imported fruit is drawn from foreign countries. The figures are:—Annual value from foreign countries, 7,285,124*l.*; from British possessions, 302,399*l.* This is a very striking and suggestive comparison, which it would be well for the Colonies to carefully weigh and consider. If they can grow and ship, at a fair price, any of the fruit which is now supplied to us by foreign States—and of this there can be little doubt—they have here a fair field for commercial enterprise, and one in which they will receive every encouragement, on the sole ground, if no other, of the bond of mutual sympathy and support which binds together every portion of the Empire. Apart from the mere increase of population, the English are, I believe, becoming more and more a fruit-eating community, and this tendency is to be encouraged, not merely as a sign of advance in civilisation and in the use of luxuries, but also as a direct incentive to more rational and healthful modes of living, and to a departure from the strongly heated foods and strong drinks which characterise our habits as northerners, and which are responsible, in some degree at least, for the prevalence amongst us of intemperance and vice. This is a phase of the subject which can only be touched upon here. All I wish to point out, in passing, is that an increase in our supply of wholesome and refreshing fruit, both at home and abroad, is one which is entirely free from objection, either on the ground of health, morals, or political expediency. A fruit such as the banana is in itself a valuable food, but others, such as the orange, grape, and pineapple, are especially valuable on account of the potash salt, the citrate, malate, and tartrate which they contain. When fish, or meat preserved with salt, forms an important article of diet, we are told the blood loses much of its potash compounds and becomes unhealthy, unless the loss is made up. Now fruits, notably those of the orange family, supply these essential salts in a most effective manner. Fruits also by their flavour and juiciness serve to stimulate a weak appetite, to give variety and lightness, no less than elegance and beauty to an otherwise solid diet, and they contribute in a palatable and refreshing form much of the water required for the daily needs of digesting and assimilation.

ENGLISH TRADE IN FOREIGN FRUIT.

It may be interesting, not only for fruit-growers in the Colonies, but for home people as well, to review the character of the different fruits that are now imported into the United Kingdom, to trace their origin, as well as the special circumstances of the countries which now hold the monopoly of supplying them. This will afford the best means for ultimately deciding which of these fruits can be grown in our colonial possessions, and what are the special points to be kept in view before a successful trade in fruit can be maintained between the Colonies and the Mother Country.

In the first table of statistics placed before you to-night, I summarised the total value of fruits imported into the United Kingdom during the year 1885. As showing the gradual but substantial development of the trade in foreign fruit which has taken place in this country, I am enabled, by the courtesy of Mr. Seldon, Chief of

* Subject to a duty of 7s. per cwt. imposed March 7, 1860, yielding a revenue (in 1885) of 513,740.

the Statistical Department of Her Majesty's Customs, to place before you a comparative statement showing the value of fruit of all kinds imported into the United Kingdom in the years 1845, 1865 and 1885 respectively:—

Kind	1845	1865	1885
Apples, oranges, lemons, &c, ...	£158,098	£1,131,183	£3,619,788
Nuts, almonds, &c.	80,682	424,866	701,910
Currants, raisins, figs, &c.	648,108	1,629,935	3,265,825
Total	£886,888	£3,185,984	£7,587,523

This table explains itself. The trade in foreign fruits in 1865 was nearly four times what it was in 1845, while that of 1885 was nearly double that of 1865. With the increased and improved steam communication which we now have with all parts of the world, the probability is that the United Kingdom will take still larger supplies of fruit from abroad, and the indications are strongly in favour of much of that fruit coming from our Australian, Canadian, and West Indian Colonies, which can supply us with fruit equal to any now seen here. I do not wish, however, to confine my remarks solely to what the Colonies can do as regards supplying the English market. Although great interest is taken, as a result of the Colonial Market at the Colonial and Indian Exhibition, in the possibility of the Colonies supplying fruit to the English market it must be remembered that this does not cover the whole of the ground. Many Colonies, such as the West Indies and British Honduras, have developed a large trade in supplying the United States with bananas, oranges, and pineapples; others, like Fiji, in supplying tropical fruits to the sister Colonies of Australia and New Zealand. Tasmania exports its surplus fruits to Victoria, while Queensland sends its bananas and pineapples to New South Wales. In the East Indies the Straits Settlements export choice fruits to India, and so on throughout our Colonial Empire interest has been awakened in the commercial value of fruits which a few years ago were little thought of. While, therefore, in my remarks this evening, attention is specially devoted to the possibilities of the Colonies supplying the English market with fresh and preserved fruits, I shall at the same time endeavour to place before you any local or intercolonial trade which may have been developed in fruit, and then give a general idea of the importance which fruit as a factor in colonial commerce is fast assuming, and the promise it holds out of still greater importance in the future.

If we turn to the second table of returns given above, we find that apples at present are imported to this country to the value of over 700,000*l.* annually. The chief supply, to the value of nearly 500,000*l.*, comes to us from the United States of America. Growers in the States have practically monopolised our market by shipments of this fruit, which, whatever its special merit of cheapness may be, is certainly, as sold here, inferior in flavour and juiciness to the best English-grown apples. Unfortunately, however, the quantity of really good English-grown apples is quite inadequate to meet the demand, and hence we are compelled to fall back on foreign supplies. The next largest supply of apples from abroad comes to us from continental countries through Belgium to the value of 100,000*l.* annually, while the Dominion of Canada occupies third rank, and supplies apples to the value of 91,000*l.* annually. As regards oranges and lemons, the quantity consumed in these islands is very large. We import annually about 500 million oranges and lemons, which is at the rate of 16 per head of population. More than one-half of this quantity, equal to a value of nearly a million sterling, comes to us from Spain. The remainder comes from Italy (Sicily), to the value of nearly half a million sterling; from Portugal and the Azores, to the value of 130,000*l.*, and from Turkey, to the value of 1,9000*l.* The value of oranges imported from Malta and all other British possessions taken together is only 7,000*l.* annually.

The large class of fruit included in the Customs Returns under "unenumerated raw fruit," is composed of grapes, French pears, apricots, plums, pineapples, melons, bananas, prickly pears, forbidden fruit, cherimoyer, pomegranate, and other sub-tropical and tropical fresh fruit from the Mediterranean region, from Madeira, the Azores, and latterly from the West Indies. France is the largest contributor under this head, to the value of nearly half a million sterling. Spain ranks second, and supplies us with such large quantities of Almeria grapes that 20,000 to 30,000 barrels of this fruit alone are sometimes disposed of in the London market in a single day. The other unenumerated raw fruits are supplied by Holland, to the value of 212,669*l.*; Belgium, to the value of 150,882*l.* Germany, to the value of 96,174*l.*; and Portugal to the value of 80,096*l.* The value contributed by all the British possessions is less than either of these—the exact amount being 51,004*l.*

Fruit, dried and preserved, 558,777*l.*, consists of dates, canned Californian fruits, preserved ginger, tamarinds, and a miscellaneous supply pretty equally distributed amongst most countries of the world. Of nuts used as fruits we import the walnut, sweet or Spanish chestnut, filbert—Smyrna, black Spanish, and Barcelona—Brazil-nut, coconut, monkey-nut, butter-nut, cashew-nut, pistachio-nut, pecan-nut, and occasionally other nuts more or less rare. It may be mentioned, in passing, that these are not true nuts in the strict acceptance of the term; some are seeds, others are fruits. France and Spain, again, supply the largest quantity of these nuts, while the West Indies and Brazil and some portions of the East Indies supply such as are specially confined to the tropics. The almond of commerce consists of the kernel of a peach like fruit, probably native of the warm and dry portions of the Levantine Mediterranean. The tree appears to flourish where the olive grows, and, although often seen in England, and found hardy in the neighbourhood of towns, it only bears in exceptional seasons, and after a mild and uninterrupted spring. Our chief supply of almonds, which reaches an aggregate quantity of 400 tons, and a value of nearly a quarter of a million sterling, comes from Italy, Spain, and Morocco. "Jordan almonds" come from Malaga in Spain, while bitter almonds come chiefly from Mogador in Morocco, which, by the way, possesses one of the most charming and equable climates in the world. The well-known fruit called grocers' currants are the produce of the Corinth vine, which is a seedless variety of common grape. This particular vine is almost exclusively cultivated in the Morea portion of the small kingdom of Greece and in the Ionian Islands. We imported in the year 1885 nearly 60,000 tons of currants, of the value of about a million and a half sterling. The vineyards of Corinth grapes are near the sea and cultivated with great care. It is somewhat remarkable that when tried elsewhere, for instance at Sicily and Malta, this usually seedless grape has developed berries so charged with seed as to be useless for commercial purposes. The imports of raisins, or dried grapes, are nearly 30,000 tons annually, of the value of nearly a million sterling. Muscatels, or the better class of stalk raisins, come from Malaga, in Spain, and are in demand all the year round, except during the short English fruit season. Valentia, or loose raisins, on the other hand, are chiefly used during the three winter months when the British housewife is concerned with plum-pudding. Figs, in a preserved state, are consumed to the extent of 6,000 tons annually, of the value of 200,000*l.* They are imported chiefly from Turkey, while the remainder comes from Greece, Portugal and Spain.

Such, in brief, is an outline of the English trade in foreign fruit. Summarising the results, we find that we procure supplies of fruit from Spain to the value of nearly two millions sterling; from Greece to the value of one and a half million sterling; from Italy and Turkey to the value of three-quarters of a million sterling each; from France, United States, and Germany (including Holland and Belgium), to the value of half a million sterling each. The total value of fruit obtained from all British possessions, as noted above, is less than from either of these, and is only a little over a quarter of a million sterling.

REVIEW OF FRUIT INDUSTRIES IN THE COLONIES.

With the exception of one or two, most of our Colonies are separated from the Mother Country by such "countless miles of ocean" that it was thought impossible to draw from them any appreciable quantity of fresh fruit. But the rapid progress made in the construction of large and swift ocean steamers has brought even our Australian Colonies within the compass of a four weeks' voyage; and, if we can draw supplies of oranges, apples, and pears from the far-off orchards of Australia and New Zealand, what cannot be done with the production of Colonies at less than one-half the distance? The voyage to New Zealand is possibly longer than to any other British Colony, and if, as has been proved to be the case, supplies of excellent fruit can be brought from thence, there is suggested to us a possible opening for a trade in fruit with our Colonial Empire at present hardly realised. The establishment of a colonial market in connection with the Colonial and Indian Exhibition was the means of bringing very forcibly before us the characteristic fruit of each Colony, and the lesson taught by it, if rightly followed up, will tend to bring an acceptable supply of food within reach of all classes in the Mother Country, while at the same time it will develop such interest in the resources of the Colonies themselves that attention will be devoted to an almost unworked field of productive industry.

As regards the exhibits of each Colony, which consisted of both fresh and preserved fruits, I may mention that a report, undertaken at the request of H. R.H. the President of the Commission, has been prepared by me, and is now in the press. This report enters as fully into details as was practicable in the limited space at my command. I have briefly summarised under each Colony its capabilities in the way of fruit, and mentioned what appeared to be the most successful of its exhibits. I will not now, therefore, travel over the ground of this report; but, with your permission, shall endeavour to supplement it by such further information as I have gathered during this inquiry, which to me has been throughout of an interesting character.

CANADA.

Following the order in which the Colonies were placed in the Official Catalogue of the Colonial and Indian Exhibition, we begin with the Dominion of Canada, which, as was naturally expected, made a magnificent show of fruit, and there is little doubt the Dominion is destined to become, in the near future, a very formidable rival to the United States in the supply of apples to the English market. The Canadian fruit possesses high colour and delicate flavour equal to the best American apples, and it is merely a question of time whether Canadian apples are not as largely consumed in Europe as American apples.

At present American apples are imported to the value of 500,000*l*, while the value of Canadian apples amounts only to 91,000*l*. It would be unfair to suppose that Canada can produce apples only. In its clear, bright, and stimulating climate it can grow almost any fruit of temperate climates, but at present, through its horticultural societies and other organisations, it wisely devotes chief attention to the improved cultivation of the apple, and to the introduction of new varieties or the acclimatisation of old ones. The Province of Ontario is the most important centre for apple growing, and in good years it is estimated that this one Province alone will produce over a million barrels.

AUSTRALASIA.

The Australian Colonies, although much further off than Canada, possess one great advantage arising from their position in the Southern Hemisphere. Their winter is our summer, and our winter is their summer. The Australian fruits will, therefore, come into the English market at a time when few other fruits are available. As a writer recently remarked: "In May and early June housekeepers are sorely tried to furnish the last course. English apples are few and shrivelled. Those of American growth are spent. Pears are not on hire. The time of strawberries has not come, except for the 'swaggering' classes. Grapes are in their worst season. The nuts of autumn are dry and musty, and oranges are over. It is at this season that we are to be blessed with the noble and beautiful growth of Australia, of which as yet only the timid firstlings have appeared in the fruit market of the Colonial Exhibition."

Taking a rapid review of the Australian Colonies, it might be mentioned that New South Wales and South Australia are destined to produce oranges equal to any in the English market, and in this one fruit alone they possess an opening of great value. Australian oranges are expected to arrive in Europe in June, July, and August, a time when no oranges are found in the Northern Hemisphere. Shipments of this fruit at such a time must naturally cause a change in the characteristics of the English fruit trade, but for fine fruit carefully packed and well placed, there is little doubt it would soon establish itself as a recognised article of trade, and prove adequately remunerative.

Victoria produces excellent apples, apricots, cherries, figs, melons, plums, and raspberries. Fig drying is being taken up as a local industry, and it is to be hoped that some portion at least of the 200,000*l*. we pay at present for our supply of foreign figs will be attracted by our brethren in this Colony. The canned fruit of Victoria has been pronounced in the City to be equal to the best Californian fruit now so largely used in Europe; and, after carefully testing them, one firm has expressed the opinion that "there will doubtless be a large trade done between the Mother Country and the dependency of Victoria."

Each Australian Colony by virtue of its geographical position, its climate, and soil, and the tastes and habits of its people, is enabled to take up its own special branch of fruit industry. South Australia produces grapes and apples, which can be sent here in large quantities; but if all its pears are equal to those which appeared in the Colonial Market, and they can be supplied in large quantities, this Colony will have a distinctive fruit of great value in northern markets.

The weak points in the shipments of last year are, I believe, well recognised at Adelaide, and will no doubt be carefully avoided in the future. I am glad to notice that the Royal Agricultural and Horticultural Society of South Australia is taking action with the view of securing a cool chamber capable of taking 10 tons of fruit by each fortnightly steamer from February 1 to April 30 of the current year. The first consignment of South Australian fruit of this season is probably, therefore, now on its way home; and I feel sure that the members of this Institute, no less than English people generally, wish every success to an enterprise which, although primarily in the interest of trade, tends at the same time to bind us closer together as an Empire in the paths of progress and in mutual well-being.

Queensland is capable of producing rich stores of both temperate and tropical fruits, and there is a local trade with Sydney in bananas and other fruit which no doubt will lead to much greater development. Pineapples of good quality and large size are grown in the Colony, and Mr. Theodore Wright speaks of fruit weighing from twelve to thirty pounds in weight grown at Mackay, on the Pioneer River. While sub-tropical Queensland, with a fine dry stimulating climate, granted only a sufficiency of water, possesses excellent capabilities for producing fruit with good keeping qualities, equal to the best Californian fruit, it is evident that tropical Queensland must eventually become the seat of a large fruit industry, provided a good outlet is found for it.

Western Australia, with an equally dry and stimulating climate, has produced raisins and currants of excellent quality. As regards the latter, it has been believed that the Corinth vine has not proved a success anywhere except in the Morea and Ionian Islands. What may have happened elsewhere I cannot say, but the currants shown at the Colonial and Indian Exhibition from West Australia, South Australia, and the Cape of Good Hope were seedless, and, moreover, were of such good quality that

they could hold their own with any at present imported into this country.

Practically an undeveloped country, Western Australia cannot be expected to show such an advance in matters horticultural as her sister Colonies; but what she has done already is good earnest of what she is capable of doing, and it is evident that choice and delicious fruits are to be numbered amongst the stores of her prosperous future.

Tasmania, unfortunately, was not represented at the Colonial and Indian Exhibition, and, in view of her capabilities as a fruit country, this was a distinct loss both to herself and to those who feel an interest in colonial industries. As regards the importance and value of fruit culture in Tasmania, I cannot do better than quote a few words from the admirable Paper read before the Royal Colonial Institute by Chief Justice Sir William Dobson on May 11 last. He said:—"As might be expected from our climate, the cultivation of fruit forms a staple industry. I cannot demonstrate this more clearly than by telling you that, besides what we consume at home—and we are large fruit consumers—we send away 85,000*l.* worth to the neighbouring Colonies in an unmanufactured state, and we manufacture four and a half million pounds of jam, or more than 2,000 tons, of the value of 86,000*l.*, of which we export 72,000*l.* worth. We also export what is called pulp to the value of 13,000*l.* This is fruit of soft kinds that would not stand a voyage, which is boiled down and put into casks and shipped, for the most part, to our neighbour, Victoria, who imposes a heavy duty on our jam, but imposes a comparatively trivial duty on the pulp, which her jam manufacturers convert into Victoria jam. Our manufactories employ about 300 hands, of whom one-third are women. In the valleys on the slopes of Mount Wellington, and in other moist and sheltered spots, the little settler has his raspberry plot and his black currant plot, for these are the most favoured fruits for jam making. Once planted, they need little attention, and the only labour required is in picking and carrying to market."

Fresh fruit from New Zealand arrived last summer in 30 consignments, and English people were able to realise what the apples of the Antipodes were like, by the beautiful fruit which Sir Julius Von Haast displayed for some weeks amongst the other numerous attractions of the New Zealand Court. The changes of temperature and the daily variations must be considerable in a country like New Zealand, and these are factors which must be well weighed by horticulturists. But it is evident that apples, quinces, and fruits of this character can be very successfully grown there. Moreover, they possess such keeping qualities that fruit stood the long voyage without special storage, and remained good for several weeks afterwards. A writer on fruit culture in New Zealand remarks that since New Zealand fruit reaches Europe when there is little or none in the market it must realise good prices. He adds: "So long as the grower could get 2½*d.* per lb. for his fruit it would pay well."

FIJI.

Although one of the latest additions to our Colonial Empire, the Fiji Islands are striving their utmost to take a worthy place. They possess in their late Administrator, and now Lieut-Governor, the Hon. J. B. Thurston, C. M. G., an officer of great zeal and energy, and one who is not only thoroughly conversant with local circumstances, but who sympathises with any well-directed efforts to develop the resources of these fertile islands. Sydney, in New South Wales, is only seven and a half days distant from Viti Levu, while Auckland, in New Zealand, is only four and a half days distant. Hence it is not surprising that a trade in tropical fruit, begun in 1877, has now assumed considerable importance. In 1885 the value of bananas and pineapples exported from the Fiji Islands reached 24,000*l.* A fruit-preserving company has been established, and the canned Fiji fruits exhibited at the Colonial and Indian Exhibition were attractive and good.

SOUTH AFRICA.

We come now to the South African Colonies, and, if time permitted, I would be glad to enter fully into the merits of the excellent collections which were sent last year from the Cape of Good Hope and Natal. The Cape of Good Hope is so engrossed with diamonds that it has little time for rural industries; but if it seriously devoted attention to the subject of fruit, it could supply European markets with raisins and currants, and with fresh grapes in almost unlimited quantities.

The collections of Natal fruits were most varied and interesting. Many were essentially tropical, others were purely temperate fruits. The varieties indicated a wide range of climatic conditions, while the quality of all the fruits was exceptionally good. The yellow peach is so abundant in the Colony that it is often used for feeding pigs. If dried and exported in large quantities, Natal peaches should prove a valuable addition to the food supply of this country. Fresh fruit from Natal could be placed in the English market during the months of March, April, and May. These are probably the months we most require them. As indicating the interest taken just now in colonial fruits, a correspondent at Pietermaritzburg suggests that, "if Australia can send her oranges over a far greater distance of tropical sea to arrive in good condition in the London market, there is no reason why the Cape should not also engage in the trade, and find it even more profitable."

EASTERN TROPICS.

In the Eastern Tropics we have the Empire of India, Ceylon, Mauritius, and the Straits Settlements. As regards India and Ceylon, it is doubtful whether we can, at present at least, obtain any fresh fruits of a suitable character. In fact, they have very few fruits which they can spare in large quantities capable of bearing a long sea voyage. They might, however, supply some preserved fruits. At the Colonial and Indian Exhibition there was shown, from India, a small dried apricot (*Prunus armenica*, L.), an important article of food in the Punjaub Himalayas, and in the North-West Provinces, which deserve attention as a probable source of an import trade for the English market. This fruit is known in India as the mish-mush, or "Moon of the Faithful." Dr. Watt remarks that it is largely eaten by all classes, fresh or dried, but chiefly fresh, and sometimes in preserve by Europeans. Sometimes the apricots are pressed together and rolled out into thin sheets or "moons" two or three feet in diameter, like a blacksmith's apron. From Afghanistan large quantities of the dried fruit are imported into India, and distributed by trade far into the plains of Bengal.

Mauritius produces most tropical fruits, such as pineapples, bananas, litchis, guavas. The natural outlet for Mauritian fresh fruit would be during the winter months to the Cape and South Australia. Preserved and canned fruit might be prepared cheaply and abundantly, and for these there are markets all over the world. Although no serious attempts have hitherto been made to develop the fruit resources of Mauritius, there is no doubt an external trade in fruit might be established, which would do something to alleviate the present depressed condition in which it is placed by the fall in sugar.

The Straits Settlements yield perhaps the richest stores of tropical fruits of any of our dependencies. The mangosteen, durian mango, pineapple, papaw, duku, attap, loquat, plessan, rambustin, pumelo, bananas, blimbing, guava cherimelia, were all shown at the Indian and Colonial Exhibition in a preserved state, and, with other better-known tropical fruit, they formed one of the most interesting collections of East Indian fruits seen in this country. Singapore pineapples are largely exported preserved whole in syrup, and the enterprise shown by several firms in popularising this article will no doubt lead to a considerable trade being established in this country.

WEST INDIES.

From the Eastern Tropics, I would ask to go with me to the Western Tropics, and especially to those beautiful islands dotted over the Caribbean sea. While

the West has given to the East the pineapple, the banana, and the guava, it has received in return the orange, lime, shaddock, and mango, and its fertile soils and sunny climates have greatly improved them. The Bahamas were the first of the West India islands to give attention to the cultivation and export of fruit. The first cargo of pineapples was shipped to England in 1842. In 1855 the shipments consisted of 16,469 dozens, of the value of 3,415*l.*; in 1864, of 61,500 dozens, of the value of 8,516*l.* To keep the fruit for a voyage of almost twenty-eight days by sailing vessels, the whole plant was taken up and shipped. This was rather an expensive system, as the planters lost the suckers, or shoots, for replenishing their fields, and the quantity taken at one shipment was necessarily small.

Of late years, the bulk of the Bahamas fruit is shipped to the United States, and in 1885 the statistics as regards pineapples stood as follows:—

	Dozen	Value
To Great Britain	31,900	£4,785
To United States	424,065	46,062

The total value of the fruit exports of the Bahamas averages about 54,000*l.* annually.

These consist of oranges, shaddocks, avocado pears, bananas, coconuts, and sapodillas. Canned or preserved pineapples are also exported, but it would appear that much more might be done in this direction. From a letter received recently from a correspondent at the Bahamas, I learn that "Eluthera and Long Island have done fairly well this year, selling their pines at 2*s.* per dozen. But Cat Island, with a population of 5,000, nearly all engaged in pine growing, has done very badly. The people had plenty of pines, but could not sell them. When I was there in the beginning of August there were several thousand dozens still in the fields, and the people would gladly have sold them at 4½*d.* or 6*d.* per dozen—a price which would barely cover their carriage to the beach. But no sale could be made even at that price. The prospects of the orange crop are good, but so long as the fruit is sent to market *in bulk* in the holds of schooners, good prices cannot be obtained, and many cargoes are damaged and lost." From another source I learn "that fully one-third of the fruit crop of the Bahamas is lost through want of care in properly packing and shipping the fruit."

The other West India islands, with the exception of Jamaica, of which I shall speak presently, have not been able to establish an appreciable fruit industry. The difficulty is not in growing fruit, but in securing regular and suitable means of transit. The inter-colonial steamers of the Royal Mail Company cannot be utilised, as they have a purely local itinerary. What are wanted are rapid steamers connecting directly with the United States or Europe, and provided with suitable accommodation for carrying fruit. The fruit trade of the several islands at present is as follows:—Trinidad, chiefly coconuts, 43,000*l.*; Tobago, chiefly coconuts, 2,600*l.*; Grenada, 390*l.*; St. Lucia, 404*l.*; Barbados, chiefly tamarinds, 1,305*l.*; Dominica; 3,444*l.*; Montserrat, limes and lime-juice, 11,000*l.*, St. Kitt's and Nevis, 1,078*l.*; Antigua, chiefly pineapples, 156*l.*

Although Jamaica embarked in a fruit industry much later than most of the others, it now occupies the first place as a fruit exporting country. The value of its shipments is not far short of 250,000*l.*; annually, which go principally to the United States. The chief fruit exported is the banana, which in 1885 reached a value of 130,000*l.* Next comes the orange, to the value of 34,000*l.* Other fruits exported are pineapples, limes, mangoes, coconuts, shaddocks, and tamarinds. The Jamaica bananas are cultivated by both Europeans and negroes, and, according to the season, sell locally for 7*l.* 10*s.* to 10*l* per 100 bunches. Small bunches, less than "seven hands," are not saleable. The bulk of the orange crop is yielded by self-sown trees, growing in pastures or native gardens. When the fruit is carefully picked by hand, graded according to size and degree of ripeness and well packed, it finds a ready market. The demand for Jamaica fruit is necessarily affected by the Florida crop, but latterly the trade is somewhat brisk, and good prices are realised. Even with the trees at present existing, if attention were seriously given to the subject, the export of oranges from Jamaica might be increased fourfold. It reflects somewhat unfavourably on the West India islands, which can grow this fruit so successfully and readily, that oranges from Sicily are still being imported into New York and New Orleans, and that, after crossing the Atlantic, they are placed in the market in a better and more acceptable condition for buyers than West Indian fruit. This is a matter which, with a little more experience and knowledge on the part of growers, might be greatly changed. With suitable storage in cool chambers, Jamaica could supply the English market with pineapples, oranges, cherimoyer, water-lemon, sweet-cup tree-tomato, rose-apple, limes, mangoes, and many others. As regards mangoes, thousands of tons are produced annually, and I have elesewere suggested that, after exporting the best in a green state, using others for chutneys, pickles, and preserves, the rest might be utilised in the production of a useful spirit, or in the manufacture of glucose.

The rapid rise of the fruit trade in Jamaica is due to the enterprising counsels of the late Governor, Sir Anthony Musgrave, who secured regular and rapid communication with the States and subsidised steamers, and connected the fruit ports by telegraph and extended the railways. Much is still needed in the way of roads for opening up fruit districts, and for bringing them into closer communication with the coast. By such means, the fruit would be cheaply and expeditiously brought to the port of shipment, and the small settlers encouraged to embark in fruit culture.

What Sir Anthony Musgrave did for Jamaica, Sir Frederick Barlee appears to have done for British Honduras. The establishment of a regular mail service between Belize and New Orleans was the first step in making British Honduras a fruit exporting Colony. In 1880, it exported no fruit except coconuts. Last year it exported fruits, consisting of bananas, limes, mangoes, oranges, avocado pears, pineapples, and tamarinds, to the value of 14,464*l.*

A very interesting attempt was made last year to import fresh tropical fruit from British Guiana by Messrs. Scrutton & Sons, who had one of their steamers fitted with a cool chamber specially for the purpose. Bananas and many delicate fruits were received from the West Indies during the course of the Exhibition in excellent condition. It is to be hoped that all connected with this interesting experiment will resolve to make it a permanent feature in West Indian trade, and induce the English to become as large consumers of bananas and other tropical fruit as the people in the States.

Before closing my remarks upon the West Indian fruit trade, I would mention that the growing of fruit for export has initiated quite a new departure in the methods of local trade. It is true that fruit-growing in itself is somewhat uncertain, and apt to suffer sudden reverses, but the fact remains that it enables some thousands of small growers to place land under cultivation and to utilise what otherwise would be simply wasted.

Again, a trade in fruit has introduced a system of cash payments on the spot, with the result that the cultivator is placed at once in possession of means for continuing planting operations and extending them to the fullest extent. As a case in point I might mention that the fruit trade in Jamaica is the means of circulating nearly 250,000*l.* annually, amongst all classes of the community, and this large sum is immediately available, without the vexatious delays formerly experienced in establishing other and more permanent industries. Bananas, for instance, come into bearing in about fifteen or eighteen months from the time of planting, and as the return is usually from 10*l.* to 20*l.* per acre, the planter is able, with a comparatively small capital, to establish his land in cocoa, coffee, nutmegs, limes, oranges, and coconuts, which when

the bananas are exhausted, will remain a permanent source of revenue. It is on this account that I look upon the fruit trade of the West India islands, as indeed many other small industries, as calculated in the aggregate to build up, little by little, and improve condition for the people of these islands—a condition which ultimately will enable them to meet much more successfully than they otherwise would the depression under which they are now suffering.

PRESERVED FRUIT.

In my previous remarks I have not touched particularly on preserved fruits, and on such special preparations as jams, jellies, and candied fruits. Where fresh fruit is abundant, local circumstances will determine, whether that fruit can best be utilised in a fresh or preserved state. For Colonies beyond reach of a convenient market for fresh fruit, and where sugar of good quality is obtainable at a moderate price, it would, no doubt, as at Singapore, be advisable to preserve such fruits in syrup, and export them in that state. Taking the preserved fruits at the Colonial and Indian Exhibition as fair samples of productions in this class, the general impression produced was not satisfactory. Pineapples from Singapore and Bahamas were an exception, and appeared to be fairly appreciated. But many other preserved fruits were not presented in an attractive and satisfactory manner, and, compared with the general character of preserved fruits received in this country from California, they were decidedly inferior. This arose from various causes, but it is only necessary to mention here that the syrup was generally too thick, the quality of sugar used too low, and the fruit generally was put up when too ripe, and consequently the flavour was lost. Those who undertake to preserve fruits should obtain a tin of Californian Bartlett pears, and carefully study the nature of the syrup and the excellent manner in which both the flavour and consistency of the fruit are preserved intact. I mention this as the highest standard I know of what a canned fruit should be. If tropical fruit could be preserved with such success as the Californian fruit I have just mentioned, it would command relatively high prices. Such preparations as guava jelly and lovi-lovi jelly (the latter from the fruit of *Flacourtia inermis*) would become recognised articles of commerce, if prepared by experienced and skilled persons.

As regards jams, there is practically no market for those from the Colonies. The abundance of English and continental fruit suitable for jam-making, and the low price of sugar, enable English-made jams to be the cheapest, and possibly the best, of any.

There is, on the other hand, a good opening for attractive and tastefully-prepared candied and crystallised fruits, which come to us now chiefly from France. Of candied limes, oranges, kumquat, rose-apple, loquat, shaddock, coconut, guava, mango, skilfully prepared, and with the characteristic flavour of each duly preserved, there would arise a moderate demand; but, as they would enter into competition with candied fruits now so successfully prepared by the French, this is a fine art department in fruit industry in which the Colonies can only attain success when they have devoted considerable attention to the subject.

There is no reason, however, why they should not at once enter upon preserving their best fruits in syrup, and as I have pointed out above, their chief competitor in this branch is California, which has established a reputation not easily to be surpassed.

Bananas would appear not to be palatable preserved in syrup, on account of a slight astringency which is developed in them, and, in competition with figs, they are practically unsaleable in a dried state. Hence this fruit at present is only marketable in a fresh state. A proposal has been made to import bananas in pulp for the purpose of making champagne. But if fruit pulp, that is, fruit reduced by partial boiling and preserved with salicylic or boracic acid were to become a commercial article, I believe this plan would utilise an enormous quantity of fruit which is now wasted for want of a proper outlet. Fruit pulp, if imported in large casks, might be very successfully treated in this country, where sugar is so cheap; and the conserve made from it could easily be put up in neat and attractive bottles and sold at a moderate price. In the Colonies, strange to say, sugar is much dearer than in England, even in those that grow sugar. Refined sugar has to be imported, and generally costs, for instance in Jamaica, as much as 5*d.* to 7*d.* per lb. Again, attractive tins or well stoppered bottels would be fully one-third more than in England: hence, it is almost impossible for the Colonies to compete with the Mother Country in any preparations of fruit preserved with sugar. With fruit pulp simply packed in casks the case is different: and I commend the subject both to fruit-growers in the Colonies and to merchants at home in search of a new industry. Some hundreds of tons of bananas, where the bunches are too small for export, and several thousand tons of mango pulp could be exported from Jamaica, to say nothing of guavas, pineapples, red plums (Spoodias), star-apples and naseberries.

PACKING AND SHIPPING FRESH FRUIT.

Before closing my Paper it might be useful to growers of fruit in the Colonies to say a few words as regards the various methods adopted for selecting and preparing fresh fruit for export purposes. When fruit is produced in large quantities, and it possesses a distinct value in foreign markets, it is a matter which concerns the Government, no less than the people generally, to take every step that is practicable and suitable to place that fruit in such a market in the best possible condition. Great care is taken generally in the preparation of crops of sugar, coffee, cacao, pimento, tobacco, ginger, and other produce; but the careful and scientific treatment of fruit, although capable of yielding returns proportionately quite as large as many of these, is practically overlooked, and consequently the loss entailed upon both growers and shippers is enormous. The fruit growers of America, France, Spain, and Italy, who at present command the English market, have given for many years past the most careful attention to the subject, and the result is seen in the large sums which they realise for their shipments and the general prosperity of their industries. It is clearly not enough to grow good fruits, but it is necessary also to study carefully how and when they should be packed, under what conditions they should be shipped, and the special requirements of buyers in the markets to which they are consigned. Those who study these matters most thoroughly and effectually must reap their reward in good prices, and their marks would become in time so well known and trusted as to be firmly established. It would be impossible here to enter into practical details respecting the treatment of each class of fruit. As regards apples: given fruit of attractive appearance and good quality, they might, as in America and Canada, be racked in barrels without paper, but so arranged as to lie in tiers and keep firmly together to prevent rubbing or bruising. Apples from Australia and New Zealand of the more delicate sorts would be better wrapped in paper, and with the layers divided by thin strips of cardboard or wood. The best New Zealand apples arrived last year packed in chaff, but it is a question whether this is really necessary. Pears might be wrapped in paper and packed in two or three layers in light boxes.

Oranges for the American market are preferred hand-picked and with a portion of the stem attached, which, it is believed, ensures better keeping qualities, and they are carefully wrapped in soft tissue paper and packed in boxes or barrels. For the English market "stem-cut" oranges are not specially sought; but the plan might very well be tried by Australian growers, to test whether such oranges arrive in better condition than those without stem.

Pineapples will keep very well for ten or twelve days without special stowage. The best fruit received in England from the Azores and Madeira is packed one or two in a compartment in a light box, or in flat cases with about ten or a dozen fruits. Early in the season they fetch as high as 5*s* to 8*s*. each, but sometimes

only 2*s.* 6*d.* each. Pineapples for the American market from the West Indies are packed in barrels, and sometimes in bulk, but the loss, which in both cases is great, might be saved by packing in light boxes or cold storage. Grapes are largely received in England during the winter months, and they come chiefly from Spain, packed in corkdust, in barrels or half-barrels. They fetch from 10*s.* to 20*s.* per barrel. Growers in Australia and the Cape would do well to ship only the best fruit, known to keep well, and possibly they would find paper the best substitute for cork-dust. Chaff packing or ordinary sawdust would appear not to answer.

So far, I have said nothing respecting special storage for fruit during transit. This is a subject which has already received some attention, but it is evident that special chambers in fast-going steamers will become a necessity, if trade in fresh fruit between the Colonies and the Mother Country is to be thoroughly successful. The question of storing fruit to keep during long voyages has often been discussed, and numerous experiments have been tried, with results more or less satisfactory. In the first place, it is absolutely necessary that all perishable fruits intended to be shipped should be gathered before they are ripe. The exact condition when export fruit should be gathered requires some experience; but it is understood in the West Indian expression of "full fruit." It is necessary the fruit should have attained its maturity as regards size, but not in the elaboration of the juices, which gives it its ultimate sweet flavour. What is sought by a special chamber on board ship is to retard the ripening process of the fruit as much as possible without affecting its flavour —in fact, to keep the active principles of life in the fruit in such a state of suspense that it will travel long distances before the ripening process is accomplished. The question is: How can this be done most cheaply and efficaciously? In some experiments tried on board the S.S. "Ivanhoe," trading between Jamaica and New York, a chamber was fitted to contain nothing but nitrogen gas. It was believed that if, deprived altogether of oxygen, the fruit could not ripen, or, in other words, it could not undergo the slow combustion which is a necessary concomitant to the process of ripening. This experiment, although interesting in itself, failed, because its promoters overlooked a well-known fact in vegetable physiology. They found that while the outer-portion of the fruit by means of nitrogen gas was kept from ripening, the inner cellular portions set up a state of incipient fermentation, which rendered the fruit at the end of the voyage absolutely worthless. Of other experiments I need not speak here. So far as we can gather at present, it would appear that a cool and well-ventilated chamber, in which the temperature is kept uniformly low, and in which the air is fairly dry, is the most efficacious of any for the transport of perishable fruits.

Probably the first successful attempt to import fresh tropical fruit in a specially prepared or cool chamber was made by Messrs. Scrutton, Sons & Co., of Gracechurch Street, in the S.S. "Nonpareil," in May 1886. The consignment consisted of 400 bunches of bananas, some sapodilla, the bell-apple or water-lemon, and loquat. In subsequent consignments there were brought bananas, pine-apples, alligator pears, bread-fruit, papaw, limes, oranges, and tomatoes. These fruits were brought from British Guiana, and arrived in excellent condition after a voyage of twenty-one days. The cool chamber on board the "Nonpareil" had a capacity for nearly 1,200 bunches of bananas, and by means of a refrigerating machine fitted by Haslam, of Derby, a dry equable temperature of about 39 to 41 degrees was maintained during the whole voyage. This is probably the lowest temperature necessary for fruits, otherwise it would be frozen and possibly be spoiled. A regular temperature of about 45 degrees might, under ordinary circumstances, be sufficient to keep well-selected and not over-ripe fruit in good condition, and especially if provision is made for keeping the air in the chamber as dry as possible. Excess of moisture or want of proper ventilation very quickly affects fruit in these chambers, and hence it is only by careful and systematic experiments the required conditions can be exactly obtained.

If cool chambers for fruit could be provided at a reasonable cost, there is no doubt that they would greatly enlarge the prospects of a trade in fresh tropical and sub-tropical fruits between the Colonies and the Mother Country. As noticed above, a proposal has been made by growers in South Australia to engage a cool chamber on board the Orient steamers to bring fruits to this country during the present year, and similar arrangements are in course of being made by other Colonies. We shall then, I believe, enter upon a distinctly practical phase of our subject, and the results will, I hope, be as satisfactory to our brethren in the Colonies as they will be beneficial and full of promise to ourselves.—*Colonies and India.*

A Correspondent writes to an Indian paper as follows on Wooden Labels for Trees:—The following method of preserving wooden labels that are to be used on trees or in exposed places is recommended:—Thoroughly soak the pieces of wood in a strong solution of sulphate of iron; then lay them, after they are dry, in lime water. This causes the formation of sulphate of lime, a very insoluble salt, in the wood. The rapid destruction of the labels by the weather is thus prevented. Bass mats, twine, and other substances used in tying or covering up trees or plants, when treated in the same manner, are similarly preserved. At a recent meeting of the Horticultural Society in Berlin wooden labels thus treated were shown which had been constantly exposed to the weather during two years without being affected thereby.—*Journal of Horticulture.*

We have received some packets of Gishurstine from the Belmont Works of Price's Patent Candle Company, reminding us of coming winter and the necessity for providing against wet feet. Ever since this useful preparation has been introduced we have used it, and found it of the greatest comfort in protecting boots from the effects of wet. But there is another use we applied some of it to, which the proprietors of it may not be aware of. We added about one-third of petroleum oil, and in this mixture we rubbed up some red lead, forming a paste of the consistency of cream. This we rubbed on wooden labels before writing on them with Wolff's pencil, and we have found the writing last as long as the label. It soaks into the wood and enables the pencil to make an indelible stain.—*Journal of Horticulture.*

One plant frequently met with on the sugar plantations in the North is the *Caladium esculentum*, an aquatic plant, which furnishes the large Taro root so well known to the Sandwich Islanders and the natives of other groups of islands in the Pacific. It is common on the Johnstone River and many places further north, and appears to be as thrifty as could be desired in those localities. Like rice, marshy ground suits it best, but, like that cereal, it can be grown on well cultivated land without much water. Caladium-like, the large arrow-shaped leaves rise on high foot stalks immediately from the roots; but, although the leaf and stalks are very agreeable to the taste, they are seldom eaten, as they are used for the purposes of propagation, these when severed from the root and inserted in thoroughly moist soil or mud produce in six months a harvest of roots. It is estimated that 1,500 persons can be fed on the produce of a single square mile; but unless this estimate represents the entire food of that number of persons there does not appear to be much that is extraordinary in it. In those islands where it is common the natives make thick paste out of the root; and this, under the name of *poé*, forms their staple article of diet. The South Sea Islanders are remarkably fond of making a patch of cultivation somewhere for themselves on the plantations in the North and growing a few sweet potatoes and their old favourite, the taro.—*Queenslander.*

On the Devonshire coast, a sea-grass *Poryhyra-laciniata*) is boiled, chopped, mixed with a small portion of oatmeal, and made into bread, which keeps from four to eight days, and is much used by the poor Welsh people, most of it being sent to Swansea.—*Am. Grocer.*

The strongest intoxicating liquor in the world is probably "Sham-sho," used by the natives of Burmah, and said to be made of rice and lime. It is so powerful that it will dissolve a Martini-Henry bullet in thirty minutes, and its ravages among the natives are stated to be most deplorable.—*Ibid.*

A new industry has been started in Vermont for collecting the cones of the white or spruce pines and extracting the seeds from them, which are then sent to France, Germany, and other parts of Europe, to renew the forests there that have been cut down. Each bushel of cones yields about two pounds of seed.—*Ibid.*

Close and Open Forest Planting.—In order to test the advantages or disadvantages of planting at various distances, some experiments were instituted in Germany some twenty-five years ago, and the results have recently been made known. An area of about fifty acres of the same average quality of soil and the same exposure was planted, in ten-acre portions, at distances ranging from four feet by four feet to twelve feet by twelve feet. Careful measurement has recently been made of the timber in each plot, and the following table is alleged to show the results in each case.—

Width of Planting.	Average Accretion in the 25th Year.
4×4 feet . . .	181·4
6×6 „ . . .	152·3
8×8 „ . . .	137·3
10×10 „ . . .	136·4
12×12 „ . . .	112·9

It would appear from these figures that the crop decreases in propotion as the width between the plants is increased at planting time. But there is much besides this meagre statement of the results at twenty-five years after planting required to enable us fully to understand the value of this important experiment in arboricultural practice. The management of the several portions of the fifty acres under experiment during the twenty-five years must form an indispensable factor in coming to any conclusion as to the value of these figures, which are put forward as the ultimate result of the comparative experiment. —*Journal of Forestry.*

Wood Ashes and their Uses.—We have had ample means of testing the value of wood ashes or charred earth, both as a means of warding off the attacks of slugs and other garden pests from tender vegetables, and as a material for enriching the soil and consequently accelerating growth. The old remedy, freshly-slaked lime, if used in excess, is positively injurious to some crops, and after it has lain on the damp soil a short period it loses its burning character, and then slugs pass over it with impunity. Ashes of every kind have been used, but more especially those from wood fires, and we strongly recommend that every kind of garden refuse be converted into ashes by burning it. At this season of the year, when the thinning of shrubberies is generally receiving attention, any or every kind of trimmings may be converted into valuable ashes, as when once a good bonfire is kindled, and a glowing red heat is obtained—no matter how green the wood and leaves may be—the fire will burn away as fiercely as the driest straw-stack, if kept constantly fed with fresh material until the whole is consumed; and there is therefore no more certain way of getting rid of noxious weeds, such as couch grass, bind-weeds, docks, etc., than that of passing them through the fire, as it destroys all seeds that generally abound in rubbish heaps that have been rotted away by the slow process of fermentation.—*Journal of Forestry.*

Increase of Strength in Timber by Seasoning, etc.—It is stated as a curious fact, by a writer in the *Building News*, that one of the properties especially conducive to durability in timber is its odoriferousness —woods which are of this character being the most durable. The same authority states that the increase in strength due to seasoning in different woods is as follows.—White pine, 9 per cent; elm, 12·3 per cent; oak, 26·6 per cent; ash, 44·7 per cent; beech, 61·9 per cent. The comparative value of different woods, in respect to crushing strength and stiffness, is thus shown: Teak, 6555; English oak, 4074; ash, 3571; elm, 3468; beech, 3079; mahogany, 2571; spruce, 2532; yellow pine, 2193; sycamere, 1833; cedar, 700. Regarding the relative degree of hardness, shellbark hickory stands highest, and calling that 100, white oak is 84; white ash, 77; dogwood, 75; white hazel, 72; apple, 70; red oak, 69; beech, 65; black walnut, 65; yellow oak, 60; white elm, 58; hard maple, 56; white cedar, 56; yellow pine, 54. Ironwood, hornbeam, almond, hard beech, teak, and thorn are of notable hardness, and, of course, very serviceable where that quality is essential. The finest floors are said to be seen in Russia. For those of the highest grade, tropical woods are exclusively employed. Fir and pine are never used, as in consequence of their sticky character they attract and retain dust and dirt, and thereby soon become blackened. Pitch pine, too, is liable to shrink, even after being well seasoned. The mosaic wood floors in Russia are often of extraordinary beauty. One in the Summer Palace is of small squares of ebony inlaid with mother-of-pearl. A considerable trade is done in Dantzic and Riga by exporting small blocks of oak for parquet floors.—*Journal of Forestry.*

Mechanism of a Tree.—A tree (and I beg my readers to follow this attempt at explanation closely—all depends upon it) receives its nourishment from the roots. These correspond to the mouth in the human frame. Now, as in the human frame the nourishment received is, after being supplied to the blood, exposed to the operation of air in the lungs before it is fit to give material to the body, so in a tree, the nourishment taken in at these tree mouths, the roots, passes to the lungs of the tree, and there, by contact with the air, is rendered fit to supply fresh material to the tree. These tree lungs are the leaves. This operation is effected by the passage upward from the soil around the roots, through the trunk, the branches, and every twig of the tree to the leaves, of a large quantity of water, containing in solution the nutriment for the tree. Arrived at the leaves, a process takes place which separates, by means of contact with the air, most of the water the roots had taken in, from the valuable nutriment, and throws off, in vapour, the surplus water into the air. At this time certain constituent portions of the air are utilized and mingled with the nourishment retained. This is all, now a small portion in comparison with what had arisen from the roots, yet retaining enough water to serve as a vehicle back, returned toward the roots, depositing in its way, in leaf, bark, and root, what is needed there for the growth of the tree. In these they undergo, especially in the bark, further fitting and digesting processes before they assimilate with the substance of the tree. The water which was retained to carry them down, being no longer needed, passes out at the roots. Of the extent of the provison made for evaporation by the leaves, some idea may be formed from a consideration of the number of *stomata* or stomates to be found in the leaves of plants. The number varies in different plants, for which variation a reason may be found in the different conditions of growth to which they are subjected in their several natural habitats. In the back of the leaf of the apple tree there are about twenty-four thousand stomates to the square inch. In the leaf of the lilac there are a hundred and sixty thousand of them to the square inch. In the leaves of the cherry-laurel there are none on the upper surface of the leaf, but ninety thousand have been counted on the lower surface.—*Journal of Forestry.*

THE RED SPIDER--SO CALLED.

BY A. VEITCH.

At a meeting of the Society of Florists in Cincinnati one of the speakers is reported to have said, when the subject of plant enemies was under consideration, "That it is customary to abuse and misuse the weak. This is the case with that small but beautiful insect, the red spider. Like other spiders it is carnivorous and never ate a plant in its life. Microscopic insects come to live upon the plants and the red spider to live upon them. It is a friend not a foe." This statement we regard as made up of fact and fiction in about equal parts. It is true the spider is carnivorous and is in no way dependent upon plant food for subsistence; but the creature referred to here is not a spider, but an Acarus or mite, and lives exclusively upon vegetable products. In zoological classification they both belong to the class Arachnida, but the might is in the order Trachearia, the spider in that of Pulmonaria. The function of breathing in the two orders is different. In the mite it is performed by air tubes distributed through the body, whilst in the spider the air is admitted by spiricles situated on the abdomen, and which are lined by a membrane plaited into numerous folds, which resemble gills. On these characters is founded the subdivision of the class into pulmonary and tracheary Arachnidia.

But apart from all technicalities anyone with a good pocket lens might satisfy himself that the pests of gardeners differ in important particulars from the spider. The head and breast, or thorax, of the spider is connected with the abdomen by a slender cord, as in insects. It has eight eyes, and the same number of legs, besides two short arm-like projections, or palpi, with which to catch and to hold its prey. The body of the mite is not so divided; is somewhat oval in form and tapering to the head, which is terminated by a syphon or sucker, with which to extract the juices of plants. It has six legs, but by undergoing a transformation similar to insects an extra pair is not unfrequently acquired. The body is transparent, with dark vein-like ramifications along the back which we take to be the trachea. The aged females only are red, which may have given rise to the popular name by which they are known. They spin webs, but not so artistically as spiders do, as they seem chiefly designed for nests, or, when the workers are unmolested, convenient residences for large communities; whereas the web of the spider is not only a snug retreat in times of danger, but a base from which to operate against enemies as well as a snare to entrap unwary flies or other creatures upon which it feeds. New Haven, Conn., 1st, 1885. —*Gardeners' Monthly.*

INTER-DEPENDENCE OF RAINFALL AND TEA PRODUCTION IN INDIA AND CEYLON.

The figures placed at our disposal by Mr. Hogarth shewing the rainfall and tea production on typical properties in India, deserve a more extended notice than we gave them. With some exceptions they shew that the winter months, December to February, inclusive, which are generally almost entirely rainless, are blank months as regards tea production; while March, in which flushing recommences after the pruning of November and the rest of the cold weather, and even April, shew but small results. The real tea season is the season of summer heat and monsoon rains which extends from May to October. In some cases, as we mentioned, fully 40 per cent of the whole crop is gathered in the two months of July and August, the very months in which generally, nearly a similar per centage of the total rainfall occurs. For India, therefore, it may be regarded as an established principle, that the tea harvest is not only in proportion to the amount of rainfall, but synchronous with the rainy season. Here, in Ceylon, owing to our insular position, our proximity to the equator, our place in the tracks of the two monsoons, and the consequent moisture held in suspension in the atmosphere for the large portion of the year, our seasons are not so sharply defined and our tea harvest is distributed much more evenly over the year. We should be glad to receive returns from particular properties to compare with those from India, but meantime general results may be deduced from the following table of monthly exports of tea from the island since the new product commenced to assert its position in our commerce:—

EXPORTS OF TEA FROM CEYLON IN EACH MONTH OF EACH YEAR FROM 1880 TO 1886, INCLUSIVE.

(Compiled from the Chamber of Commerce Weekly Export Table.)

	Jan. lb.	Feb. lb.	March. lb.	April. lb.	May. lb.	June. lb.	July. lb.	August. lb.	Sept. lb.	October. lb.	Nov. lb.	Dec. lb.	Total. lb.	Blue Book or Customs Total. lb.	Showing a difference of lb.
1880	1,236	5,804	708	1,928	29,979	3,750	8,432	45,265	184	146	11,578	16,806	125,816	134,523	8,707
1881	19,364	22,171	1,248	9,697	42,654	12,724	52,057	35,630	19,260	48,721	23,971	16,717	304,214	348,573	44,359
1882	15 647	18 627	181,796	20,984	51,487	82,614	37,789	66,301	34,474	38,756	40,880	26,348	665,703	697,268	31,565
1883	153,362	138,575	61,960	77,248	237,765	240,688	116,292	128,008	149,840	75,347	73,589	90,975	1,543,649	1,665,768	122,119
1884	13,738	97,595	116,248	188,540	319,969	161,657	501,943	125,060	309,501	150,092	90,277	174,333	2,248,953	2,392,973	144,020
1885	294,178	164,637	221,471	330,377	493,186	519,664	564,896	429,631	363,942	208,760	356,717	329,776	4,277,235	4,372,721	95,486
1886	461,539	364,538	530,552	1,063,624	815,854	687,377	1,132,064	777,946	474,304	476,340	626,007	413,048	7,763,213	7,849,888	86,675
Total	989,084	811,947	1,113,983	1,632,398	1,990,894	1,708,474	2,413,473	1,607,841	1,371,505	998,162	1,223,019	1,068,003	16,928,783	17,461,714	532 931
Avr.	141,298	115,992	159,140	233,199	284,413	244,068	344,782	229,695	195,929	142,594	174,717	152,572	2,418,397	2,494,530	76,133

It will be observed that our figures, made up from the Chamber of Commerce returns, shew some discrepancies when compared with the Customs figures in the Blue Book, which are higher in every case, but the differences do not affect the general results. These are that the bulk of our tea goes forward between April and September, the heaviest average figures being opposite May and July. This would seem to prove that our best flushing months are April and June. Taking it for granted that the produce exported in one month was harvested in that preceding, our heavy-yielding season extends, not as in India from May to October, but from March (which is not generally the month of drought it has been this year), to August. In those six months (going on the principle of crediting the export of one month as the growth of the month preceding, we get for our summer seasons the following averages:—

March	...	...	,, 233,200
April	...	...	,, 584,400
May	...	...	,, 244,000
June	...	...	,, 344,800
July	...	...	,, 229,700
August	...	...	,, 196,000
		Total...	lb. 1,532,100

Of course these are the averages of the seven years. And so, going on the same principle of throwing back the export figures one month, we get for our six winter months, figures as follows:—

December	...	...	lb. 141,300
January	...	...	,, 116,000
February	...	...	,, 159,000
September	...	...	,, 142,600
October	...	...	,, 174,700
November	...	...	,, 152,600
		Total...	,, 886,200

It thus appears that if April and June are the best yielding months in Ceylon, December and January give the lowest returns. The figures also seem to prove not far short of two-thirds of the tea produced in Ceylon is gathered in the south-west monsoon period, March to August. This is a result which will probably be considerably modified when the produce of Uva begins appreciably to affect our returns. Meantime, the exact percentages are:—

March to August .. 63 per cent.
Sept. to Feb. .. 37 ,, ,,

If the year is divided into quarters, December-to-February quarter gives by far the lowest yield; September-to-November follows with some improvement; March-to-May comes third, but the total in this quarter is so slightly below that for June-to-August, that they may be regarded as almost equal.

While production in Ceylon is perennial, there is a real lull in the two marked winter months, December and January, while the proportion of the harvest gathered in the six months September to February, is not greatly in excess of one-third the quantity collected between March and August. Our most productive three months are:

April with an average of			lb. 284,400
May	...	...	,, 244,000
June	...	...	,, 344,000
		Total ...	,, 872,400

Or considerably more in these three months, than in the *six* months, September to February. While our best yielding three months are April to June, in most parts of India, the three following months, July to September, are those in which the greatest returns are obtained, one half the whole crop being often gathered in those three months. In our case only a little over one-third is gathered in three months, the rest being so distributed that we have no blank months.

LONDON NOTES ON PRODUCE: TEA AND COFFEE.

There are complaints again as to the quality of Indian teas. The *Grocer*, referring to last week's sales, says:—The quality of the tea now on offer seems to be further deteriorating, as the proportion of common to fine grades almost daily increases; and as continued plentiful supplies are put forward, this week amounting to 23 050 packages, the public sales have gone off with greater heaviness at again rather easier prices. The market altogether is in a much weaker position than before, as not only have the dealers heavy stocks on hand still undisposed of, but the demand from the country is decidedly less active, and orders to buy tea are given with great reluctance. Fine teas sell tolerably well, but all undesirable and poor liquoring sorts have been realised with difficulty at a frequent reduction of ½d to ¼d per lb.

The price current of Messrs. Recker and Lee, of Galveston, Texas, contains the following remarks anent true and false coffee, which are distinctly "pointed":—There is nothing more saddening to the earnest Christian mind than the recipes for making coffee that are given in American cookery books. With hardly an exception, they direct that coffee should be boiled. As well might a Fijian cookery book direct that a missionary should be stewed. Coffee never was, and never can be, made by boiling it. The Americans are a nation of coffee drinkers. The annual consumption in the United States represents over one-third of the entire product of the world; so that the pressing necessity of obtaining good coffee, and knowing how to make it, is of great importance. Thomas J. Murrey, the well-known caterer, author and gourmet, in a recent communication on the subject of coffee in the South, pathetically remarks:—"What oath-breeding formula is followed by these coffee-spoilers I am unable to say, but it must be a very complicated one to be able to convert a wholesome beverage into the vilest compound ever tasted by man or beast." This uncomplimentary, but unhappily too true, reflection is largely due to using rank, low-priced Brazil coffee. However, a gleam of hope appears on the horizon towards an evolution in this respect, and the demand for rich, mild coffee is steadily increasing. It is a remarkable fact that the coffee of a nation is closely associated with its religion. Speaking broadly and generally, it may be said that true or infused coffee is the result of Catholicism, and that false or boiled coffee is the result of Protestantism. France, Italy, and Spain produce true coffee; while England, America, and Germany boil their coffee. Even in the latter countries, when true coffee is found, it is where Protestantism is weak. High Church households in this country and in England frequently drink real coffee; on the other hand, it must be confessed that Catholic Ireland is as ignorant of coffee as is Calvinistic Scotland; and for this exception to the general rule there is as yet no adequate explanation.

JAVA TEA.

Messrs. Gow, Wilson and Stanton have issued a circular, with diagram, showing the quantity imported and delivery of Java tea, during the last six years.

	1881	1882	1883
Imports	1,916,000	2,158,000	3 0 7,000
Deliveries	1,3 5 000	1,78 ,000	2 8 3,000
Stock	411,000	751,000	9 4,000
	1884	1885	1 86
Imports	3,586,0 0	3,344,000	3,946,000
Deliveries	3,709,000	3,537,000	3, 76,000
Stock	875,500	676,000	944,000

Our diagram shows a marked increase in the arrivals of Java tea in London during the second and third quarters of 1886. The above figures are interesting as showing a gradual development of the trade, the deliveries keeping pace pretty evenly with the arrivals.

The direct imports from Java to London during 1886 were the heaviest yet recorded. As large quantities have also been shipped from Java to other countries besides England, it is probable that the yield per acre during the past year shows an increase over recent

seasons; it is to be hoped that growers have by this means been to some extent compensated for the low range of prices current. The contraction in value of Java tea, however, has not been so great as in teas from some other places. Java teas are consumed in so many different markets that the demand from one quarter or another will generally retard a serious and sudden decline in prices, when caused by a drop in similar grades of teas from other countries. This cause has for some time past maintained the value of Java pekoes at a comparatively higher range of prices than Indian growths; it has also frequently retarded —and at a certain period checked—a decline in the value of Congous and Souchongs which might otherwise have been more pronounced. The wide area over which Java tea is distributed thus acts as a great and continuous safeguard. The value of broken pekoes has been greatly interfered with by the unsettled state of affairs in Ireland, where they were at one time largely consumed, and this class of tea being taken in fewer foreign markets than whole leaf descriptions, has probably suffered to as great an extent as Indian growths. Broken pekoes, however, are now becoming more used in some of the Continental markets. Quality.—Looking back over the past twelve months we note with some regret the poor average quality of a large proportion of the offerings; this is specially unfortunate at a time when super-abundance of weak liquoring teas had been arriving from other localties, and had already seriously depressed the market for the lower grades. Future prospects.—The brightest spot in the year is noticed in a few consignments which have stood out pre-eminently over the rest as being unquestionably grown from good Indian seed, and being manufactured with the greatest attention to quality, accompanied by skilled and careful manipulation. The future of the Java tea trade must be largely influenced by the liquoring character of the tea, and now that imports from India have so largely increased, and that there is every reason to anticipate a still greater addition to the tea harvest in Ceylon, this matter of quality may become one of *vital* importance to proprietors of tea estates. We would therefore, again impress upon owners the advisability of planting *good* Indian seed, and neglecting no opportunity of utilising every appliance for efficient manufacture, and for greater economy, which the most recent scientific researches have placed within their reach. Bulking in Java, has perhaps shown some improvement during the past year, but still requires additional attention in many factories. The subject is of greater importance now than ever as an additional charge has been imposed for the performance of this operation in England. Average price: the 56,490 packages of direct import sold in public auction during the year realised an average of 9¼d.; the average for the 31,473 packages sold during the first six months of the year being 9¾d., and of the 25,017 packages sold during the last six months being 8¾d. In 1885, 45,272 packages of Java tea of direct import were printed for public auction; the equivalent in chests being 39,418. In 1886 the quantity had increased to 56,490 packages, the equivalent in chests being 48,038.

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

Paris, February 19.

German farmers are discussing a not unimportant question, namely, whether large or small-breed cows are best for milking purposes. Starting from the term of 8 or 10 years, during which the keeping of a milch cow is remunerative, and comparing the relative cost of their feeding and difference in live weight when finally slaughtered for the market, which of the two classes of cows will be on the whole the most profitable to keep, assuming the yield of milk in each case to be equal? Take two cows whose live weight is 8 and 12 cwt. respectively. After utilizing their milking powers during 8 or 10 years, will the superiority in live weight, say 4 cwt. when handed over to the butcher, balance or surpass the greater cost of food consumed by the heavier animal pending ten years?

It is roughly estimated that a cow requires for sustenance 2¼ lb. of dry matters—that science so selects for its standard—per hundredweight; consequently, a cow of 12 cwt. will require in rations nine pounds of dry substances more than the small animal. In the course of a year the excess would amount to 29 cwt., and if valued at fr. 2·50 per cwt., the difference in money value would be per annum 72 fr., or for ten years 720 fr. Now is there any butcher to be found who would pay 720 fr. for a live weight of 4 cwt. of a cow, after serving ten years as a milk-producing machine? Conclusion with German agriculturists: for milk industries small, not large-sized stock, are to be preferred, as they eat less into the bargain.

In France, as a rule, milk is never consumed unboiled; in Germany the contrary is the case. Professor Reichmann has determined the relative digestibility of milk in both these states. Unboiled new milk coagulates in the stomach five minutes after it is swallowed; in the space of four hours it is completely digested. The digestion is produced not by a ferment, but by an augmentation of lactic juice and also of muriatic acid. The action of these acids is at its maximum 75 minutes after the milk descends into the stomach. Boiled milk requires two hours and-a-half to be digested.

Dr. König recommends the more general consumption of butter-milk; it is richer in albuminoid matters which constitute the elements of nutrition than either fresh or skimmed milk being 4 per cent, while the others are but 3; naturally it is less rich in fatty matters, being under one per cent, while fresh milk is 3½. Its taste indicates it contains less milk-sugar, due to the latter being converted into lactic acid. The stomach digests it quite as well as meat, eggs, or whole milk, and in the neighbourhood of towns or factories is in great demand, where it is prepared as an appetizing and nourishing soup.

Since the close of the fifteenth century, when the Moors were definitely defeated, till now, Spanish agriculture remains in the same state. The realm is naturally rich, the climate excellent, yet the population very sparse, does not raise sufficient cereals for its wants. At Florida, near Madrid, an Agricultural College was commenced in 1854; it is still in course of construction, and will not be terminated till the country possesses some solid government. It is what Liebeg would call the "vampire system" of farming which is pursued. One example suffices for all. In the province of Murcia, in the south-east of Spain, it is the old Roman plough which is still in use. The soil is never manured, being by nature rich; the rotation is naked fallow, followed by barley and wheat. There are no black cattle, so there is no manure; there is no pasturage, save what the Merinos eke out in the Sparta fields. Goats replace cows, and straw, hay. Farm laborers are paid 2 fr., and women 1 fr. per day, and are contented, so as Sancho Panza observes, when one is contented there's an end to the matter.

The fallow receives three primitive ploughings: in September the wheat is sown broadcast and lightly ploughed in, so that when the wheat rises, it has the look of having been sown in lines, as the seed falls towards the ridge of the furrow. As the farmsteads are few and far between 8 to 10 miles distant, the owner never visits his fields from the time of sowing the grain till he comes to scythe the crop down in June. When cut the grain lies 10 or 12 days on the soil; then is carted home. There are no roads—the highway is the railroad. There are no spring carts even for travelling.

The sheaves are opened out on a circular "threshing" floor 66 feet in diameter; the layer of straw is twelve inches thick; over this mass is dragged by mules a kind of chaffer, consisting of Silex knives stuck in heavy blocks of wood. The result is not only to shake out the grain, but to cut the straw; a series of riddlings separate the grain from the mass. The straw is the provender for the mules

and sheep; only rye straw is employed as litter. In the absence of irrigation—and plenty of facilities exist to execute it—there is neither grass land nor green crops. The small quantity of manure from the stabling of the mules is applied to the vine.

The culture of the vine is equally primitive; there is one vine per each six square feet; it receives three tillages—between January and May, and one manuring—stable stuff, every fifth year, on each side of the vine alternately; a trench 20 inches long, 8 wide, and 12 deep, receives 25 lb. of manure. The preparation of the wine is simplicity itself. A reservoir in cement, cubing 60 feet, on a level with the soil is filled with grapes and pressed down with the hand. The mass remains thus during four days to ferment, to allow the sugar to be converted into alcohol. The juice is next run off, and the residue carried to the press-vat, which also is the mill for squeezing olives for oil. The vine is then collected into deal vats; German rye whiskey added to make the liquid keep, and at once filled into barrels and exported. The wine has now 16 per cent alcoholic strength, which the blenders water down to 8. The residue of the winepress is either dried for fuel or applied to the vines as manure. Were it distilled as in France, it would yield ample alcohol to save German importations. The backwardness of Spanish agriculture may be judged by this fact; many proprietors are ignorant of the extent of their holdings, as the latter have never been surveyed. It is but just to add the State has promised to do so—since four centuries.

The Agricultural Society of the Loire has taken a step in the right direction; it is arranging to establish a farm, garden, and flower school to train small farmers' daughters and servants, in all branches of domestic economy, as applicable to their expectations in life. There is a great demand for educated helps in the rural districts, and superior young women readily receive higher wages. The school will effect another salutary end; checking the tendency of young women to immigrate to the cities, in the hope to obtain higher paid employment, but which too often terminates in their ruin.

Good oaten straw, that is, free from rust and must, is an important forage in the ration of milch cows. Straw is accused of imparting a disagreeable flavour to milk, and a tallowy character to butter. Such may be produced by some other straws, or even by that of oats if unsound. Experiments made in Silesia confirm these views. In Schleswig-Holstein, where the most scientific attention is given not only to the preparation of butter, but to the feeding of the cows, oaten straw enters into the rations of milch stock in the proportion of 9 lb. per 9 cwt. of live weight. Oaten straw in addition should be chaffed and proportioned to the other rations.

The Russians have been the first to employ compressed rations or cake-feed for horses during campaigning. Since eighteen months trials have been made with the fruit of the *Sterculier acuminé*, or "kola," an alimentary product, native to North Africa. Professor Heckel, of Marseilles, has prepared cake food for horses, in which the Kola fruit enters largely. He attributes to the Sterculia exciting properties akin to oats; in the latter, the stimulating element resides in the delicate pellicle which coats the seed. The food has been tried on cavalry horses at Marseilles and elsewhere, and with satisfactory results. The exciting action on the nerve muscles is only more immediately active in the case of oats. The Sterculia cake is accepted as able to replace one-half the feed of oats; in other words one pound of ordinary oats is equal to two pounds of Sterculia.

In Belgium, Serradelle culture continues to make progress both as a fodder plant and for green manuring. It is sown with winter rye in April, at the rate of 33 lb. per acre. Cows prefer it to any other kind of dry forage, and in nutritive composition it treads closely on red clover. It is neither exacting in point of soil or manure like clover. It produces 32 tons of green stuff per acre, and ploughed in as a green manure can be profitably followed by potatoes.

An enormous quantity of bamboos has recently been shipped to France, and the demand continues.—*Japan Mail.*

In Case of Scalding.—In case a child or other person should accidently drink scalding water, cod liver oil and lime water, mixed in equal parts, should be administered a teaspoonful at a time, to the scalded throat, given slowly so the healing mixture trickles down almost of itself. This not only heals the injured part, but supports the strength of the child as food would until other nourishments can be taken.—*The Farmer's Review, Dec.* 1885

A Mixture of Zinc White with zinc chloride is found to furnish a paint of great value both for wood and metals, as it becomes very hard, and can be washed or brushed without injury, which qualities are, of course, of prime importance. An essential precaution, however, to be observed in regard to this paint is not to apply it in rainy or frosty weather, as it then becomes mealy and scales off.—*American Cultivator, Jan.* 1886.

Several interesting experiments were recently carried on at the Cawnpore Farm, or "The Agricultural Station," in the N. W. P. Notable among the experiments was the use of woollen refuse from the mills as manure. This is probably the first occasion on which this manure has ever been tried in India. The experiment succeeded admirably with crops of all kinds, and the mill-owners will, no doubt, be very glad to get rid of the refuse, as it is of a highly inflammable nature. Refuse from brick kilns, and ashes from reeds, and grass cut green during the rains and buried, were also tried as manures with success. The growth of Nankin cotton proved a failure, but the season was unfavourable.—*Madras Mail.*

The Darjeeling Tea Season.—The tea season at Darjeeling promises to be an early one. Rain has fallen in all parts of the district during the past few days, and in sufficient quantity to satisfy every requirement. The trees on the less elevated parts are quite green with new leaf, and several gardens anticipate manufacturing in a few days. The cold weather throughout has been moist, and with the hard frost experienced in December should, with the present seasonable spring, bring the leaf out strong healthy, with a quick growth. A Darjeeling correspondent writes:—"I should say from the forwardnes, of the leaf that plucking will have begun by the 15th instant on almost every garden in the district. The oldest resident cannot recollect such favourable weather for tea, and undoubtedly the severe frost experienced during this cold season have done much to free the gardens from blight. The gardens are quite clear of the pests which have done so much harm in recent years."—*Times of India*, 11th March.

Java Cinchona.—A well-known Java proprietary planter is on a visit to Ceylon at present in Mr. A. Kessler, who has a very large interest in cinchona in Southern Java. This interest is spread over some half-a-dozen estates and all but one, consist solely of cinchona, of which as many as 2,000 acres are cultivated. The exception is a plantation which is divided between coffee and cinchona. Mr. Kessler's oldest trees are not above five to six years, but he has already harvested a good deal and got profitable returns. He and other Java planters will, however, be shipping on a much larger scale henceforward, and with a quality of bark likely to be far richer than any from Ceylon. Mr. Kessler thinks the returns recently sent officially to Ceylon, of the area planted in Java and the probable quality of the bark, a fair approximation, and as a large holder he is naturally anxious to see and learn about cinchona in Ceylon. We bespeak for Mr. Kessler a courteous reception during his trip through the Central Province commencing today. He will first go to Kandy and then up through the young districts, and, perhaps, on to Uva. We trust he may have a pleasant visit and gain a fair idea of the extent under cinchona here.

INTERDEPENDENCE OF RAINFALL AND TEA PRODUCTION IN INDIA AND CEYLON.

AN INDIAN PLANTER'S NOTES ON TEA IN CEYLON.

In our previous article we noticed the averages of tea production in Ceylon for a series of years and for the months, quarters and half-years of the period since tea became an important factor in our export trade. Most of the tea being, as yet produced in the south-west of the island, it naturally followed, looking at the influence of rainfall on the production of leaf, that more than two-thirds of our crop are harvested in the south-west monsoon months. We indicated that when Uva becomes, as it inevitably will, a large producer of tea, the averages are likely to be disturbed. Meantime it may be interesting to see in what proportions monthly, quarterly and half-yearly the crop of 1886 was produced. Going on the principle of crediting the export of one month as the yield of the previous month, we obtain the following results:—

Months	Pounds Tea Exported	Percentage.
January	364,500	4·52
February	530,500	6·58
March	1,003,600	12·43
April	815,800	10·11
May	687,400	8·52
June	1,132,000	14·02
July	778,000	9·65
August	474,300	5·88
September	476,300	5·78
October	626,000	7·76
November	413,000	5·12
December	777,000	9·63
Total	8,078,400	100·00
Average	673,200	8·33

It will be seen, from the above that March, which is a month of very small yield in India, was the second best month of 1886 in Ceylon while December which is blank in India gave us 9·63 per cent of our crop. Our best month is June, then comes March, followed by April, July, December and May. The period of greatest yield in 1886 was from March to July, thus :—

March	12·43 per cent.
April	10·11
May	8·52
June	14·02
July	9·65
Total in 5 months	54·73

or considerably more than one-half, about the proportion they get in India in June to September or July to October. We differ essentially from India in our appreciable percentages for December, January and February, viz. 9·63, 4·52 and 6·58=20·73 or with 12·43 for March =33·16, or one-third of the whole in the winter months.

On a future occasion we may hope to be able to deal with the figures of tea production as compared with rainfall on particular estates in Ceylon, such as Mr. Hogarth placed at our disposal in regard to typical "gardens" in the leading tea districts in India. These we now proceed to notice. Lukimpur gives the largest production of tea per acre in any district in Assam or all India. Premising that the returns for rainfall are perfect only from 1882, those of 1881 being imperfect and 1880 being nil, the crop being given for the 6 years from 1880 to 1885, while the rainfall is shewn complete only for the four years 1882 to 1885, the monthly percentages of crop gathered and the averages of rainfall on a Lukimpur estate compare thus:—

Months.	Mean percentage of crop.	Average rainfall
January ...	Nil. ...	1·55
February ...	„ ...	3·21
March ...	·35 ...	4·20
April ...	2·243 ...	12·19
May ...	5·59 ...	11·46
June ...	12·915 ...	12·55
July ...	19·2 ...	19·68
August ...	20·4 ...	20·34
September...	17·32 ...	14·79
October ...	14·42 ...	4·19
November...	6·49 ...	0·66
December...	1·07 ...	0·50

The average annual rainfall was 106 inches and as our readers will observe, in this case well distributed. Indeed, if more of the rainfall were concentrated in June and July, instead of falling in August and September, the coincidence with the figures for estates in Upper Dimbula would be very close. The great difference is in the winter cold, which, in India, renders production small from November to April, there being but a slight recovery in May. June, July, August, are the heaviest rainy months, and in those three months more than half the whole crop is harvested. All but a small percentage is gathered between April and September, the other half of the year from October to March yielding a percentage which can scarcely pay for the gathering. But in this case, we may say both rainfall and crops, are more equally distributed over the months than is the case in other places in Assam and Cachar. On another estate in Lukimpur the tea season extended from June to October, 38·9 per cent being gathered in August and September, in which months over 28 inches out of an annual average of 95·5 fell. In this case also crop and rainfall closely coincide. On an estate in Sylhet, where the bulk of the rainfall occurred between May and October, the vast bulk of the crop was gathered between June and November, the heavy months being July to October. For an estate in Cachar with an annual rainfall of 107 inches, there are complete figures for monthly averages of rainfall and percentages of crop for the 6 years from 1880 to 1885, and in this case it will be seen the tea season extends from April to September. The figures are as follows:—

Months.	Percentage crop.	Ave. Rainfall
January ...	nil ...	0·3
February ...	nil ...	1·6
March ...	3·3 ...	8·3
April ...	9·1 ...	12·3
May ...	12·0 ...	17·7
June ...	15·7 ...	17·2
July ...	12·9 ...	15·0
August ...	13·5 ...	16·1
September ...	10·8 ...	12·0
October ...	11·4 ...	5·0
November ...	8·4 ...	1·3
December ...	1·6 ...	0·2

It will be observed that from November to February the rainfall was very slight and that as regards crop December gave very little; so with March, while January and February were blank months. The six months of heavy rainfall extended from April to September, May and June shewing nearly 35 inches. The crop months extended from May to October, the three months of May, June and July yielding over 42 per cent of the whole.

There are figures for estates in Darjiling and the Central Terai which shew that the climate of the Eastern Himalayas is much more rainy than that of the valley of the Brahmapootra. On the well-known Geille estate the annual rainfall ranged from 86·32 inches to 132·21; another estate gave 85·50 to 121·61.

An estate in the Central Terai ranged from 103·33 to 149·48. In another case we get a range of 89·73 to 171·52; sixty-seven inches of the latter quantity having fallen in August 1882. On an estate in the Darjiling Central Terai we find that out of a total crop of 1,581 maunds and 5 seers in 1882, the proportion in the four months—June to September—was :—

June	266·31	maunds
July	289·15	,,
August	290·13	,,
September	257·14	,,

or about two-thirds of the whole. So generally in other cases. One estate yielded 1,533·27 maunds 1885, of which the proportion gathered between June and September was

June, maunds	338·18
July ,, ...	254·
August	272·5
September	200·5

or considerably more than one-third of the whole. On an estate in the Dooars the rainfall in four years, 1881 to 1884, ranged from 112·84 to 184·49, so large a quantity as 70·77 inches falling in August 1882. The vast bulk of the rain falls between May and September, while the bulk of the crop is gathered between May and October, the percentages in July, August and September being :—

July	18·30
August	19·06
September ..	15·88
Total ..	53·24

or considerably more than one-half. In another case the percentages were :—

July	15·44
August	18·66
September ..	17·80
Total ..	51·90

Again more than half in three months.

The general conclusions are as we have stated, that on a large proportion of the Indian tea estates, with a rainfall of from 70 to over 170 inches of south-west monsoon rain, December, January and February are blank months or nearly so as regards crop, while the yield in April is usually small. The real crop season extends from May to November, (in which latter month pruning is usually performed), but the bulk of the harvest is gathered between June and October, as much as two-thirds of the whole crop being frequently gathered in the four months, June to September. Our Indian neighbours are, therefore, much more exposed to a "rush," such as coffee planters were wont to experience, than are the tea planters of Ceylon. The Indian tea planters, on the other hand, can count on the enjoyment of a cold weather holiday, extending from about the middle of November to the middle of March.

Having thus noticed the figures which Mr. Hogarth kindly placed at our disposal, we are enabled, through his further courtesy, to add the following notes of his impressions in regard to our system of planting and manufacture in Ceylon :—

Mr. HOGARTH'S NOTES.

It is only to be supposed that a tea planter from another country would find fault with many things in Ceylon and it is only to be expected that there are faults to be found in a growing enterprise.

The selection of suitable land, the chances tea has of ultimately holding its own against disease, and the time and manner of pruning, are subjects that a travelling planter is cautious in expressing his opinion on. But there are things to which our attention has been drawn and among these are :—

Careless planting.—Many Ceylon planters pull the seedlings up bare of any soil, and dibble them in like cabbages. In Assam the plants are lifted with as much earth round them as can be secured, and the greatest possible care is taken that the tap root is not bent. The tap root can be cut off without injuring the plant, Dr. King of Botanical fame says, but it must not be turned up.

Too early plucking.—Many planters are plucking their plants far too young. Nothing tends to stunt a garden like harsh treatment in its growth. The root system is representative of the branch system and early plucking checks the growth of the former. The excuse given is that "funds are wanted," but things must be desperate when you run in the face of nature.

Economy in everything is advisable, but false economy is ruinous. Already complaints are rife of Ceylon teas not "keeping"—that may or may not be from under-firing; and in a country where fuel is so scarce the tendency will be to fire as little as necessary. Where there are so many operations in the manufacture of an article any-one of which may produce a chemical change, it is most difficult to place one's finger on a blot and the hint of under-firing is simply a hint and nothing more.

A great drawback to Ceylon is the want of power for driving rolling machines. Hard rolling is necessary for strength, but *long* rolling is often mistaken for hard rolling. In Assam Jackson's Excelsior is the machine generally used; it requires about a 6 H. P. engine to do the work rapidly and well. In Ceylon fuel is scarce, and many factories rely on their old coffee wheels of about 3 H. P. to drive the rolling machinery. This in Mr. Hogarth's opinion, means spoiling good leaf. You must have the means, as well as the knowledge, to make good tea. Rapidity of manufacture is of the utmost importance in Assam and Mr. Hogarth doesn't see why it should not be here. He is very cautious about expressing himself on the treatment of the plant, as climatic influences must be considered, but in the treatment of the leaf after it is plucked there can be little doubt, and if Ceylon is to hold its own in the competition that is likely to arise during the next few years, he says, it must be better found in power to drive suitable machinery. He thinks there will be a great struggle for a few years and if you can't afford to meet the enemy well appointed, you had better give up tea planting. Last year has shewn that leading gardens in Assam will do well, but there is not middle class for teas as there used to be, it has come to be fine and common and Ceylon will have to choose one or other place.

On which we would remark, as we did when Mr. Hogarth mentioned the matter to us, that many a planter accused of over-plucking young tea, would reply

"My poverty, but not my will consents."

So with the choice of land: a large number had no choice but to transform their collapsed coffee estates into tea plantations. There can be no question as to the advantages of taking up plants for the field with masses of earth about them, and in the lower and hotter districts transplanters are largely in requisition. In the higher and more moist regions, however, neither transplanters nor shade is necessary, and we certainly do not need to protect our plants against that plague of crickets which is so destructive in some parts of India. Seeing that the cry previously was that we burnt our teas it is curious now to have the alleged liability o our teas to "going off" attributed to under firing from scarcity of fuel. Fuel and suffi

cient power are, no doubt, important considerations and as to quick hard rolling versus long-continued hard rolling, Mr. Hogarth told us that, in his own practice he found it better to put 80lb. at a time into Jackson's Excelsior Roller and get the leaf rolled rapidly, than to put in 300 lb. and take time in proportion. We mentioned to him the very different practice of Mr. Gow, who subjected the leaf put through his hot air withering machine to a full hour's rolling in Jackson's Excelsior, plenty of power being supplied from the resources of Messrs. John Walker & Co.'s Iron Works, where the experiment took place. If we understood Mr. Hogarth aright, hard rolling, long continued will obliterate "tips," while they can resist hard rolling for a short period. As to pruning, we told Mr. Hogarth that the process has been tried in every season of the year in Ceylon and there is scarcely yet a concensus of opinion as to the best period. Planters seem agreed, however, that, thorough pruning once in eighteen months is sufficient, if the removal of crows-feet, blossom, fruit and dead wood is carefully performed when the necessity becomes obvious in the interval.

TEA:—HUGE PROFITS AND QUICK RETURNS.

Having noticed an enquiry in an Indian contemporary as to where the profits go between the price the planter receives for his tea and the retail selling price, the idea occurred to us to send into the East End of London, and to find out by actual purchase, first, what is the smallest amount of tea the shops will sell to customers, and, secondly the prices charged. It is unquestionable that the largest proportion of the tea purchased in London is bought in the very smallest amounts procurable at a time, and consequently the prices charged for these small amounts will best illustrate the profits realised on the bulk of the teas sold over the counter. As the result of our enquiries, we found that the majority of East End shops sold as little as half an ounce, these half ounces being generally kept ready packed in paper. We heard that some shops sold ½d. packets, more particulary to factory hands who purchased from day to day the requirements for each meal separately. We obtained five samples, and sent these to one of the oldest established firms of tea brokers in the Lane where, there being both Indian and China "sides," there was reasonable prospects of obtaining a fair valuation. The following is the reply we have received: "You set us a very difficult task, we are only in the habit of tasting self-teas, we had to bring all the talent we could to bear from both our Indian and China rooms. We have numbered the samples and make the following remarks, viz.:—

No.	Weight purchased.	Price paid.	Rate per lb.	Quality.	Value.
	oz.	d.	.0		
1	.. ½	.. ¾	.. 2	..Mostly Indian mixed, little coarse ..	9d to 9½d
2	.. 1	.. 1½	.. 2	..Nearly all China, little sour	8d to 8½d
3	.. 1	.. 1½	.. 2	..China.. ..	6d to 6½d
4	.. ½	.. 1	.. 2 8d	..Mixed Indian and China and little Oolong, fair ..	..10d to 10½d
5	.. 1	.. 2	.. 2 8d	..Fair Indian and China..	about 11d

To the above values you must add:—

Wholesale dealer	2d
Duty	6d
Retail dealer, some get more ..	6d
Total ..	1s 2d

to 2s 8d. It is far and away, better than any of your samples."

The firm thus reporting were not aware where we had procured the samples, nor what was our motive in sending them for valuation. Hence the above is as unbiassed, and as scientific and honest a report as it was possible to obtain.

Now if we add the wholesale dealer's 2d and duty 6d as mentioned above, to the above valuations, and compared the results with the retail prices actually charged, we have the following significant figures.

Sample No.	Retail price charged. per lb.		Valuation Cost to Retailer. per lb.					Estimated Profit per lb.			
	s	d	s	d		s	d	s	d		s d
1...	... 2	0	1	5	to	1	5½	0	6½	to	0 7
2...	.. 2	0	1	4	to	1	4½	0	7½	to	0 8
3...	... 2	0	1	2	to	1	2½		9½	to	0 10
4...	... 2	8	1	6	to	1	6½	1	1½	to	1 2
5...	... 2	8	1	7		—		1	1		—

Thus on the samples procured by us the retail profit, according to valuation, may be said to have varied between 6½d, per lb. the lowest, and 1s 2d per lb. the highest, which, to use a well known aphorism, accounts for the milk and the cocoanut.

We send you a sample of a mixed tea which costs the dealer here 1s 3d, which he sells, duty paid, at 2s 3d. for the *retail* dealer to sell at 2s 6d.
—*H. & Colonial Mail.*

THE INDIAN TEA SALES SUGGESTED REFORMS.

We insert this week a letter from Messrs. Taylor-Colman, and Sudlow, one of the leading firms of buying brokers in this market, touching upon the size of the sampling breaks of Indian and Ceylon tea. We made some comments on the subject a few weeks ago when it was first mooted, and as our opinions are unchanged we need not refer to them, except to say that there appears to be a singular apathy displayed by the Committee of Wholesale Tea Dealers, the Indian Tea Districts' Association, and the Brokers' Association. Another season will soon open; and as far as we have been able to gather not the slightest action has yet been taken by any of the authorities abovementioned, either with a view to remedy existing defects, or even to discuss them with a view to such results.

The matter concerns these gentlemen much more seriously than would appear by the amount of interest they show in it; and we again urge them to take immediate steps to arrive at a satisfactory reform of the present regulations, as we are convinced they have, worked their last season as they now stand, and must as our correspondents point out, utterly break down under the slightest extra pressure. Indian planters may not see any immediate cause for alarm; but we must remind them that the supply from Ceylon is rapidly increasing—most of it, too, in rather small lots which occupy as much time in the sales as large breaks do, and the two together will, we feel sure, tax the powers of the trade seriously as time goes on.

But we must now leave this subject to refer to the other more absorbing topic which our correspondents touch upon, and which might fitly be headed, *the Ethics of the Pulpit*.

We confess we have quite expected that the present system in the public saleroom would soon end in an explosion of indignation. We believe it was Mr. Gladstone who once expressed his opinion at some ecclesiastical gathering, that, as a rule, "the pulpit did not get justice from the pew,"—the tea buyers evidently seem to think exactly the reverse—in short, that the pew does not get justice from the pulpit. We are quite of their opinion that nothing will last but absolute fair play. An auctioneer has, by common consent and immemorial usage, a sort of prescriptive right to present his wares in the most attractive language that his audience will give him a patient hearing for, but there can be no doubt that what is called "puffing" on the part of the vendor is strictly illegal and immoral. How far the practice

known in Mincing Lane as "jogging" or "trotting" comes within the limits of illegality we are scarcely in a position to say. We would, however, give it as our opinion that in the long run the value of tea is not one fraction enhanced by any such practices. As anyone whothinks calmly for a moment must see that a buyer who is "rushed" into a purchase at a higher price than he can resell at is practically silenced as a competing bidder for some time after. The legal maxim of *caveat emptor* is perhaps sufficient safeguard in such cases. But anyone who is accustomed to attend the sales can read between the lines that the head and front of the grievance consists in this. Certain grades of Pekoe Souchong are valued to a fraction, and when the bottom price is, say 7d a dozen, buyers will want it at 7d. We have occasionally been present and observed with amusement when some desirable lot was put up, a simultaneous shout of 7d, would spring like a volley of musketry from all parts of the room. Of course every bidder considered he was first entitled. But when the smoke had cleared away the auctioneer calmly applied the hammer to the desk as he smilingly decided, "Sevenpence my own bid." Naturally enough, eleven occupants of "the pew" felt aggreived, and manifested their feeling in disrespectful animadversions on "the pulpit." Our correspondents remind us of the committee which was appointed a few years ago, for the redress of grievances, and the abolition of preferential and favoured seats in the vicinity of the pulpit. This committee passed a rule that no buyers should sit in the box with the selling broker. An old custom had been, however, for the selling broker to have a clerk at his side to keep a correct record of the prices, and gradually this official has become a buying broker with a preferential position, far away, the best in the room. There can be no doubt that this is an evasion of the rule and it should be discontinued. The record of prices could be equally well kept in the body of the room, and in fairness to all parties this preferential advantage should at once be abolished. The tone of the Indian tea sale-room has certainly degenerated during the last ten years. It is now much more noisy and disorderly than it used to be, and the general opinion is that this is due in great measure to the impression abroad that even handed justice is not always forthcoming. We trust the selling brokers will gracefully give way without the necessity of another trade meeting and a committee of reformers. We have always maintained that sellers and buyers had reciprocal and mutual interests, and a little kindly forbearance on both sides will, we have no doubt, make matters go smoothly again.—*H. & C. Mail.*

THE SIZE OF THE SAMPLING BREAKS OF INDIAN AND CEYLON TEA, ETC.

To the Editor of the "Home and Colonial Mail."

SIR,—We have been expecting to see some further discussion of this subject in your columns, as it must be evident to anyone regularly attending the Indian tea sales that the present system is unworkable, and in times of the least extra pressure must utterly break down. The buyers cannot accurately taste and value so many breaks as they have had each sale during the last six months. From our knowledge of the views of most of the larger buyers with whom we come in daily contact we believe the tendency is not to look at less than twenty chests; indeed, in times of pressure, it is quite impossible to do so; therefore the question should be at once considered whether breaks of twenty chests and under should not be treated as small breaks, and sold at the end of the sale.

There is another matter which demands immediate redress, and that is the present unsatisfactory practice of selling-brokers putting their own bids in first whilst acting as auctioneers. Anyone can see that the auctioneer doing so has a great advantage over any other buyer, as he alone knows the exact moment when the hammer will fall on the previous lot, and consequently can put in his own bid simultaneously. Friction and unpleasant feeling is caused by the system, and the sellers' interests in the long run must suffer, if anything but pleasant relations exist. A Committee was appointed some years ago ostensibly to rearrange the seats of buyers in the public saleroom, and for the purpose of abolishing any prefential positions which certain buyers had occupied for a considerable time. We expressed to them our apprehension; and also at the same time that the old custom of "last buyer claiming the next lot" was abolished, that some such unpleasantness as this would be sure to arise; and events have but served to justify the opinion we then formed. Nothing will be satisfactory in practice but fair play to everybody; and such there will not be, and cannot be, till the two functions of seller and buyer are dissociated, and no one be allowed to occupy the pulpit but the auctioneer. If the selling brokers' firm receives orders to buy any lots in their own catalogue, the bidding should in fairness be done from the body of the room, and not from the preferential position of the auctioneer's chair.—Yours, &c., TAYLOR, COLMAN AND SUDLOW.

March 2nd 1887.

.—*H. & C. Mail.*

BRITISH NORTH AMERICA: A PARADISE FOR A FARMER.

Pelee Island, which is situated in the most southerly part of he Dominion, has a mild and most salubrious climate. The land is all that can be desired for raising all kinds of fruit, vegetables, roots, and cereals of all kinds. Timbered land can be had from $10 to $20 an acre, partly cleared from $20 to $30 per acre, and all cleared with good buildings and free of stumps from $40 to $75, according to location. The whole southern shore of the county, extending some 40 miles, is admirably adapted for the raising of grapes, peaches and all kinds of fruit. Early next summer this village will have railroad communication with the railroad system of Ontario by the Leamington and St. Clair railroad, running from Lake Erie to Lake St. Clair, crossing the Canada Southern at Comber station, and thence north to Stoney Point on the Grand Trunk railroad. It is said that Dr. Scudder, of Cincinnati, has bought 5,000 acres of marsh in the island, which has been drained by the Chatham Dredging and Contracting Company, under the supervision of Alexander Baird, P. L. S. The ditches are from 4 to 7 feet deep, with an average width of 30 feet. The water in said drains is elevated into Lake Erie by means of an engine and large wheel, which raises 100,000 gollons of water per minute. This marsh is ditched all round, and will be cultivated next summer. Cattle are at present pasturing upon it. There are large tracts of marsh land in the county, at present unprofitable, which require to be drained in the same way, and will ultimately be the finest land in the Dominion.—*Colonies and India.*

PLANTERS AND HIGH EXCHANGE IN NETHERLANDS INDIA.

(*Straits Times.* March 12.)

Mr. Van den Berg at the close of his pamphlet raises a question hard indeed to solve, namely the effect which an appreciation or a depreciation of currency may have on the wellbeing of a country. In British India, for example, it is generally held among the mercantile community that the fall in exchange has benefited trade by encouraging production. But experts of high authority hold the exact contrary. Equally divided is opinion in Java. Some people there argue that the currency policy of the Dutch Government has advantaged the community materially by protecting the public interest from the calamitous consequences of keeping a fluctuating standard of value in silver. Others are equally positive that the planting interest has been a loser by the Government de ter

mination to set up gold as regulator of the currency in the Netherlands East Indies. Mr. Van den Berg does not try to solve the question brought up in consequence of this conflict of opinion. He simply sets forth his own views. He has all along regarded this topic from the standpoint that a monetary standard should be based on fixity of value to be kept up to the mark by Government using every reasonable means. He comes, hence, to the conclusion that the Netherlands Home Government took action honestly and wisely in doing every thing in its power to safeguard the currency of the colony from depreciation by making gold its monetary standard for the future. This measure called for as it has been under the circumstances has worked detrimentally upon one section of the community. In British India, the fall in silver, however, disastrous to the Government finances, has proved a boon of immense value to the country by stimulating exports. In Ceylon, a new era of prosperity has set in since tea growing has forged ahead. The Straits Settlements have a bright future before them, there being every sign of an enormous expansion of the trade of the colony. China too shows no sign of its commercial, industrial, and productive capabilities having in any way taken a turn for the worse by the depreciation of the silver monetary unit of the country. The contrast between the universal depression prevailing in Java, and the prosperous times falling to the lot of the neighbouring British Colonies and China, has aroused, among the producing classes in that island, strenuous opposition to the currency system enforced there. By keeping exchange quotations high, it places Java at a disadvantage with respect to other producing countries, where the low exchanges ruling have marvellously stimulated the turning out of export articles. In Java, exchange rates have kept at almost stationary figures during the last twelve years, so that producers and exporters there have not benefited one whit by the steady fall of gold prices in the consuming markets. A consignment of Java produce realising in London say £10,000, does not yield the Java planters or shippers a larger quantity of guilders than it used to do before the fall in silver set in, namely 117,500 or 120,000 guilders Netherlands India currency. But at the same time, a similar amount of £10,000 remitted to India at the rate of 1s 5d per rupee brings R141,176 against 100,000 rupees only in bygone years, when that coin stood at 2 shillings. The fall in exchange benefits British India producers by about 40 %. The adoption of gold as standard of value has deprived Netherlands India planters of a similar benefit. They have to put up with every fall in the gold price of their goods, without finding any adequate compensation in a low rate of exchange, by which exporters and producers in India and Ceylon have profited so largely. However harmful the existing currency system may be to the planting and exporting interest in Netherlands India, the author of the pamphlet is dead against a return to an exclusive silver standard of value on the ground of its detrimental effect on the native consumers of imported articles. With an exchange rate of 30 to 35 per cent to the disadvantage of importers, the prices of imports must be raised proportionately, if the trade is to be continued at all, and, the bulk of imports being intended for consumption by natives the latter would, for the greater part, have to bear the burden of the general rise in prices, consequent upon the readoption of silver as a standard of currency. Supposing for instance the native community be taken as paying one hundred millions of guilders a year for imported articles, about thirty five millions more would have to be laid out on the same quantity of commodities, in case the rate of exchange be regulated by the actual price of silver. These figures speak too eloquently to admit of enlarging any further on the baleful effect on the condition of the people of Java sure to follow a change in the direction indicated. This change resulting as it certainly would in capital invested in industrial enterprise becoming depreciated 30 per cent in value would despoil the owners of the same by an equivalent percentage. The same hardship would be felt by all persons living on fixed salaries. As will have been seen Mr. Van den Berg goes upon the sound principle that the good of the bulk of the community, sure to be the losers by low exchanges, should countervail the benefit a few derive from a depreciation of the standard of value.

COFFEE; A STUDY.

Le Cafe—Etude Historique et Commerciale—Tournai 1886.

(*Translated for the "Ceylon Observer" from the "Indische Mercuur," 19th Feb. 1887.*)

This little book written by a wholesale dealer in coffee, and addressed to his customers is, in its way, very interesting, as it treats rather fully of the origin of the use of coffee in the various countries in which it is produced, and of the different peculiarities of each kind.

The writer mentions all the sources whence he has derived his information, and happily eschews statistics, so that the little work affords pleasant reading to the trader as well as to the consumer.

The writer is, however, not always correct, thus for instance in page 18 he refers to Java and Batavia as if they were two separate islands. He considers that 40 years is much too long to adopt as the duration of the coffee tree, and in page 23 he tells us that the coffee of Ceylon and Java is yellow or white, while the Brazil kinds are green. This may be partly true as concerns Java; but Ceylon almost always comes under the head of blue. In his account of the methods of preparing coffee he omits all mention of the West-Indian system, and of its being exported to Europe in parchment, (horn shell) of which he seems to be unaware. In page 52 he speaks of Liberian coffee as having an excellent flavour—d' un gôut excellent—an opinion in which we of the seaports do not join, any more than in the expectation that this kind will be exclusively the coffee of the future.

In page 72 he says :—"The Dutch were so much struck with the perfection of the Brazilian produce, that they sent Mon. van Delden Laërne, a notable specialist, to study the preparation on the spot. ("Les Hollandais onlété tellement pappés de la perfection de la production Brésilienne qu ils out enveyé M. v. Delden Laërne, spécialiste notable pour l' étudier sur place.")

This was not the object of the mission, which was rather to ascertain how far the cultivation in Brazil was capable of extension, and for the general information of our Government.

That Brazil coffee is as good as private Java coffee and far better than Java Government coffee I cannot admit—although I am obliged to acknowledge with much regret the truth of the statement to the effect that Government Java coffee has been losing in quality whilst that of Brazil has by means of a better system of preparation been improving from year to year.

The writer goes on to inform the lover of coffee that he should always have a good supply of the raw material in store, as this article improves with age, and as in the

case of wine, coffee should be used when six, eight or seven more years old.

He greatly extols Maragogipe coffee for its flavour—and predicts large importations of it.

That Java coffee generally goes under the name of Cherebon coffee, I must contradict—such may be the case in Tournai—but certainly not generally.

In page 86 he treats of Padang-coffee and classes it in appearance and flavour far behind Java, in this the Americans will assuredly not agree with him.

Under the heading of Sumatra coffee, he says Bugis (probably meaning Bungi) and Bally coffee are placed, and in this he is very ill-informed—he places both in the same class, and calls them very bad—and names Singapore as the port of discharge. All he says of Macassar coffee is, the coffee of Macassar which likewise is found at Singapore is very superior to the Bugis and Bally coffee, it resembles that of Java, but like that of Padang the flavour is not so fine. ("Le café Macassar que l' on trouve aussi à Singapore est tres superieur aux bugis et bally, it ressemble au Java mais, amme le Padang, il est moin fin de goût.") Altogether the little work impresses me with the idea that the writer is least posted up in the matter of the different kinds of coffee which are produced in Netherlands India. W. H. JR.

HINTS FOR DRAUGHTSMEN.

The surface of a sphere equals the square of the circumference multiplied by 0.3183.

The diameter of a sphere equals the square root of its surface multiplied by 0.56419.

The side of an inscribed cube equals the radius multiplied by 1.1547.

The diameter of a circle equals the square root of the area multiplied by 1.12833.

The diameter of a sphere equals the cube root of its solidity multiplied by 1.2407.

The circumference of a circle equals the diameter multiplied by 3.1416, which is the ratio of the circumference to the diameter.

The area of a triangle equals the base multiplied by one-half of its height.

The diameter of a circle equals the circumference multiplied by 0.31831.

The side of an inscribed equilateral triangle equals the diameter of the circle multiplied by 0.86

The surface equals the product of the diameter and circumference.

The radius of a circle equals the circumference multiplied by 0.159155.

The circumference of a circle multiplied by 0.282 equals one side of a square of the same area.

The area of a circle equals the square of the radius multiplied by 3.1416.

The square root of the surface of a sphere multiplied by 1.772454 equals the circumference.

The area of a circle equals one-quarter of the diameter multiplied by the circumference.

The area of an ellipse equals the product of both diameters and .7854.

The radius of a circle equals the square root of the area multiplied by 0.56419.

The circumference of a sphere equals the cube root of its solidity multiplied by 3.8978.

The side of a square equals the diameter of a circle of the same area multiplied by 0.8862.

The side of an inscribed square equals the diameter multiplied by 0.7071.—*Mullen's Pattern Making.—American Cultivator.*

THE MAHWA TREE.

We copy the following interesting letter from an exchange:—Taking advantage of a wet holiday, and prompted thereto by Mr. Maiden's interesting letter in your issue of December 15, I beg leave to give a few additional items about the Mhowa tree, a very old and well-known friend of mine. Nearly all the wild animals of the jungle are attracted to the vicinity of these trees during the flowering season. By day, parrots, minas, hornbills, pigeons, and other birds, keep up a perpetual motion and clamour as they flit about, darting round hither and thither, and hopping from branch to branch, feeding on the succulent flowers. As night falls, wild hog, deer of various kinds, and even jackals come to feast on the fallen blossoms, and not unfrequently the sloth bear and the big black bear meet beneath the odorous branches, and get almost tipsy on the intoxicating mass of withered blossoms which carpet the sward.

Attracted by such a surfeit of game, the tiger and leopard will often pay a prowling visit, and, therefore, every sportsman is keen to note the neighbourhood of a Mhowa tree, and every native Shikarree, or hunter, can tell with unerring accuracy in what parts of the forest they are to be found. This, of course, refers to the wild parts of the forests where population is sparse.

The tree is not unlike our oak in form, size, and the colouring of the foliage. It flowers in March and April. As the flowers ripen the corollas become fleshy and tinged with the juices they secrete; they then gradually loosen from the calyx, and, falling to the ground, are, in Central India, and in many other parts, carefully gathered by the women and children, the grass round the tree having been previously burnt off, so that none of the precious blossoms may be lost.

In my book on the Nepaul Frontier, p. 106, I make reference to the tree, and speak of the spirit which the natives distil from it, and have said, "The peculiar sickly smell of the mhowa, when in flower, pervades the atmosphere for a great distance round, and reminds one forcibly of the peculiar, sweet, sickly smell of a brewery.

The spirit distilled from the freshly-dried flowers is called, by the natives daru. It is usually diluted with from five to ten times its bulk of water, and is then sold at about a penny per quart. It is largely consumed by the lower caste natives, and, in times of severe droughtiness, when nothing better can be obtained, I have seen "Tommy Atkins" imbibing the vile-smelling potation in the bazaars, holding his nose meanwhile in mute protest against the too aggressive odour. "One hundredweight of flowers is said to yield from four to six gallons of proof spirit. The very carefully-distilled and rectified spirit, if put into oak casks, becomes of a yellowish colour with keeping, and is said to be little inferior to the best Irish whisky.

In France, after a long course of experiment, a means has been found of rectifying the spirit, and the bad smell is entirely got rid of. The result is very good alcohol. In 1884, I gather from the *Indian Agriculturist*, that mhowa flowers were exported to Marseilles for distillation, to the value of 6¾ lakhs of rupees.

"The oil is manufactured from the seeds by bruising, rubbing, and subjecting them to heavy pressure. It is a coarse sort of oil," says the authority I am quoting, "but in the manufacture of soap is largely used in the country, and also for candles. For that purpose it would be worth in England from £25 to £35 per ton. It has been tried by candle manufacturers, and pronounced very suitable and a valuable oil for such purposes."

The tree is a hardy one and even in poor ground flourishes well. It readily propagates itself by seedlings. According to Lieutenant-Colonel Miller, officiating Political Agent at Bhopawar and Commandant of the Malwa Bheel Corps, not more than 40 trees could be planted to the acre, and the yield per tree appeared to vary from about 120 to 240 lb. of flowers. If it be true that the flowers contain about half their weight in sugar, this would mean a yield of one or two tons per acre; but as Mr. Maiden justly says, the idea of mhowa sugar becoming a commercial rival to cane or beetroot is ludicrous. Mr. William Fox, F.C.S., of the laboratory, Great Tower-street, London, submitted the flowers to analysis with the following result:—Honey, 42·03 per cent; cane sugar, 1·04; ash, 2·32

cellulose, &c. 42·20; water, 12·41; total, 100·00. No grape sugar was present. He adds:—"It will be impossible to make ordinary or cane sugar from a substance yielding the above results. The sugar contained in the mhowa can only be utilised for brewing or distilling purposes. The flowers, I may add, are all male flowers."

Yet another authority writes thus:—"When dried, mhowa flowers rather resemble inferior figs. When fresh they have a sweet taste, but by no means agreeable odour. The fruit succeeds the blossom. It is about the size of a very small apple, and the kernels contain oil, which is of an inferior colour, and rancid taste, but is very generally used by the poorer natives for lighting purposes, as well as for cooking; and it is also applied externally as a remedy for wounds, sores, and cutaneous diseases generally."

Lastly, I may mention that I know, from my own experience, that the leaves and flowers, mixed with bamboo leaves chopped straw, dry grass, dry stems of maize or sorghum, no matter how dry, or old, or musty, forms a capital food for bullocks or stock generally, and in seasons of scarcity, the tree will withstand long continued droughts; it should be experimented upon, and attempts should be made to introduce its acclimatistation here. And this leads me to my et cetera.

Your London correspondent went too far when he spoke of "five mhowa trees yielding the same amount of sugar as an acre of sugar-cane." Nevertheless, the mhowa is a very useful tree. The leaves and flowers make an excellent fodder, as has just been stated; the tree itself is strikingly ornamental; it will grow in poor soil, and withstand long droughts and extreme heat. It is but a type of hundreds of other trees fit for "industrial culture in extra tropical countries," as Baron von Mueller terms it.—*Planter and Farmer.*

DESICCATED COCONUT.

It used to excite our juvenile wonder when we were informed as to the many uses to which the palm was applied by Oriental nations. That one single tree should in its various parts have so many virtues, and be capable of so many applications was almost incredible. But years have passed away since then, and such wonders have ceased to astonish. Were it not so the modern uses of the coconut would make us open our eyes. At one time a coconut was a coconut and nothing more. When its milk had been extracted, and its snow-white kernel eaten, there was an end of it, except as, occasionally the shell was transformed into a child's toy or a drinking cup. But now these simple uses are almost too rude and elementary to be mentioned at all. This versatile fruit performs for us so many services, and has, by the ingenuity of modern civilisation, been turned to such varied account, that very few, even amongst intelligent and educated people, would like to be compelled on the instant to pass an examination on the uses of the coconut. One of the forms in which it is most pleasantly utilised is that manufactured by Messrs. Linton, Hubbard and Co., 18 and 19, Red Lion-square, London, W. C., whose "Desiccated Coconut" ("Noix de Coco" Brand) is so largely used in manufacturing and culinary purposes. The Coconut Biscuits, which are so delicious, and have come into such great popularity within recent years, are made of this delicate and palatable preparation; all well-known biscuit firms use large quantities of Linton's Desiccated Coconut. It is also largely employed by chocolate manufacturers, and by confectioners generally in the production of those charming sweetmeats which have displaced to so great an extent the old-fashioned lozenges and sugar-plums that used to be the delight of our children. Beyond these uses, however, it is worth the notice of householders, refreshment contractors, and hotel-keepers, as supplying the material for a great variety of dainty dishes which cannot fail to be acceptable to the most fastidious tastes and stomachs. By its aid, for example, we can have a delicious Coconut Tart, or the most elaborate Coconut Meringue Tart; or it may take the form of a nutritious pudding, or custard, such as would tempt the appetite of the most delicate invalid and do much to supply the nourishment which such a person requires. Indeed the ease with which the "Noix de Coco" is digested, combined with the large amount of nourishment, renders it peculiarly useful in hospitals and for sick cookery everywhere. Again, it may take the form of a tasty and attractive-looking cake, or it may become a speciality of the dessert-table. What, for instance, do our readers think of this little recipe? "Place a layer of sliced oranges in a deep dish, sprinkled over with fine white sugar; then a layer of Noix de Coco; alternate orange, sugar and Noix de Coco, until the dish is full, heaping Noix de Coco on top." We commend the idea to those who may be on the look out for something new and nice wherewith to please their guests. Eaten with cream or milk the Noix de Coco form a delicious dessert without any special preparation, or it can be served in a variety of ways. We have indicated but very few. Any cook who is worth the name will readily find by a little experiment many effective modes of dealing with it, and will be glad to have added to her resources a material which can be so easily manipulated, and which will yield so much satisfaction at the expense of so little trouble.

This Desiccated Coconut or Noix de Coco, is prepared in various forms for manufacturing purposes and sent out in barrels of about 200 lb. each, also in 56lb., 28 lb., and 14 lb. tins. The Noix de Coco for making puddings, tarts, cakes, desserts, ices, &c., is also put up in very attractive, handsome decorated canisters of 1 lb. and ½ lb. each. Again, it is supplied in paper packages with attractive lable in cases of 24 1 lb. packages or 48 ½ lb. packages.

In closing our notice, we may say that Desiccated Coconut is also manufactured by several firms in New York, but the resultant product lacks the properties of Messrs. Linton, Hubbard and Co.'s preparation; as the American is badly adulterated with unwholesome compounds, and is made principally from rotten and stale nuts, which are bought for this purpose at a cheap rate; whereas the firm we are noticing use only the best nuts procurable. Two samples have been examined by us, and the one of English manufacture had a crisp snow-white appearance and pleasant odour of coconut, whilst the American sample was manifestly discoloured, and as manifestly not sweet. Our railway refreshment managers should certainly take note of Linton's Desiccated Coconut. We should state that this firm are the only manufacturers of this article in the United Kingdom.—*Railway Supplies' Journal.*

Successful experiments are said to have been carried on in the Island of Hawaii with tea plants from India and Japan, the latter variety being the better adapted to the soil. A large tea plantation is said to be proposed.—*M. Mail.*

Laudanum-Drinking Extraordinary.—A case of a woman who had for forty years been addicted to laudanum-drinking, and who consumed regularly half a pint of the drug, or ten ounces, daily, was reported to the Solihull Board of Guardians on February 9th as having been admitted to the workhouse. The medical officer was instructed to continue an allowance of the drug or stop it at his discretion.—*Chemist & Druggist.*

Tea.—In a conversation with an Officer who has been some 12 months in Burmah, we were surprised to find that there are several Tea gardens on the hill sides between Prome and Tonugoo in British Burmah. They are said to have been opened up by Indian Planters, and are now doing very well. There is a fair supply of labour at a low cost, and easy means of transport to Rangoon by either river or rail. Notwithstanding things are so unsettled in Burmah, many Englishmen are arriving in the country ready to open up trade or land. Some, we hear, have already hit upon a "good thing."—"Ceylon Advertiser."

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, March 3rd, 1887.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS
BEES' WAX, White	Slightly softish to good hard bright	£6 a £7 5s
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown	Renewed	1s a 3s
	Medium to fine Quill	1s 4d a 2s 6d
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s 6d
	Medium to good Quill	6d a 2s 6d
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s 1d
and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 6d
Long Ceylon	Middling to good	8d a 1s 4d
CINNAMON 1sts	Ord. to fine pale quill	7½d a 1s 5d
2nds	,, ,, ,, ,,	7d a 1s 2d
3rds	,, ,, ,, ,,	6½d a 11d
4ths	Woody and hard	6d a 9½d
Chips	Fair to fine plant	2¼d a 7d
COCOA, Ceylon	Bold to good bold	73s a 83s
	Medium	66s a 72s
	Triage to ordinary	25s a 45s
COFFEE Ceylon Plantation	Bold to fine bold colory	92s a 105s
	Middling to fine mid.	80s a 90s
	Low mid. and Low grown	75s a 80s
	Smalls	72s a 78s
Native	Good ordinary	67s a 71s
Liberian	Small to bold	58s a 68s
East Indian	Bold to fine bold	90s a 110s
	Medium to fine	80s a 90s
	Small	73s a 77s
Native	Good to fine ordinary	65s a 71s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£5 a £17
FIBRE, Brush	Ord. to fine long straight	£10 a £35
Stuffing	Coarse to fine	£8 a £17
COIR YARN, Ceylon	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £32
Do	Roping fair to good	£13 a £15
COLOMBO ROOT, sifted	Middling wormy to fine	10s a 28s
CROTON SEEDS, sifted	Fair to fine fresh	10s a 20s
GINGER, Cochin, Cut	Good to fine bold	75s a 5£ 10s
,, Rough	Small and medium	35s a 55s 6d
	Fair to good bold	30s a 58s
	Small	20s a 27s 6d
GUM ARABIC, Madras	Dark to fine pale	20s a 98s 6d
NUX VOMICA	Fair to fine bold fresh	7s a 11s
	Small ordinary and fair	3s a 6s
MYRABOLANES	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	5s 6d a 5s 9d
Pickings	Burnt and defective	3s 3d a 4s 6d
OIL, CINNAMON	Good to fine heavy	1s a 3s
CITRONELLE	Bright & good flavour	¾d a ⅞d
LEMON GRASS	,, ,, ,, ,,	1⅛d a 1⅜d
ORCHELLA WEED	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7¾d a 7¾d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO Lump	Fair to fine bright bold	9s a 14s 6d
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	3s 9d a 10s
dust	Ordinary to fine bright	3s a 9s
RED WOOD	Fair and fine bold	£4 10s a £4 17s 6d
SAPAN WOOD	Middling coated to good	£6 a £7
SANDAL WOOD, logs	Fair to good flavor	£20 a £44
Do. chips	Inferior to fine	£5 10s a £16
SENNA, Tinnevelli	Good to fine bold green	8d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2¾d a 4½d
TURMERIC, Madras	Finger fair to fine bold	9s 6d a 10s
Do.	Mixed middling [bright	8s 6d a 9s
Do.	Bulbs whole	7s 6d a 8s 6d
Cochin	Do split	6s 3d a 7s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 29s
2nds	Foxy & reddish 5 a 8 ,,	10s a 16s
3rds	Lean & dry to middling under 6 inches	7s a 12s
4th	Low, foxy, inferior and [pickings	4s a 8d

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS
ALOES, Socotrine and Hepatic	Good and fine dry	£8 10s a £8 10s
	Common and good	£4 a £7 10s
CHILLIES, Zanzibar	Good to fine bright	32s a 33s
	Ordinary and middling	25s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTAITONS.
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	11d a 11½d
	Common dull to fair	8¾d a 10½d
,, Stems	,, fresh	2½d a 2¾d
COCULUS INDICUS	Fair	9s
GALLS, Bussorah blue & Turkey ₱ cwt.	Fair to fine dark blue	59s a 65s
	Good white and green	48s a 51s 6d
GUM AMMONIACUM per cwt.	Blocky to fine clean	15s a 34s
ANIMI, washed, ₱ cwt.	Picked fine pale in sorts, part yellow and mixed	£13 10/a£14 1 0/ £10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden per cwt. Ghatti	Sorts	90s a 120s
	Fair to fine pale	38s a 80s
Amrad cha	Good and fine pale	90s a £7
	Reddish clean	34s a 68s
ASSAFŒTIDA, per cwt.	Clean fair to fine	35s a 40s
	Slightly stony and foul	25s a 30s
KINO, per cwt.	Fair to fine bright	40s a 42s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 100s
OLIBANUM, drop per cwt. ,,	Fair to fine white	45s a 55s
pickings	Reddish to middling	32s a 44s
siftings	Middling to good pale	13s a 17s
	Slightly foul to fine	11s a 13s 6d
INDIARUBBER Mozambique, red hard		2s 5d a 2s 6¼d
per lb. Ball & sausage white softish		2s a 2s 3d
	unripe root	10d a 1s 2½d
	liver	1s 8d a 2s

FROM CALCUTTA AND CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS
CASTOR OIL, 1sts per oz	Nearly water white	3½d a 4¼d
2nds ,,	Fair and good pale	2⅝d a 3d
3rds ,,	Brown and brownish	2¼d a 2⅝d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 6d
	Fair to good black	1s 11d a 2s 2d
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS
ALOES, Cape, per cwt.	Fair dry to fine bright	23s a 26s
,,	Common & middling soft	8s a 22s
Natal	Fair to fine	25s a 30s
ARROWROOT Natal per lb	Middling to fine	3d a 3½d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.	QUALITY.	QUOTATIONS
CAMPHOR, China, ₱ cwt.	Good, pure, & dry white	62s a 64s
Japan	,, ,, pink	
CAMBIER, Cubes, cwt.	Ordinary to fine free	32s 6d a 33s
	Pressed	29s a 30s
Block [per lb.	Good	21s 9d a 22s
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb	61's a 80's, garbled	2s 9d a 3s 9d
Medium	83's a 95's	2s 6d a 2s 8d
Small	100's a 160's	1s 4d a 2s 4d
MACE, per lb.	Pale reddish to pale	2s 3d a 3s
	Ordinary to red	1s 10d a 2s 1d
	Chips	1s 5d a 1s 6d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	6d a 9d
SAGO, Pearl, large, ₱ cwt.	Fair to fine	11s a 14s 9d
medium	,, ,, ,,	11s 6d a 13s
small	,, ,, ,,	10s a 12s
Flour [per lb.	Good pinky to white	8s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine	2¾d a 2¾d
Singapore	,, ,,	2½d a 2¾d
Flour	,, ,,	12s 6d a 17s 6d
Pearl	Bullets, per cwt.	26s a 27s
	Medium ,,	21s a 22s
	Seed ,,	21s a 22s

CEYLON UP'COUNTRY PLANTING REPORT.

LOW PRICES FOR THE CEYLON NEW PRODUCTS IN LONDON—SATISFACTORY RESULTS OF A CINCHONA PLANTATION AND BARK ANALYSES—THE WEATHER : ? ROMISE OF RICH HARVESTS.

28th March 1887.

The late news that tea was down 2d a lb. all round; that cinchona had dropped ¾ of a penny; and that cacao was receding in value was pretty good for one week. The only comfort is that that kind of thing can't go on, but a little of it goes a long way. In these days there is really more excitement in tropical agriculture, than in a gambling table; and although the planter's life is supposed to be a quiet one and his daily occupation void of the fever of commerce, still his waters are troubled now and again, and the fluctuations in the value of his products are so violent, as to upset his calculations and make him feel that ordinary forethought goes for little, and that to be in a state of preparedness for the time he would need to be a prophet or seer of some kind. If the mantles of these long-headed fellows could be imported for the rise of the planting community what a run there would be on them, and what a comfort it would be to get into one.

As an example of the upsetting of a basket of eggs the following figures which are authentic, tell their own tale. Eighteen months ago, there was a parcel of renewed succirubra bark about, 5,000 lb. in weight, sent to Colombo, which showed by analysis the fine outturn of 4·35, and was sold at R1·45 a pound. The Manager of that place was more than delighted with this fine result, and for the last year-and-a-half he has guarded and cherished those trees, as he would an Eldorado. He shaved them again the other day, with hope in his eye, and a vision of funds cheering his heart, and harvested quite as much as before. But from the time he parted with his bark he has had no comfort, for the analysis came up showing 2·20 as against the former 4·35 and whereas the old price had been R1·45 a pound, the broker valued the parcel in Colombo, at 34 cents if sold at once, and he recommended that he should sell! It is when you extend these figures that the superb beauty of the contrast is shown thus:—

5,000 lb. sold 18 months ago..	..R7,250·00
5,000 lb. from same trees worth today..	1,700·00
difference.. ..	..R5,550·00

In this Jubilee year it is perhaps as well that things should be "done handsome" and there is no one will dispute that the figures above are a step in that direction, as a record of the "downs" which the Ceylon planter is subject to—the "ups" he takes more philosophically. I suppose there is nothing specially unique in this, others might tell similar tales. It must, however, be a comfort to the growers of cinchona, that if the experience which I have just chronicled is to be looked for, the export of bark will fall off in time, for it would lead one to believe that one has but to keep one's trees long enough to find them worthless. The behaviour of the manager under his severe disappointment is worthy of all praise. He did not swear at the analysts, as some people do, nor, take up his parable against "those Colombo fellows" which is always a relief to the heart of the stricken planter. No, he sat for a time speechless in the gloom of his depression, and by-and-bye consoled himself with music, for which there are historic precedents. The instrument which is his favourite in his darkest hours is the penny tin-whistle, it is easily learnt, and can be carried about without trouble, and, as he says, "if things go on like this, one never knows what one may have to do to get a living." I suggested that perhaps he might teach his dog to carry "a tinny" in his mouth, for if he succeeded he could then laugh in the face of adverse fortune. When I left him his spirits were steadily rising, and this spite of produce declining all round: but the dog was on his haunches.

This "tropical winter," which was broken a few days ago by welcome rain, seems to have set in again with great intensity. Everywhere there is blossom and flower, and a promise of a rich harvest of fruit. In the matter of coffee, alavanga pruning is evidently going out, and the old methods are being reverted to. But the bug, will that keep away? It is about, and in pretty strong force in some places; but you have to look for it, as the black fungus, which is its baneful shadow, seems to find a difficulty in developing in these dry days, and attention is in consequence less liable to be directed to the presence of the plague. If we are spared an infliction of the pest—and even with that our place would still not be among the highly favoured, as we have plenty of other things to bother us—the coming crop of coffee may be expected to be better than we have had for some years.

PEPPERCORN.

LETTERS FROM JAMAICA:—No XVI.

WEATHER AND CROPS—BANANA CULTIVATION—BUILDINGS.

Blue Mountain District, January 1887.

DEAR SIR,—Since I last addressed you the weather has improved, but it is not yet as settled as could be desired for the "curing for market" of our lower field crops. The weather is very cool, cloudy and pleasant, with occasional light showers, but the sun does not shine continuously all day long: yet when it does come out it seems very fierce for the time of the year. This month usually brings cold winds and hot sun, as it does in Ceylon, and an occasional "Norther," one of which visited us on the 18th-19th and was very strong indeed, and must have done a good deal of damage in exposed places. What causes these occasional wind-storms puzzles me, unless it be the absorption of air into some place where evaporation is constantly occurring.

Crops, judging by my own *lower* fields, have been very good for settlers, especially as they are getting 7s a tub (two Imperial bushels) for their cherry coffee, the price in London being still 64s per cwt. for ordinary Jamaica coffee in bags. What prices will eventually be realized by those who are buying largely, must be causing anxious qualms, for it all depends on the Brazil crop; for if news came of better supplies down would go the market, but we must hope Brazil has seen its best days as regards its slave-grown coffee, and that the West Indies, and other producing countries, will once more have "a good innings."

Three miles farther on brought us to our destination, "Water Valley." We passed some banana walks and sugar-cane fields, all looking very fine, for St. Mary's and Portland are considered the best soil for bananas as well as for sugar, the land being very rich and fertile. During our visit we rode one day into Annotto Bay: it is a mere hamlet as to size and houses, but there is a fine church, a court-house and police-station, barring the Fort and the old Dutch houses. It reminded me somewhat of Matara, as there are no less than three rivers emptying themselves into the

sea, in this scattered township, like our Ceylon back waters. Another excursion was to Port Maria, the "capital" of the Parish: this is as yet the prettiest spot I have seen in Jamaica; picture to yourself a very pretty Bay, with a small islet in the centre, overhanging cliffs, a deep blue Mediterranean Sea, so that were it not for tropical surroundings one might be supposed to be in Cornwall, or Guernsey. Indeed the country for some miles before reaching Port Maria has quite an English look, favouring our Sussex and Surrey hill slopes, and the splendid pastures in which cattle, sheep and stock generally are seen browsing so contentedly. Of course, the sugar, the palms and the bananas break the "home spell;" nevertheless it it is all very pretty. From the Rectory, situate on a hill overlooking the bay and town, the sight is very picturesque: you thence look down upon the pretty Church close by the sea, the fine Court-house, the police station, Wesleyan Chapel, and clean-looking little town, well supplied with water, and boasting two or more fountains. Beyond is a second small Bay or cove; here we lunched and could have fancied ourselves back at Kalutara, or Bentota, as we sat under the shade of the cocoa-nut trees, the waves almost washing our feet. Another visit I paid was to "Claremont," once the residence of the East family (of Tom Cringle's Log fame) in the grand old times; fancy an upstairs house which as you ride up to it, recalls memories of the Pavilion, Kandy, though perhaps not quite as large, but the lower story uninhabited and fast going to decay. These old Jamaican "Nabobs" (to use an Indian term) lived like princes. This property some thousand acres in extent was bought not so very many years ago for £500, house and land full of valuable log wood, trees, and valuable also as a capital grazing pen, and Banana "walk;" but good parochial roads is Jamaica's great want to enable planters to get their produce safely and cheaply to the shipping ports. This log wood, together with the bananas, has been the mainstay of many sugar planters, since prices of sugar fell so very low. It grows, as I have already stated, indigenously and £1 10s. a ton can be cleared off it, delivered at the wharf. As to sugar not paying, I was told it could be produced for about £10 a hogshead, nearly its present value in the market; but when the rum is taken into account it becomes a valuable factor, as it can be produced at a profit of £5, a puncheon, thus leaving the planter something at least to live upon. In good seasons, bananas are also very profitable, yielding all round about £10 the 100 bunches; the price is highest during the summer months up to August. But in all tropical countries one must be prepared for damage by storms floods and hurricanes, and when they are out they sadly damage the planters' prospects. Still we should not grumble for even European countries are subject to like contingences. Witness the late dreadful gales in England which have done so much damage to shipping, and gardens and horticulture generally, branches of fine trees being broken down by the heavy weight of snow.

W. S.

CHINA TEA AND ITS RIVALS.

The cultivation of the tea plant is extending so rapidly, and is being commenced in so many countries, that the Chinese tea growers will have to look seriously to the improvement of their stock, and the Chinese Government will equally have to see that the export duties upon the leaf are not made so heavy as to serve to place it at a disadvantage in its competition with the tea of India, Japan, Java, Ceylon and South Africa. That the product of China is gradually losing ground in the English market, and its place being taken by its younger rivals will be seen by a glance at the imports into the United Kingdom during the past three years, which are as follows:—

	1884.	1885.	1886.
	lb.	lb.	lb.
China tea ..	140,284,000	136,523,020	140,610,749
Japan tea ..	84,000	72,760	51,200
Java tea ..	3,586,000	3,345,020	3,946,110
India & Ceylon tea	67,152,000	66,862,614	83,465,164

Thus, while the total British import has grown from 211,106,000lb. in the year 1884 to 228,073,223lb. in 1886, the increase in China tea is represented in 1886 by only 326,749lb. and in 1885 there was an actual decline in the import of 3,760,980lb. During the same time the import of Indian and Ceylon tea has increased by nearly twenty-six and a-half million pounds. Last year, too, South African tea made its first appearance on the English market, some 5,000'b. having been imported. The land under tea cultivation both in Ceylon and India is meanwhile annually increasing greatly, and it is now seriously proposed to start tea gardens in Burmah. A correspondent of one of our Rangoon contemporaries, discussing the project, says that a market would be found on the spot for all the tea that could be produced, and there would be no necessity for exporting any of it for many a year to come. "The climate and soil," he adds, "are favourable to hybridising, and in this way important improvements in quality would probably be accomplished, and the outturn per acre would soon compare favourably with that obtained in the best tea-growing districts of India." The only serious difficulty in Burmah would be the labour question, but this difficulty would not long stand in the way, seeing the vast supply of surplus labour so easily obtainable from the adjoining provinces of India. The probability is therefore that in a few years more Burmah will take a place among the tea-producing countries, and be one more rival to China. The idea of starting tea plantations in some of the Malay States has also more than once been mooted, and is pretty certain to be carried out at no very distant date. The Chinese tea-planters will therefore in real earnest have to look well to their interests. Sir Robert Hart has already administered one much needed warning that the foreign tea trade will slip from their grasp unless they make serious efforts to retain it, and the Chinese Authorities have recognised the importance of the question by issuing a proclamation to the tea-growers, setting forth the necessity of maintaining the standard of their production, but warnings on such matters are little heeded as a rule in China, the anxiety of the producers being generaly limited to the requirements of the moment. Chinese agriculturists take little thought for the morrow, and they are not only essentially conservative in their methods but greatly prone to kill the goose that lays the golden eggs. In Indian tea plantations science is brought to bear to improve the stock and to facilitate the drying and curing processes; while in China the methods of a century back are still employed, and no effort is made at improvement. The result is a complaint of deterioration of the teas, and their gradual displacement in the British markets by the carefully picked, sorted, and cured teas of India and Ceylon. The latter are also making their way in the Australian colonies. The export of Indian tea from Calcutta to Australia and New Zealand in 1886 was 1,539,530 lb. as compared with 1,867,925 lb. in 1885, and 1,029,463 lb. in 1884. In 1885 the import was rather too suddenly increased, being almost doubled, but that the leaf has grown greatly

in favour there is evidenced by the large increase last year. A few years ago the Australian Colonies drew their entire tea supply from Foochow, and the fact that the Indian leaf has found so good a market there ought to be a significant hint to the tea planters of Fohkien and Chekiang, who have so long enjoyed almost a monopoly of the Australian demand, that this monopoly is at an end and that in order to hold their ground they must carefully maintain the quality of their Congous.—*Hongkong Daily Press.*

INDIAN TEA IN THE FUTURE.

It must be a matter for anxious thought with man. Indian tea planters at the present time,—and particularly with those in hill districts, where the yield is small, and the produce lacking in strength —whether tea will pay in the future, considering how low prices now are, and the improbability of any improvement for some time to come. Supplies have been, as far as possible, kept off the market, but prices have continued to droop, and, on the 4th instant, they stood in London at levels of which there had been no previous experience. "Fannings" of Indian tea were worth 7½d per pound at the beginning of March in 1884, and last year, at the same time, they were quoted at 8½d; but on the 4th instant the price was 5¼d. Indian pekoe was worth 1s in March 1884 and 1886, but on the 4th instant the quotation was only 9¾d. The "recent movements" are said to show "very satisfactory results" as regards the consumption of Indian and Ceylon descriptions. During last month the deliveries of these descriptions in London amounted to nearly 7 2-5ths millions of pounds, or an increase of 1¾ millions as compared with February 1886. So the lower the price the greater the consumption of Indian tea. That tea planting properly conducted under suitable conditions, is a profitable enterprise, even with low prices, is abundantly proved by the dividends paid by the Assam Company, and others, as the result of last season's working. Prices for the lower classes of Indian teas have probably reached their lowermost level, though it would not be surprising if the finer kinds should experience a further decline. What sort of prospect then is held out by a consideration of the figures available? The total shipments of Indian and Ceylon teas for the present season may be put at not over 85 millions of pounds whilst China exports may be reasonably calculated at say 5 millions less than last year, in other words at 135 millions. Taking Java at 8 millions, and sundries at 2 millions a gross total is obtained of 230 millions of pounds. It is admitted that consumption has largely increased, but can it be expected to do so in such a ratio as to dispose of the quantity of tea which estimates for the future show? In the way of extension, thousands of acres have been opened in the last year or two in Assam alone; Ceylon planters talk of tea *et proeterea nihil*; whilst even Java adds some millions to its yield, according to present forecasts. It is not wonderful, therefore, that tea planters speculate anxiously as to their position in 1890. Estimates naturally vary greatly, but some approximate idea may be formed by a careful consideration of probabilities. It should be under rather than over the mark if Indian tea at that date is set down at 90 millions, Ceylon at 35 millions, and Java at 10 millions. Certain sanguine spirits have even predicted that the Ceylon yield will be nearer 60 millions than 30, by that time, but that is an exceedingly hopeful estimate. Taking the above as approximately correct, the rivals of China and Japan will aggregate 135 millions, as against the present 93, an increase of 42 millions in three years.

In spite of all efforts that have been, and may be made in the direction of new markets, consumption cannot possibly keep pace with such an increase in production, and the weakest producer must go to the wall. There seems to be no doubt as to who that weakest producer is, as India's Celestial competitor has already shewn unmistakable signs that the pace is too severe for him, and that the more it is increased, the further he will drop behind in the race China tea seems to be in much the same position with regard to Indian as cuprea bark from South America occupies with reference to Indian bark. In the latter case, when the value of the unit of quinine drops below 6d. it does not pay to send cuprea bark to the English market, though, low as prices are, Indian planters can yet dispose of any stem bark at a profit in proportion to its quality. In the same way, now that Indian tea prices have dropped to what was formerly the China level, the latter country has to retire more and more from competition. The question is, allowing for such an increase in consumption as will take off a fair proportion of the estimated increase in yield, with a sufficient quantity of China tea be forced out of the English market to allow of prices retaining their present position? It seems probable that medium class teas, such as sell at present at 8d. to 1s. 2d a pound in bond will suffer most, as they will be the ones to come most into competition with the average China tea. It cannot pay, as it is, for the Chinese to export to England their lowest classes, considersng the tax which is levied on every pound before it is shipped, thus at once placing it at a disadvantage as compared with the lowest classes of Indian tea. Really fine classes of tea have always held their own well, and such kinds from India and Ceylon, with their superior strength, have little to fear from Chinese competition. Still, the pressure in the market may lead China to make strenuous efforts at retaining her position, either by finer plucking, thereby making finer teas, and a less quantity, or by abolishing her tax on tea. The latter is unlikely; in fact, a heavier tax was proposed not long ago, and the idea was only relinquished because of the urgent representations that any additional increase of taxation would reduce the already minute profit to a vanishing point, and practically put a stop to the trade. The first supposition is more probable, and if it is thoroughly carried out, it would mean a drop in fine teas corresponding to what may now occur in medium classes. But an effort was made by China in this direction at the beginning of the present season, in consequence of influential representations, principally from the London trade, though so far without much success in inducing better prices. Machinery, freedom from local taxation, and careful management are in favour of the Indian planter; he is prepared for the struggle for existence which has already begun; and any proprietor of a good garden under proper care need not fear the result. For those, and they are too many, whose plantations are indifferent, their yield poor, and their means insufficient for proper cultivation, it would be the truest wisdom to give up at once, and look out for some pursuit which is not likely to present such a marked example of the survival of the fittest as, in all probability, tea planting in India will do at the end of a few years.—*Madras Mail.*

THE COW PEA AS A FODDER CROP.—The cow pea is one of the most valuable fodder plants for the South. We have seen a crop of peas which yielded four tons to the acre of most excellent fodder, and it left the ground in the best condition for sowing wheat. Another farmer sowed peas among his corn, at the last ploughing, covering them with the plough, and we should estimate the yield on the ground, of both crops, at a ton and a half of corn fodder, and forty bushels of peas, with the corn equal to thirty-five or forty bushels to the acre, and a large quantity of pea straw, which makes good feed. The common opinion that the South is not a stock country, is entirely unfounded. With the long growing season, the really rich, but badly managed soil, and the great variety of fodder crops and feeding stuffs, it is not at all exaggerating the matter to say, that beef cattle can be reared to one thousand pounds weight in three years, at a cost of one cent per pound live weight, and in addition, there is a large quantity of manure left, which is really invaluable to the Southern farmer.—*American Agriculturist.*

PONDICHERRY STEAM PRESSED GROUND NUT OIL.

The comparatively sudden development of the ground nut traffic in Southern India has opened out markets for the oil which but a few years ago were not dreamt of, and Pondicherry has, from the early beginning of the oil trade, taken the lead in the Indian export markets. Last year's crushing operations were restricted, owing to the unusually high price of the nut, caused by a heavy export demand throughout the whole season, and also by a decreased supply arising from inundation damages to the crops. In 1884, the total crop was estimated at upwards of 80,000 tons. Nearly 70,000 tons were exported in bulk and in oil from Pondicherry alone, and this year's yield is expected to exceed 100,000 tons, about nine-tenths of which will probably find its way to Pondicherry. Just now, however, there is a depression in the trade, in consequence of the exceptionally low quotations at Marseilles; still, there are buyers at growers' prices —mostly, as yet, for crushing and for shipment in shells to Coast ports, Calcutta, Burmah and the Straits. It is calculated that, at R10 per candy at the place of growth, cultivators can realise a fair profit so that, at the present rate of R16-12-0 per candy, either the producer, or "middle men" or both, must be making extravagant profits. Last year the price touched R22, and kept at above R20 for the greater part of the season. The rapid devlopment of the ground nut industry is traceable, in a great measure to the comparatively easy method of cultivation. Beyond the sowing and gathering of the crop there is nothing to be done; it requires no watering, and needs no tending, and, as the coolies who collect the nuts are paid in kind, the capital outlay is limited to the mere cost of labour for scattering the seed. Within the last year or two, and notably from the beginning of the present year, nearly all the Eastern Coast ports and Calcutta, Rangoon, Moulmein, and the Straits. have been regular buyers of the Pondicherry oil; even at the current high rate of the nut, it can be manufactured and sold at about one rupee per imperial gallon. The ground nut oil trade is as yet but in its infancy, and the cheapness and purity of the article, together with its unquestioned general usefulness as a *cuisine* commodity, must cause a steadily increasing demand for it.—*Madras Mail.*

TEA CULTURE IN SOUTHERN STATES OF AMERICA.

BY MRS. D. WALKER.

In one of last year's numbers of the *Gardeners' Monthly*, I gave an account of the success of our tea plants, which this autumn are profusely covered with bloom and buds. The bushes have much increased in diameter, are perfectly healthy, strong and vigorous with dark heavy foliage. They seem impervious to drought and floods, and vie with our native evergreens in beautifying the garden.

Now, about planting the seeds collected last year from our own bushes. The ground where they were to be planted was thoroughly mulched, the soil naturally being very sandy. The seeds were dropped on the ground and left uncovered. No further care was given, the weeds for the whole of the past season not being removed.

And this time, there are a hundred or more fine thrifty plants covering the spot; proving, indisputably, that tea can be grown in this State, and surely such an industry should not be overlooked. What difficulty could there be in importing some Chinese who are accustomed to the manipulation of the leaves; and, in short, understand the proper process of preparing the tea for market?

Assam and other East Indian teas are largely imported into Europe, and commonly drunk. There can be no doubt as to their excellent flavour. While in England this summer, I drank Assam tea every day, and thought it much superior to our ordinary black tea, for which we pay (retail) $1·10 per pound.

Another fact is worth reporting. In England, the duty on tea is twelve cents a pound; here there is no duty, and good tea is far more expensive than abroad.

[This note is very acceptable as keeping before the community a topic it is apt to forget. There is no reason for doubt that the tea plant will grow as well, and produce as good tea in portions of the Southern seaboard States, as in China. The whole question is reduced to one of cost of production. The introduction of Chinese labor would not help the question in the least. All experience has shown that every new locality must be a law unto itself. In the early history of vine-growing in America, it was thought essential to import vine dressers from the vineyards of Europe. Their art was of no value here, and vine-growing was not a success until we cut loose wholly from the experiences of the old world. The most successful vineyardists of to-day never saw the old world. And this must be true of tea culture. When some enterprising young man shall take hold of the tea question, note well just where its weaknesses are, and go resolutely to work to strengthen these points, tea culture will be one of the most profitable industries of theSouth. And that person and that time will surely come.—ED. G. M.]—*Gardeners' Monthly.*

THE SPONGING SEASON AT BAHAMAS.

An old and valued contributor to this paper, now Governor of the Bahamas, sends to this month's *Fortnightly Review* an excellent description of those islands, and we shall be surprised if the varied allurements which Mr. Blake holds out do not cause some of his friends to go over and pay him a visit. Among other things he describes the sponge fishery.

"From October to July the sponging season is in full swing. There are over five thousand men and boys engaged in the fishery, each schooner carrying a crew of five to seven. The sponges are found all over the banks, which vary in depth from two to four fathoms. The fishing is managed on the share system, the crew being thus directly interested in the success of the voyage, which lasts about six weeks. Arrived on the ground, the small boats, of which each schooner carries two or three, put off, manned each by two men, one of whom sculls, while the other, armed with a thirty-foot pole, bearing at the end a double hook, lies extended over the bow, and examines the bottom through a "sponge glass," or bucket with a glass bottom. Laying this upon the surface, everything below is seen as clearly as if no water intervened. Even in fifteen and twenty fathoms the bottom can be clearly seen and examined. The sponges when found are hooked up by the armed pole, and as soon as the schooner's deck is filled she sails away to a "ranche," where she deposits her now evil-smelling load in a "crawl," or enclosure of wattles in shallow water, where it remains for a fortnight, during which the crew are fishing for a fresh cargo. On their return all hands enter the crawl and beat out the now-rotted fleshy part of the sponge, which, when first gathered, presents the appearance of a round mass of dark indiarubber freely perforated. When the fleshy part has been thoroughly removed and the marketable skeleton washed, the heap is laid on h ore in a secluded spot, while the lot that has taken its place remains in the crawl, and the schooner starts again for the sponge banks, At length enough has been gathered and cleaned to load the vessel, when the sponges are sorted by the crew into glove, reef, lambs, wool, grass, &c., and each kind separately strungs in rings of from one to two dozen. In this way they are sold by auction in the sponge exchange, when the first step of the preparation for the consumer is carried out by the sponge merchants. The sponges are exposed to the sun to improve the colour. They are then clipped and all irregularities and pieces of shell or rock removed by the clipper, and once out of his hands they are, so far as the Bahama sponge merchant is concerned, ready to be pressed in bales and exported.

It would be a good thing if all Governors of the Queen's dominions abroad sent to Mr. Escott equally readable accounts of the countries which they rule. It is well known that they are not as a rule overburdened with work.—*Pall Mall Budget.*

CASUARINA EQUISETIFOLIA.

We think the fashoinable fad of Bengal Forest Officers in laying down the general principles of forestry as they hold good in India according to their lights, a great waste of time. Most of the conclusions arrived at are erroneous and must be productive of on little mischief. Forestry is an eminently empirical science, consequently its general principles must be derived from actual experience, and until we have a sufficient store of experience, it is of no use to attempt publishing a general hand-book on forestry as applicable to India. If the object is, on the other hand, to give the general principles of forestry as applied, say to France or Germany, it would be much better to translate one of the leading hand-books of those countries on the subject, or, if necessary, to translate extracts, rather than to attempt the production of a faulty book, which gives itself the appearance of being based on Indian experience, whereas in reality all the difficult points on which Indian experience is wanting are studiously passed over in silence. Our remarks are called forth by some astoundingly incorrect statements which are given as matters of fact in the work of a Bengal Forest Officer who is considered an authority on most planting matters. This gentleman discourses on our well-known Casuarina in the following amazing terms: "the *fabulous* growth of the *Causarina equisetifolia* reported from the Madras Presidency, which, however, is still an *exotic*, &c." Why "fabulous" and why an "exotic?" This leads to the consideration of another assertion on the same subjet which can only be propped up by a maintenance of the most extreme views with regard to acclimatization, or to speak more correctly, lasting introduction, namely, that a permanent and independent position in the new country's flora, like the American Water-weed in English canals or the Australian Wattle (*Acacia Dealbata*) on the Nilgiris. Accepting any definition short of this, *Casuarina equisetifolia* is not an exotic. Though we cannot positively assert that natural reproduction may be reckoned on in a Casuarina plantation, we have good grounds for believing it, at least in the ordinary climate of the Mysore plateau and North Arcot District, beyond which our observations have not extended. In the Bangalore plantations it has been planted pure and made unprecedented growth, which we submit, is a crucial test, the more so as the rainfall seems to be very irregular in most of them. It is certain that in Mysore generally the tree seeds plentifully and produces a crop of seedlings wherever the ground is in a fit state to raise them. Hardihood is a test of successful introduction, and here no arborial species can surpass it over so large an area. Growing magnificently along the sandy shore of the Madras coast, it is quite at home and makes excellent growth on the hard loams and inland climate of Eastern Mysore whence it extends West with its graceful pine-like foliage, in a country where no Conifers are, into a damp climate where few of its late companion species can follow it. At Cotacamund, with a mean yearly temperature a few degrees above that of London, the same wonderful tree turns up again. We may well parody a trite saying by describing it as "all things to all climates."—*South of India Observer.* [If *Casuarina equisetifolia* grows well in Ootacamund, it surely ought to flourish at our highest elevations in Ceylon. What is the highest elevation at which it has been tried. There are species which grow well at high altitudes for a few years and then die out. –ED.]

THE USES OF LIME.

Lime should never be ploughed under, but kept as near the surface as possible. Your directions are precisely right; viz., "spread it evenly in a finely pulverized state and diffuse it well in the soil by harrowing. That is the proper practice, and it is exceedingly rare that when lime is thus used it is not found to be of great service to the crops, especially clover and grass. And as clover and grass are—so to speak—the underpinning of a successful rotation, this is exceedingly important. But farmers are much aided by reasons why things are thus or thus, and minute directions how to secure certain conditions. Now, I would like to give M. P. R. not only my experience during several years, but reasons why lime is useful, and directions how to procure the requisite finely pulverized condition, and its intimate diffusion in the oils.

First, there is a good deal of misapprehension regarding the effect of lime as a fertilizer. It has long been, and now is—by many persons—thought to be a stimulant to the soil, and, therefore, a dangerous substance to use. This is by no means true. It is partly true, and as it contains a little truth, it is, like a little knowledge, a dangerous thing. Lime is a direct and indispensable plant food. This is evidently proved by the following figures, showing the percentage of lime contained in the ash of—

Clover	27 to 40
Potato vines	39 to 46
Turnip leaves	32
Rye straw	7¾
Corn stalks...	10½
Pea straw	38
Hop vines	17
Tobacco	37

Moreover, there is not a plant or any part of a plant that does not contain more or less of lime; this is not surprsing, when it is considered that as animals feed upon plants, and the bones contain about 50 per cent in round numbers of lime; and if the soil is deficient in it, of course the plants do not thrive, and cannot, however much of the other needed elements of plant food the soil may contain. For if one is deficient, the plants cannot make use of the others. The lime also must be soluble, and it is only soluble practically in a caustic or fresh state, and is practically insoluble in its mild or carbonized state. For instance, if a small quantity of fresh lime be put into a barrel of soft rain water, the lime is dissolved, and the water becomes hard; but if a large piece of marble, which is carbonate of lime, be put into the water, the lime is not dissolved, and the water remains soft and pure.

Second, lime is not only a plant food of itself, but it has a strong decomposing action upon fresh organic matter in the soil, and quickly reduces it to a condition in which it is available as food for plants; moreover, it aids greatly in what we call the nitrification of organic matter; that is, the development of nitric acid from nitrogenous organic matter, and the formation of nitrates in the soil, which can be taken up by plants. This is the way in which it is supposed to act as a stimulant; but wrongly so. It is rather an exhaustive agent in the soil, because it rapidly makes soluble and available organic matter, which would otherwise remain longer in the soil, and only become available slowly. Lime is therefore a most valuable addition to a richly manured soil, or to land that is rich in vegetable matter, as newly reclaimed and drained swamps. But caution must be used to feed such a soil well, as—to use a familiar simile—its powers of digestion are very strong indeed and it calls for more food in proportion.

Third, lime also exerts a chemical action upon the mineral particles of the soils, dissolving their silicious surfaces which hold potash and phosphoric acid, and freeing these invaluable substances so that they can be appropriated by the roots of the crops. This is not an exhaustive process, because it is exerted upon an inexhaustible store of material, and as long as any soil remains, this process can go on without danger of exhaustion.

Lime is, therefore, useful in any soil in which it does not already exist in a soluble condition. It is more useful, perhaps, upon stiff clay soils, because it loosens and opens them, and makes them porous and gives admission to the air, than upon sandy soils. It is most useful upon the feldspathic and micaceous clay soils, or sandy loams, because these minerals contain from ten to eighteen per cent of potash, insoluble without the help of lime. It should also, therefore, be used in the finest possible state of division, which is secured by air-slaking, and be most intimately diffused in the soil, that its action may be as effective as possible.—*Southern Planter.*

COCONUT FIBRE.

It was Linnæus who first called the Palms the "princes of the vegetable kingdom," but it has been reserved to writers of the present day to designate the Coconut and the Palmyra respectively the "prince of Palms;" which of these two plants, however, is most entitled to the term it is difficult to say for we read that the Palmyra (Borassus flabelliformis) has been immortalised in a poem in the Tamil language, and though 801 uses of the Palm have been thus recorded the list is by no means exhausted. Whether it be possible to enumerate so many uses for the Coconut Palm (Cocos nucifera), I have not been at the trouble to inquire, but I venture to believe that for sterling value as a commercial plant the Coconut can compete any day with the Palmyra, or any of its allies.

It would seem that with a plant so well-known as this, and about which so much has been written, nothing now remains to be said. It is an old story to be told that the outer husk yields coir; that the inner hard shell can be, and is generally carved into ornamental cups; that the kernel of the nut itself is edible when fresh, and that it yields large quantities of oil when dried. These are facts known to all who know a Coconut when they see it, and what schoolboy is there who is not acquainted in some way with this familiar nut? But each one of its uses might be dilated upon, and to use an oft-repeated term, "volumes might be written" upon each; but our business at present is only with the husk, apparently a minor portion of the Coconut, commercially considered A glance at the engraving, however, will show that a large trade must be centred about these "unconsidered trifles," and that such is the case, I shall endeavour to show by briefly recording what I saw on a visit to the Coconut fibre works of Messrs. Chubb, Round & Co., situated in the West Ferry Road, Millwall. This firm is one of, if not the largest importers and manufacturers of Coconut fibre, and their stock of material, which is well shown in the engraving, is a very striking sight. The enormous heap of husk—which, indeed, is known in the locality as the "mountain"—comes upon view immediately upon entering the premises, and one can scarcely, at first sight, realise the fact that the enormous pile is composed entirely of these apparently useless portions of the fruit. At the time of my visit this reserve stock of husks was estimated at considerably over a million and-a-half, and presented an appearance as shown in the engraving (fig. 186), which is from a photograph taken by Mr. John G. Horsey, only a week or so previously. Before proceeding to describe the various processes through which the husks pass to convert them into marketable material, it will be well to say something about the nuts themselves.

Coconuts, or as they are generally termed in the trade Coker-nuts, to distinguish them from the Theobroma Cacao, which furnishes cocoa and chocolate, are shipped principally from Trinidad, Jamaica, Demerara, Tobago, several of the other Leeward Islands in the British West Indies, Ceylon, Belize (British Honduras), all round the coast of America, and the Fiji Islands; the quantity landed in the United Kingdom being about 12,000,000 yearly. Nearly all the nuts are imported in the husks or outer covering from which, on arrival, they are stripped by men using two fine-pointed steel chisels, and who, by constant practice, become so skilful in the art that many are able to open 1,000 to 1,200 nuts per day. The nuts themselves after being removed from the husks are generally sold to wholesale fruit dealers, who, in turn, supply the retailers. costermongers, and others, but they are likewise often sold under the hammer at public auction.

After removal from the husk they are sorted into seven sorts or varieties, known respectively as large milky middle size, small, starters, milky growers, green, and dry. Those from Trinidad are the sweetest in flavour, and are mostly preferred by the manufacturing confectioners, biscuit-makers and others, though the Ceylon nuts run them very close in quality. Coconuts are largely used in the North and West of England, and they are also in great demand at holiday times, at fairs, on race-courses, and such-like gatherings in all parts of the kingdom. The husks, after the nuts have been cracked, are stacked in the yard in the open air, as shown in the engraving, until they are required for conversion into fibre; for this purpose they are first passed singly through a powerful "crusher," or "back breaker," driven by steam power, with large revolving corrugated wheels which flatten the husks, and to a certain extent make them more pliable; but after this severe pressure, so springy is the nature of the husk that, somewhat like a sponge, they immediately assume their original shape on emerging from the crusher. They are then thrown into huge stone tanks, each holding many thousands, where they undergo several hours' steaming and soaking. Great care and skill are required to know how long to keep them in the tanks, husks from different countries requiring more or less time according to circumstances, such as age, thickness of outer cuticle, substance of fibre, and other peculiarities known to the manufacturer. In the tanks the husks swell considerably, and have to be kept down by heavy pressure. One of the tanks filled with husks is shown in the centre of the engraving.

After the husks are sufficiently soaked they are ready for the mills, which are technically known as "Teasers" or "Devils," and consist of cylinders or drums, each being studded on the outer circumference with about 3,000 fine or thick 3-inch steel teeth, specially tempered. The mills vary slightly according to certain requirements. They are driven by steam, and revolve with great rapidity, requiring the utmost care and constant attention of the workmen. Each husk is divided longitudinally into thin pieces, and each piece is passed into the mill separately by the workman between two steel rollers, the workman retaining a firm grip of it so as not to allow it to pass out of his hands, but the few moments he holds it there, the drum with its numerous steel teeth is revolving and combing out the irregular fibre and refuse. After one half of the slice of husk is thus cleaned the workman reverses it passing in the other half. The continual feeding of these mills gives such strength of wrist and dexterity to the workmen that what appears a very dangerous operation is gone through with wonderful rapidity, and each slice of husk is passed through three of these mills in succession, occupying but a few seconds from the time that the crude husk is passed into the mill until it comes out a perfectly cleared bundle of light brown separated fibres; these bundles are next laid out in drying rooms on heated iron tables to perfectly dry them, when they are ready for making brushes and brooms of various kinds.

But to return to the mills. It will be seen that the principal attention has been given to the long clean fibres used for brush-making, but there are other products to which I have not yet alluded. If a coconut husk is cut through transversely, it will be found that immediately under the outer woody coating the long brush fibres, if we may so call them, are deposited to the thickness of about half-an-inch; nearer the centre, and immediately surrounding the nut, the fibres are more irregular, somewhat matted, and mixed with soft brown refuse. In the process of passing through the mill and separating the brush fibre, this finer fibre and refuse is thrown out at the back, from whence it is collected and placed on elevators, and carried automatically into the mouths of double rotary screens, or "willows," peculiarly made for the purpose, a spindle fitted with arms or roads running the entire length, and after many revolutions and much tossing about the fibre is separated and falls out at the lower ends clean and ready to be dried. This fibre is used for matting, and is not only supplied by the firm in large quantities for mat-makers, but also to the Government for mat-making in prisons; it is further largely used for stuffing mattresses, saddles, &c. The refuse, by a special process of the present proprietor, is separated into two different qualities, the ordinary coarse kind being used for

general horticultural purposes, and the granulated for conservatory use and potting.

Enormous quantities of this Coconut fibre refuse are produced by the firm. A heap is shown behind the tank in the engraving, and I was imformed that it was no uncommon thing for them to despatch 20 tons in one consignment, and that the material is sent to all parts of the world, including America, Africa, Australia, Sweden, Germany, France, Holland, &c.—the latter countries using it extensively for bulb growing. It is not a little remarkable that this refuse Coconut fibre should, in some cases, find its way back in a changed form to the countries from whence the nuts were originally brought.

In conclusion, I have to acknowledge my indebtedness to Mr. Thomas Nevell, the present proprietor, for his kindness in allowing me to inspect the works, for his courtesy in personally showing me over them, and carefully explaining the details of manufacture; as well as for much the information contained in this paper.—JOHN R. JACKSON, Museum, Royal Gardens, Kew.—*Gardeners' Chronicle.*

INDIAN CATTLE AND SHEEP.

In a country such as India, where the agriculturist and the carrier depend almost entirely on bullocks for doing their heavy work, special attention, one would think, should be paid to the breeding of animals fitted for draught purposes. But with few exceptions the natives seem willing to allow natural selection to work unhampered, forgetful that Nature at best works slowly, and that much may be done to aid her by the judicious selection of breeds, and careful crossing. Now that interest is being shown in the improvement of Indian agriculture, and that the introduction of new ploughs, which do something more than scratch the surface, renders it necessary to have powerful bullocks, the ryots are beginning to appreciate the importance of improving the breed of their cattle. Of course it will take many years before much will be really done in this direction, still it is encouraging to see that even a few are willing to take steps to make use of the facilities offered by Government for improving their stock. The plan recently approved of by Government for purchasing sires, and placing them in selected tracts, ought, before long, to lead to a marked improvement in the breed of cattle in the selected districts. The proposal is to open a central depôt in the South Arcot District, where a number of selected stock animals could be kept; these, when of suitable age, would be distributed through the district, or districts, chosen for the experiments, in the same way as is now done with stallions in the Coimbatore district.

If this scheme is to work successfully, it will be necessary for district officials to exhibit some sustained interest in the matter, for we have by no means as yet got beyond the stage in which a little interest shown by one in power acts as a strong incentive to work in the way desired. If this interest is to be an intelligent one, the district officers must themselves know something of the subject, and fortunately the necessary imformation is ready at hand in the second edition of Deputy Surgeon General Shortt's work on Indian Cattle and Sheep, which was recently published.* This little book gives a tolerably full account of the various breeds of cattle and sheep which are either indigenous to India, or have been imported from other countries, along with practical instructions as to their management, both in health and in disease. The Indian ox, we are told, is still met with wild in some parts of the country, but we fancy it must be very rare. The only two instances of its being shot, which Dr. Shortt seems able to mention, are in 1843 and 1848, and these dates are rather a long time ago. The last case we remember to have heard of was one in which a sportsman after having, as he thought, obtained a specimen of this rare animal, learned, to his chagrin, that he had shot not a wild ox, but one which had been turned loose in the jungle some years before as being too old for work. In any case, they are so rare that they can hardly be considered an important branch of Indian cattle. Of the cattle of the Madras Presidency, the most important are probably those of Mysore and Nellore. The Mysore bullock is from twelve to fifteen hands in height and is celebrated for his spirit and powers of endurance. The Amrit Mahal herd is said to date back to the time of the Hindu Government, but its special development for transport service was due to Hyder Ali, who, by introducing a breed of cattle from the Trichinopoly district, and crossing them with the indigenous Mysore stock produced the Hallikar breed, which is generally reckoned the best of the various breeds in the country. The importance to Hyder Ali of this superior type of cattle for transport purposes was very great. They enabled him, for instance, to march 100 miles in two days to relieve Chilambram, and, after a repulse, to draw off his guns in face of the enemy. The Duke of Wellington, when on service in India, experienced the value of this herd, and during the Peninsular war, as his despatches show, he often wished that he could have had Amril Mahal cattle with him in Spain. An interesting account of the management of these herds is given by Dr. Shortt, but it is not brought up to date, the historical account ending with 1871 since which time various changes have taken place. The Nellore breed is famous rather for dairy purposes than as draught cattle. They grow to a very large size, sometimes reaching a height of as much as seventeen hands, and when well bred, they can draw very heavy loads. As milkers they are much sought after in Madras, and some have been known to yield as much as eighteen quarts of rich milk in twenty-four hours. First class animals consequently fetch high prices in the market, cows selling for R200 each, and bullocks for from R150 to R350 per pair. Bulls have been bought for importation into other districts at R300 to R350 each. Various attempts have been made to obtain improved breeds by crossing the better kind of cattle, and considerable success has been met with, especially by the introduction of cattle from Guzerat, Aden, and England. But much yet remains to be done in this direction. The efforts hitherto made have been chiefly spasmodic, and carried out by individuals having no permanent interest in the country. Dr. Shortt complains greatly of the want of interest shown by the ryots—"why, they argue, should they trouble themselves about improving their cattle, which will cost money when they have none to lay out, while, by following the practice of their forefathers, things take their natural course?" This, doubtless, represents pretty accurately the opinion of a majority of the ryots, but it is by no means true of all, for many are showing a distinct and growing interest in improved methods of agriculture as is proved, amongst other things, by the large numbers of European ploughs that have been sold in the Presidency during the last few years.

Turning now to the subject of sheep, we find that Nellore comes well to the front again. The Nellore sheep is the tallest in India and, well fed, will weigh from 80 to 100 pounds when alive. In Coimbatore there is a wool-bearing breed of sheep, and though small, these fatten well and yield a mutton which is probably as good as any that is to be had in India though it is closely approached by some obtained from Mysore, where there is another breed of wool-bearing sheep. The latter breed furnishes the chief fighting rams in India. They are very pugnacious, and not only butt furiously, but also use their forefeet, and at times even bite. During Sir Mark Cubbon's time of office there was an experimental sheep farm at Heraganhalli, under the charge of a European Commissariat subordinate officer. For this farm merino rams were imported annually from Australia, and the distribution of the cross breeds raised from these has improved the sheep throughout the country to a marked extent, as regards both size

* *A Manual of Indian Cattle and Sheep, their Breeds, Management and Diseases*, by John Shortt, M.D., V.S., F.L.S., F.L.S., &c. Second Edition, Higginbotham & Co., Madras, 1885.

and quality of mutton and wool. The farm was given up in 1863 because it did not pay its working expenses, but such expenditure as this is repaid to a country over and over again when the experiments are so evidently successful as they have been in the case of Mysore. We have not touched on the parts of the book connected with the treatment of diseases and accidental injuries: Dr. Shortt's reputation is a sufficient guarantee that this will be found satisfactory. But there is one feature of the book which we cannot speak of with the same satisfaction, and that is the illustrations. How an author could be persuaded to allow his book to be disfigured with such dreadful lithographs we cannot conceive. We do not deny that the characteristic features of the animals are, in many cases, reproduced, but anything less artistic we have seldom seen. Many of them are taken from photographs in which the picture has been blurred by the motion of the animal, and the lithographer has reproduced this blurring. We are quite aware of the difficulty of getting a book well illustrated in Madras, but if it was impossible, on account of the expense involved, to get wood-cuts from home, we think it would have been better to omit them altogether rather than to disfigure with them an otherwise valuable book.—*Madras Mail.*

FROGS do no manner of harm in a garden, and are probably the gardener's best friends. The food of the frog is wholly of an animal character, consisting of slugs, worms, and insects of nearly every kind.—*Indian Gardener.*

DISINFECTANTS.—A great deal of disappointment may be experienced if people do not realize that deodorizing substances, and even antiseptics like green vitriol, are not true disinfectants. They have their advantage in removing evil odour, or checking putrefaction, but they do not necessarily kill the germs on whose life and activity many epidemic diseases depend. Destruction by fire of infected material, and where that is not practicable, chloride of lime is the best germicide for general use.—*Indian Gardener.*

SOIL CULTIVATION AND INSECT PESTS.—"At the time of the discovery and early settlement of this country," (United States,) says Prof. J. A. Lintner, "the number of insects existing in the soil was very small, but, with the cultivation of the ground this number was increased, until now there are thousands of insects, which destroy vegetation. Aside from the increase by cultivation the number has been added to by grubs and worms imported with grain from foreign countries. There are 9,700 different kinds of coleopteræ or beetles and 200 kinds of insects found in apple trees. In the Palæozoic age there were 625 kinds of cockroaches."—*American Grocer.*

VARIOUS substances have been used to make stoppers for bottles that will replace corks, and paper has formed the basis of many of these. We now have a more novel use of paper in the drug business in the form of paper bottles. The difficulty of making them waterproof has been overcome, as well as their tendency to be affected by spirits of any kind. The only difficulty that remains is that they must be made in halves, and be joined together after taken from the moulds where they have been enduring a severe pressure, and where the albumen of some of the ingredients has formed an impenetrable protection, and it only requires that some deserving mechanic eliminate a pulpy alloy that can be used as a solder. —*Planter and Farmer.*

DIFFICULTY OF BREATHING CAUSED BY PELARGONIUMS.—The *British Medical Journal* for November 28th contains a note on difficulty of breathing produced by *Pelargonium grossularioides*, by Dr. G. Bidie, Deputy Surgeon General, Madras. Dr. Bidie says that the odour which the plant gives out after rain &c., is agreeable to most people, but that in the case of a lady who came under his observation it immediatly produced dyspnœa. As the plant was in flower at the time, it was thought that the pollen grains caused the trouble, as in hay fever, but on experiment it was found to be due to the effluvia of the leaves. Whenever plants were brought near the lady she was affected by them, and when out driving or walking she would announce the presence of the enemy when the plant could not be seen by the eye, and whilst other people could not smell it until their attention was directed to it. This is, therefore, a new example of an "idiosyncrasy of olfaction."—*Indian Gardener.*

BEVERAGES OF BARBARY.—Besides wine from the grape, whose preparation calls for no special notice, there is a kind of "palm wine" or *lakmi* furnished by the sap of the date palm (*Phœnix dactylifera*). Trees in full vigour are selected for tapping. If the life of the tree is to be sacrificed, the incision is made so as to destroy the terminal bunch, but more generally the tree is to be preserved, and in that case the cut is kept clear of the terminal bunch, and is carried round the stem. The juice escaping from the wound is conducted by a reed into an earthenware pot (*karreri*), and may amount to nearly two gallons daily at first, gradually sinking to about half that quantity towards the end of the tapping, which is seldom allowed to exceed a month. The collection being terminated, the incision is carefully plastered up with clay, and after about two years, with irrigation, the tree will resume fruit bearing. Much of the "wine" is drunk fresh, when it resembles sparkling cider, but becomes insipid after losing its carbonic acid. Its colour is opalescent and milky. After undergoing alcoholic fermentation, it contains 4·38 per cent of alcohol 0·22 carbonic acid, and 5·60 of mannite.

The Moors make extensive use of a spirit prepared from the water in which comb is boiled in treating beeswax. This water, being impregnated with honey, is allowed to ferment, and is then distilled; the spirit is called *maharya*. It is flavoured with aniseed or with *naffa, i. e.*, fennel acid (*Fœniculum dulce*),—*Journal of the Society of Arts.*

STIMULATING AGENTS IN GERMINATION.—Allusion has already been made to different means of hastening the germination of seed, such as breaking the shells, soaking in very hot water, or even boiling for a short time. There are some substances which appear to exercise a stimulating effect in the germination of seeds and the future growth of the seedlings. Camphor, a vegetable product itself, appears to possess this property in an extraordinary degree. Indeed, it has been averred that camphor has the power of revivifying seed, or at least of causing them to germinate when ordinary treatment failed. Benjamin Smith Barton was the first to point out its action upon plants at the end of the last century; and a few years ago a Mr. Vogel, of Munich, carried out a number of experiments with camphor on old seeds. Controlling experiment, were conducted simultaneously, ordinary water being employed instead of camphor water. Seed of Cress three or four years old, treated with ordinary water, germinated very imperfectly and long after sowing, while that moistened with camphor water germinated quickly; that four years old in twenty-four hours, and that three years old in seven hours. Radish seed, which is usually regarded as useless after it is three or four years old, was tried seven years old, and in germinated in four days, or in a much shorter period than good fresh seed under ordinary favourable conditions. Seed of the Pea eight years old germinated in forty hours, and many other old seeds treated with camphor water exhibited equally rapid germination. Some that would not germinate at all under ordinary treatment, had their germinative force revived by camphor. Other seeds, Clover for instance, appeared to derive no benefit from the solution of camphor; but where it acts its influence is not limited to germination, but is extended to the subsequent growth. Humboldt discovered that chlorine accelerates germination, and acts as a restorer where the vital force is almost exhausted or quite lost, so far as the usual method of treatment is concerned. This must be used in a highly diluted form; about two drops of an aqueous solution of chlorine in 2 oz. of water. Iodine and bromine are said to possess similar qualities. Acid and ammonia salts in very small quantities in the water have been found to hasten germination, but they have not the power of reviving seeds.—*The Garden.*

EXPORTS OF INDIAN TEA AND OTHER PRODUCTS IN TEN MONTHS: 1886-7.

Today concludes the Indian revénue year, and in about six weeks hence we may look for the Annual Report of the Customs Department. Meantime it may be interesting to look at some of the items in the accounts for the ten months ended January, which are before us. And first as to tea. The export of the Indian leaf in pounds for ten months of three years has been

1884-85	...	...	...	58,381,000 lb.
1885-86	...	...	...	63,887,000 ,,
1886-87	...	...	...	73,37,000 ,,

It will be observed that the increase in 1886-87 over 1884-85, is not less than 15 millions of pounds. Of the quantity exported in the latest period of ten months, the proportions were 71,559,000 to the United Kingdom; 1,420,000 to Australia and less than 100,000 to the United States! To other countries went 258,000, so that out of 73¼ millions of pounds of Indian tea exported, only 1¾ million pounds were diverted from Britain. The local consumption of Indian tea is usually taken at 2 millions of pounds, but China tea continues still to be imported, some to be consumed and some to be "re-exported to Afghanistan and other foreign States bordering on India." The figures for the ten months were :—

From China	...	...	2,663,000 lb,
Other countries	...	...	572,000 ,,
		Total...	3,235,000 lb.
But in foreign merchandise exported we find tea given at...			1,557,000 ,,
		Retained ...	1,678,000 lb.

The export of Indian tea direct from India to the United States has averaged only about 100,000 pounds for the ten months of the three past years, the figures really showing a decrease from 150,000 pounds in 1884-85 to 99,000 in the latest period. Exports to Australia have fluctuated, but on the whole increased, beginning with 1,066,000, rising to 1,621,000 and going down to 1,420,000. We observe that the 73¼ millions of pounds exported are valued for Customs purposes at R44,177,000, or somewhat over 8 annas per lb. average.—Turning now to coffee, we find that contrary to the process in Ceylon, there has been a steady though not large increase in the periods of ten months, thus :—

1884-85	..	..	206,000 cwt.
1885-86	..	..	211,000 ,,
1886-87	..	..	245,000 ,,

The total export for the 12 months will probably range about 275,000. Of foreign coffee (from Aden to Bombay, no doubt), India imported in the three periods, 34,787; 14,000; and 19,666 cwt. In the case of India, it cannot be doubted that a much larger proportion of the coffee locally grown is locally consumed than is the case in Ceylon. Of the foreign coffee imported, the following quantities were again exported :—13,600; 5,000; and 4,000 cwt. We think it quite probable that the total coffee crop grown in India is fully 400,000 cwt., of which 125,000 cwt. is locally consumed.—The export of coconut oil from India has gone down rapidly and largely, thus :—

1884-85	..	..	1,054,000 gallons.
1885-86	..	..	916,000 ,,
1886-87	..	..	770,000 ,,

The export of cardamoms has, with fluctuations, increased, thus :—163,000; 234,000; and 210,000 lb.

The same may be said of cinchona bark, the exports being fractional compared with those of Ceylon. The returns are 411,000; 656,000; and 568,000 lb. It is clear that even now and allowing for the bark used up for manufacture and experiments, private properties have but added little to the bark from the Government gardens. The exports of bark from India in the year are not likely to exceed 700,000 lb., the total produce being probably under a million. The exports of unmanufactured coir have sunk to insignificance, thus :—14,000; 7,000; and 9,800 cwt. It would appear that now nearly all the coir is manufactured, for the figures for the article in this shape (excluding cordage which is mixed up with jute and other rope), show up thus :—175,000; 155,000; and 170,000 cwt. But manufactures of coir (again excluding rope) were imported thus :—9,700; 11,000; and 11,666 cwt. The exports of coconuts from India are, as might be expected, very small, ranging from 213,000 to 117,000 and 164,000; but copra was exported thus :—15,000; 21,000 and 8,800 cwt. Coconuts were imported at the rates following :—15,129,000; 11,500,000; and 14,058,000; while the increase in the imports of copra has been very large :—38,100; 92,400; and 106,000 cwt. The import is mainly from Ceylon, we suppose. Besides paddy or rice in the husk, which is not shewn separately for Ceylon, the exports of rice to our island have been :—

	Quantity. Cwt.	Value. R.
1884-85	.. 2,447,000	8,588,000
1885-86	.. 2,565,000	10,024,000
1886-87	.. 2,450,000	9,222,000

The increase in the exports of wheat from India has been marvellous,—from 13,000,000 cwt. to 19,416,000 cwt. and 21,172,000 cwt. The total export for the 12 months will probably be 25 millions of cwt., against somewhat less than 20 millions of rice. Arecanuts, or, as they are termed in these accounts "betel nuts" are classed, curiously enough, as spices, and some of the facts embodied are curious, one being the much higher valuation placed on Ceylon nuts than on those from the Straits. For instance 11,533,000 pounds imported from Ceylon in the 10 months are valued at 1,546,000 rupees; while 14,417,000 of Straits nuts are down for only R1,387,000. As Penang derives its name from the arecanut, we were prepared to find the Straits the great source of supply of this masticatory. Sumatra adds a fair quantity. Out of 26,820,000 pounds imported in the 10 months, less than half was contributed by Ceylon, but our produce gets credited for more than half of the whole value. Notwithstanding local manufacture of febrifuges, India still imports quinine, some of it, we suppose, prepared in London from Government bark. The figures for the three periods are :—10,707 lb., R519,772; 11,004 lb. R416,672; 9,320 lb. R282,165. Cinnamon has no heading in the imports, but cassia lignea (coarse cinnamon from China) figures for 13,255 cwt, 12,290 cwt, and 24,315 cwt. Castor oil is an important item in the export trade of India, the quantity for ten months being 2,339,000 gallons, valued at R963,000. "Mica" (commercially called talc) having recently attracted attention here we may say that in the ten months the exports from India were 780 cwt. valued at R191,700. The exports of linseed have averaged 8 millions of cwt., the value ranging about R47,500,000. The duty levied on rice has ranged about R1,000,000 or, say, R1,500,000 for the 12 months. This is the only export liable to duty, and the only imports so burdened are salt, liquors, opium and a few other articles,

PEARLS IN COCONUTS.

A correspondent writes :—"I am somewhat surprised that the fact has escaped you that this subject was fully discussed in the Ceylon *Observer* some years ago, with extracts given, if I recollect aright, from the Straits or Java papers. If such a fact as the occasional occurrence of pearls in coconuts existed in Rumphius' time it was sure to be recorded by this most excellent and industrious writer, and the statement made by your correspondent that Rumphius alludes to this fact is likely to be correct. You will find Rumphius' *Herbonium Amboinense* in 6 folio volumes in the foreign list of books in a shelf in the north end of the Colombo Library, and a glance at the index at the last volume, and another at the description of the Coconut given in double columns, one in Dutch and the other in Latin, will very soon enable you to see if Rumphius has alluded to pearls in the coconut. If this be a fact the hackneyed expression 'and this accounts for the milk in the coconut' may be changed into 'the pearls in the coconut.' And why not Pearls in the Coco Nut?"

On which we have to remark that we hope to refer to Rumphius in due time and if, as we suppose, from the statement made not by "our correspondent," but in a quotation from a Java newspaper, the accomplished Dutchman did refer to concretions in coconuts, we feel quite certain that instead of asking "Why not pearls in coconuts?" he noticed the phenomenon as exceedingly rare and very curious. And for this reason,—that, unlike the pearl-bearing shells, which are formed of carbonate of lime and have the power of secreting that mineral to any extent, the coconut has the slighest possible amount of lime in its composition. "The milk in the coconut" is first highly saccharine and then as it coagulates highly oleaginous, and true pearls can be formed neither from sugar nor oil. We are quite prepared to learn that the concretions on analysis differ entirely in composition from the nacre of which pearls are built up. We have no recollection of this subject of pearls in coconuts having been discussed in our paper but a very vivid remembrance of our having quoted, only to cover with deserved ridicule, a paper in the transactions of the Straits Asiatic Society by a Mr. Dennys in which people in this nitneteenth century were asked to swallow the outrageously unscientific statement that grains of rice shut up in a box developed into life and then became pearls which increased in size with efflluxion of time! That we believe, was substantially the story, which even the most pronounced evolutionist could not swallow. The question we should now like to ask of men like Mr. W. H. Wright, Mr. W. B. Lamont, Mr. Jardine, Mr. Piachaud and other coconut planters, is, "Have you, in all your Ceylon experience, seen or heard of so-called pearls in coconuts?" *We have not.*

HINTS TO FRUITGROWERS.

Mr. James Inglis, M. L. A., delivered a lecture in the hall of the School of Arts, Paramatta, on the 9th Dec. to the members of the Cumberland Fruitgrower's Union. The hall was well filled by the more active members of the Union and others interested in the great industry of Central Cumberland. Mr. John Nobbs occupied the chair. We extract from the report of the *Cumberland Times* the following portions of the address:—Mr. Inglis said that when he was contesting the election for New England—which he had the honour to represent in the Parliament of New South Wales—the slogan or war-cry of his party was "Auld Scotland for New England." He told them it was his intention to avoid prolixity; but, at the same time, he intended to take his audience with him on an imaginary journey of 25,000 miles; and if in that journey he did not weary them, he would return to the starting point and deal with matters which might be more immediately connected with the Central Cumberland Fruitgrowers' Union. He expected great things from the Union. Those interested in the fruitgrowing industry had hitherto been a heterogeneous mass of incoherent atoms, each pulling in opposite directions; but now they had determined on unity of action. The importance of the fruitgrowing industry it would be difficult to overestimate, and the large possibilities involved in it, and the immense proportions to which it might attain, were already attracting the attention of outside nations. The importance of fruit from an economic, sanitary, and dietetic point of view, was pointed out, and extracts quoted from the *Journal of Health*, showing how valuable an aid to health would be the substitution of fruit as an article of diet for the messes of bacon and grease with which the majority of the people were in the habit of regaling themselves. There was no more wholesome and nutritious article of diet than a peach, nor anything more delicious; nor could anything be more conducive to health than substituting cooling sub-acid fruits in the dietary scale for the different kinds of animal food which constitutes the staple diet of the country. The medicinal value of various fruits was also pointed out, and the watermelon was instanced as an example of a natural febrifuge and diuretic than which few were more valuable. The only caution to be observed was to see that the fruit was fresh and ripe. It was a frequent reproach, levelled against the people of New South Wales, that they were lagging behind in the race for national pre-minence. For this some assigned one reason, some another. One said Jennings-Dibbsism was to blame, another said free trade was the cause of it; but there existed an universal consensus of opinion that there prevailed among the people of New South Wales a certain sluggishness of character and temperament which invited the rivalry and quiescently submitted to the attempts of more energetic if less favoured nations to distance this colony in the race for national pre-eminence. With respect to the rival systems of free trade and protection, he had the courage of his opinions, and, like most Scotchmen, held a tolerably good opinion of himself. He did not intend to approach these subjects in any gingerly fashion, with his fingers encased in plush-tipped silken gloves. The man who considered protection to be a panacea for all political and social evils must be either a bigot or a fool. The cry for protection was neither more nor less than the wail of sluggish eneptness—the puling cry of those whose want of Anglo-Saxon stamina was betrayed in every evidence that surrounded them of their want of capacity to take advantage of the opportunities which bountiful nature had lavished upon them, and who contented themselves with praying to Jupiter, instead of throwing off their coats and setting their own shoulders to the wheel. Having himself boundless faith in the potentialities of the fruit-growing industry in New South Wales, he desired to impart a little of that faith and fervour with which he was filled to the members of the Fruitgrowers' Union; and, in order to do that, he would endeavour to show them what was done in countries where fruitgrowing took the place to which its importance entitled it among the industries of the people of those countries. He had been 12 years in India, had been through

Afghanistan, Persia, Abyssinia, and along the shores of the Mediterranean, and he could assure them that among the wild tribes of Afghanistan the fruitgrowing industry was pursued in a way which not only outvied but outdid modern European culture, whether regard were had to national manner or scientific method. The Afghan was an arrant thief, dirty, loud-smelling, and treacherous, as all Asiatics are: but as brave as a lion, as we had on more than one occasion found to our cost. The lecturer than went on to describe how the mountain men of Afghanistan, filthy and unkempt as the specimen he had told them of, made annual journeys from their mountain valleys in caravans of camels, loaded with dried fruit, which they sold to the inhabitants of the thickly-populated plains of India, leaving here a bale and there a bundle, until when they reached Calcutta they realised enormous prices for their merchandise. The natty way in which the semi-barbarous Afghans brought their fruit to market was compared with the slovenliness with which fruit was treated in New South Wales, from the hour it was gathered to the time it reached the hands of the consumers, in a condition more calculated to inspire disgust than to excite appetite, very much to the disadvantage of the latter. The fruit-markets in the bazaars of Asian cities were described and compared with the abomination which does duty for a fruit-market in Sydney, and the Union was adjured to use every effort, and never to rest satisfied until a building was erected in keeping with the admirable site now occupied by the market shed, a building worthy of their noble industry and their splendid city. Many practical hints were given to growers how they might, by introducing productive trees for break winds, instead of the unproductive hedges in vogue, add to their profits, and the pistachio, chestnut, walnut, almond, hazel, egg-plant, and several species of *terminalia* were instanced as suitable for the purpose, and for the products of which there was an unlimited market. The potentialities of the fruit industry were illustrated by reference to the Vale of Cashmere, to the Khanates of Central Asia, Merv, Herat, Khiva, &c., and all along the banks of the Oxus, where fruit constituted an important staple of the food of the people. There the value of irrigation in fruit-growing was seen to the greatest advantage, and their fruit was put to a use which the people of New South Wales might well take a lesson from. They had there a method of mixing the pulp of fruit with the kernels of nuts, melon seeds, and camels' milk. This was pressed and formed into a cheese, which, when properly made, would keep for years, and which improved with age, and was highly nutritious and wholesome. He had, without exaggeration, walked up to his knees in masses of egg plums fallen from the trees in a New South Wales orchard, and which the owner had not even the wit to convert into pork by turning the pigs in to eat. Now, had a daughter of the household turned to and run the pulp of these through a sieve, and converted it into a fruit cheese after the manner of the Central Asians, it would have prevented waste, which was to him, of all things, most hateful, and turned the plums into a wholesome article of diet. The fruitgrowing interest in California was next glanced at, and the amazing results of irrigation, by which the desert had been made to literally blossom like the rose, was dwelt on at length. The vastness of the possibilities lying before the union was illustrated by the growth of the trade in America, and statistics showing how rapidly that trade had been evolved from small beginnings. India he considered to be the nearest and best market for Australian grown fruit, although he could see no good reason why fruit should not be shown in Covent Garden market within 50 days of its being gathered in a Central Cumberland orchard. Having proved his position by incontrovertible figures, Mr. Inglis said:—Before I conclude, let me say one word about the shameful neglect of manuring which largely prevails throughout the colony. If you desire that your children should develop into specimens of humanity like William Beach, you will not begin by stinting them in their food. If fruit trees are to be kept in a state of prolific health, something must be returned to the soil for what is abstracted from it by every successive crop of fruit; and in addition to all that I have told you, ineffectively I fear, because hurriedly—but you have been such kindly attentive listeners that I have been impelled to go on and to cover a more extensive ground than I had originally intended—if you desire your union to become a powerful means for the populsion of the colony in the pathway of progress, let me recommend you to cultivate some of the old-fashioned, but not on that account less valuable characteristics of sterling manhood, such as self-reliance, thrift, industry, and manly uprightness of thought and action, avoiding pretence, evil speaking, and fraud in all its multifarious phases.

SILK.—Recent experiments have resulted in a use being discovered for the wild silk plentifully found in the valley of Kyushu, and a company is being formed to work up the material, which is found to be well adapted for mixing with cotton and wool. The silkworm lives on maple trees and produces a large cocoon.—*American Grocer.*

A LARGE amount of sago has been exported of late, owing to the immigration of Brunei sago-workers, and to the seasonable rains which enable the producers to float down the numerous tributaries of the Padas and Klias Rivers the sago in its raw state. The price of Sago Flour in Singapore, has risen from $2·07 to $2·18 per picul, and this has given fresh impetus to the industry. When the price is quoted at $2·50 per picul, the enterprising Chinese Sago-factory managers will according to agreement made two years ago, willingly pay a small stipulated increase of Royalty to the Government on both the raw and manufactured material.—*Borneo Herald.*

A NEW FODDER.—The Assistant Director of Agriculture in Burma, about this time last year, in reply to some inquiries from the Military Department with reference to the fodder supplies of Burma, recommended the cultivation of crab grass. He has just published a report on the system of cultivation then recommended, which was adopted this season at the Kyauktau farm, and gave an outturn of nine tons per acre for the first cutting in July, whilst another cutting can be made in October. The first cutting can either be used as green fodder or preserved in a silo, whilst the October cutting can also be cured as dry hay. The hay that was made last October kept in excellent condition until the rains commenced this year. This grass is but little valued in India, whilst in America it is much valued as a hay crop, and is still more valuable in Burma, as it gives twice the amount of grain and also an extra cutting. In Burma it grows to the height of about three feet, and horses and cattle of every kind eat it with great relish, and will remain in good condition if fed on it without any other grain. Its cultivation appears to be very simple, as the land only requires to be ploughed twice at the beginning of the rains with a turn plough, and then harrowed twice with a triangular harrow, when the grass will germinate of its own accord.—*Calcutta Englishman.*

All the fruits that grow with a pit, a core, or with seeds, can be made to grow without them, when it is understood, says the *Live Stock Record*. It is accomplished by reversing the scion—rooting the top end of the plant. To do this you bend the scion to sprout down and cover with dirt. After rooting, cut it loose and let the root end be up. Apples are grown without cores, peaches without seed, and grapes and other vines also, by simply reversing the plant.—*Southern Planter*.

Tea.—In the course of a recent discussion at the Society of Arts, Captain Temple mentioned a fact which should commend itself to the attention of Indian tea-growers. The natives of India, said Captain Temple, were very fond of tea, but they liked a peculiar quality, which was ascertainable by the people who grew it. He had himself seen in the Kangra district a native owner who made a tea estate pay because he supplied the kind of tea which the people of the Punjab like; whereas the European tea planters did not do this, and while they were complaining that they could not find a market, this native grower was making a good thing.—*Pioneer*.

Ceylon Arrack.—At present distillers manufacture for home consumption principally; would they be able to meet a large demand for export? Our inquiries tend to show that they would not, at least for some time, because the supply of the toddy is limited and their apparatus imperfect. Moreover, before the spirit is fit for export it must be much more carefully rectified, and stronger than it is made at present. The expense required to effect these improvements would bring the price up to at least 2s per gallon in the Ceylon market. The additional charges for freight, &c., would bring the price on the English market to about 2s 6d—quite a prohibitive sum in these days of cheap German spirit, which is placed on our market at about 1s 6d per gallon, duty unpaid. We refer more particularly to spirit suitable for manufacturing purposes, but we should be pleased to learn that our calculations are excessive. It is far better if we have to import such products that we should secure our supplies from our own dependencies, and we at present undoubtedly obtain from Continental distillers much of the spirit that we use. If Ceyon is able to compete with them, it is not too late to begin.—*Chemist and Druggist*.

On the subject of fertilizers Messrs. Edward Packard & Co., of Ipswich and London, have issued a circular to West Indian planters, in which they say:—"We have much pleasure in directing your attention to the following facts in connection with our manufacture of specially prepared fertilizers for the West Indies. The differences of climate, soils, period of growth and system of cultivation between those colonies and home, and, as regards many of those conditions, between one colony and another, materially affects the composition of the fertilizer best suited to meet the requirements of the planter, and to give an adequate return for the outlay of capital. Although manure manufacturers are well informed upon the question of fertilizers for home crops, grown in a few months, they are often at considerable disadvantage when preparing them for the very different conditions of tropical agriculture. With a view to placing ourselves in the best position to formulate really suitable fertilizers, we have secured the services of Mr. George Hughes, F.C.S., as our consulting chemist for the West Indies, knowing that he has had long and practical experience upon these important points. We have also consulted Mr. J. McCarthy, F. C. S., Chemist to the Government of Trinidad, especially in reference to our cocoa manure, and the formula those gentlemen have determined upon will be carefully adhered to by us. All manures will be sold under distinct guarantee, and all exports will be accompanied by Mr. Hughes's certificate of analysis of a sample authentically drawn at the time of shipment. Under these conditions we trust we shall be favoured with your esteemed orders for the new year, and take this opportunity of expressing our hope that i may bring better times to those interested in the success of our West Indian Colonies."—*Home and Colonial Mail*.

Indian and Ceylon Teas.—Although the supplies of Indian tea continue to be much smaller than during the earlier weeks of the year, they are apparently amply sufficient to meet the present limited requirements of the trade. Prices have been irregular, and the depreciation in values has in some instances made further progress. As was to be expected with such a preponderance in the supply of very common teas, these have suffered in value to a greater extent than other discriptionss, so long as the supply of very common tea outweighs to such an extent as at present that of other sorts, none but very low prices can possibly be anticipated, especially as many of the so-called "common" parcels are much commoner than the bulk of Indian teas usually coming under that definition, Large quantities are being sold at the exceedingly low prices of 5½d to 6½d per lb.; but many of these draw so thin an infusion that they cannot be described as particularly cheap when compared with teas at some pence per lb. more. The better kinds of tea have fetched prices quite equal to those ruling a few weeks ago, notwithstanding a marked dulness in the general inquiry, but the quantity of good tea at present offered is comparatively small. As there appears every probability of the supplies of the medium and better descriptions continuing on a limited scale for the present, buyers will probably not be wrong in holding reasonable stocks of them, as even a moderate improvement in demand bids fair to strengthen the present very low range of values. A larger quantity of Ceylon teas has been brought forward, and has fetched generally declining rates, as the quality of most of the parcels was very poor. Increased supplies of Java growths have also been offered, and have sold at easier prices. At the public sales 18,407 packages of Indian, 2,655 Ceylon, and 1,894 Java teas were offered. With the exception of tea possessing quality, values were rather easier, and about 3,400 packages were withdrawn.—*Produce Markets Review*, Feb. 26th.

Ceylon Tea.—The event of the week has undoubtedly been the sale of 27 packages Ceylon Tea, "Mariawatte" mark, in the new Andrew's patent steel chests, realizing a half-penny or a farthing above valuation on account of the package. There was a good competition for these, and the prices realized showed that the contents of the new packages had come to hand in excellent condition, and no doubt is entertained in the Lane that as these steel chests become more generally known they will be favorites, and always meet a ready sale. Their cost on the estate is said to be one rupee and ten cents, very nearly, if not quite, the same as wooden chests; and, looking to the difficulties attending the employment of woods for tea chests, the damage to packages from which these are free and the greater uniformity in weight secured, I should say there can be no doubt that Andrew's patent steel chests will come into use pretty generally. Previous to the sale I inspected the whole of the packages lying in the Cutter Street warehouse, where I found only two that had sustained any damage, all the others being in excellent order, and their contents in good condition. As I mentioned in a previous letter, succeeding shipments of these will have an inside coating of lead deposited on the steel; but the necessity for this precaution is not obvious, as the contents of the present chests are in first-rate condition. There is but one change which occurs to me as perhaps desirable—viz., the dispensing with the metal rings in the wooden surface of the lids, placed there to enable the lid to be readily removed. The warehousemen thought these were intended for fixing ropes through for the purpose of hoisting up the chests; and the same idea may occur to ship's crews, and then the fear would be that if the rings be so used the great strain brought on the lid would destroy its air-tight property, notwithstanding the screws inserted for holding it in its place. Instead of the ring I would advise the use of a simple "thumb catch," which would serve all the purpose of the ring without the possibility of any misapplication of its use.—London *Cor*, Local "Times."

FLORIDA ORANGE CROP.

From memoranda appended to the various reports it appears that comparatively few bearing trees have been killed. Nursery trees in many localities were killed. The damage to older trees cannot be estimated at present, but the general opinion inclines to the belief that but few bearing trees were materially injured. An unfavorable report (from Sumter county) on this subject reads as follows:—"About one bearing tree in one hundred was killed to the ground, and perhaps one-tenth of the bearing trees are slightly killed back, some to the main trunk and some slightly only. A great many will shed their leaves, but this will do no harm. Some groves seem to be entirely uninjured from the freeze and look nice and green." *To the Editor of "Bradstreet's."*

SIR—My estimate of this season's crop was about 1,000,000 boxes; 50 per cent of this I think had been marketed, leaving 50 per cent on trees and in packing-houses. That in packing-houses, however, amounts to very little, only a few thousand boxes. That on the trees was more or less frosted, and but very small proportion of it can be marketed, and I think I am safe in saying fully 90 per cent of the frosted fruit will be a total loss. I hardly think the bearing trees are hurt to any extent, and it is the belief of many of the experienced growers that we can look for fair crop next season. At present, however, it is hard to tell just what the damage to trees is; in a month or six weeks we can answer that question better. The nursery, or young trees, in many localities were killed. —Yours respectfully, A. M. IVES, General Manager, Florida Fruit Exchange.

The price of frozen oranges has been about $1·66 per box in New York, but no more are coming here at present. The result appears to be that about one-half of the Florida orange crop has been lost. Several cargoes of foreign oranges are already well on their way to this port to supply the deficiency.—*Bradstreet's.*

TEA IN GUATEMALA.

The *Guatemala Star* is urging the Government of the Republic of Guatemala to foster the cultivation of tea. It says:—

A wide field is offered to prospective tea-growers in the large uncultivated tracts of land on the sides of the hills and mountainous regions of the country which are admirably adapted for the purpose of cultivating the fragrant leaf. The soil is just the thing, and the climate is all that can be desired. Here in Guatemala, as is done in China, tea can be raised by the poorer classes in small quantities, who can cultivate a few hundreds of shrubs on their own lands, and either cure the leaves themselves or sell them to their richer neighbors after assorting them according to their quality. If the large *finqueros* were to assume the responsibility of extensive tea plantations, it would give employment to the very many destitute and labor seeking Indians who are now very poor and desirous of having a wider field for their labors than is afforded them in the present less than semi-cultivated state of the country. Men, women and children could all alike be employed in cultivating the plant and in picking and curing the leaf. This employment would not last, like in the cultivation of the coffee tree, for two, three, four or five months, but would extend throughout the entire year, and the benefits arising from the constant employment of the working classes would be incalculable towards the political, moral and intellectual status of the country.

An idea has been formed by many people who have given this subject their attention, that it will be necessary to import into the country a great number of Chinese laborers in order to make the cultivation of tea a profitable enterprise; but such is far from being the case. It will only be necessary to make a contract for five years with a dozen or twenty thoroughly experienced Chinese in order to instruct the natives here in the various processes of tea cultivation, and, at the expiration of that period, a sufficient knowledge will be gained to enable the project to be carried on by the Guatemaltecans themselves without further aid.

The *Star* claims that one great advantage which Guatemala will have over the rest of the tea-producing world is that the teas produced in this country will be upon the Markets of London and New York some five or six weeks prior to any other kinds, and thus its value will be greatly enhanced.

If the climate and soil of Guatemala is as favorable to the production of tea as it is to coffee we can see no reason why tea cultivation should not become a profitable industry, and we receive from the new field tea of as rare and exquisite flavor and quite as marked in its characteristics as the coffee there grown, and which has for years been a favorite with epicures. We certainly hope the Government will lend its aid to give the industry a start and a foothold.—*American Grocer.* [Here, as elsewhere in America, the enterprise cannot succeed for want of abundant and cheap labor.—ED.]

THE BHUTAN AND THIBETAN MARKETS.

About the middle of last month I visited the Bhutia encampment of Dewangiri, and amongst other matters I enquired into the subject of Tea. I found that the Bhutias had as usual brought with them a few bricks of the commodity they designate Tea. I obtained a small quantity and noted a few particulars, which may possibly prove of interest.

2. The Bhutias stated that the Tea was brought by traders from a place called Janarjippoo, situated a year's journey to the north east. To indicate the direction, they pointed at first due North and then due East, intimating that a traveller to Janarjippoo from Bhutan would have first to go North and then East. They stated that they had given in exchange for a brick two cloths of Eri Silk, each cloth containing as much thread as they had bought for the equivalent of R1-4 in the Assam Valley. Estimating roughly the labour of weaving at 12 annas per cloth the cost of the Tea would appear to have been R4 per block. That this could not be its real price in Bhutan was proved by the fact that I bought it at R3-8 in Dewangiri. The price last year was, as far as I can ascertain, R2-4 in the same place. The Bhutias stated that it had become dearer in the interior. I enquired why they drank Tea which had come such a distance when a much cheaper kind was to be obtained in Assam. They stated that Assam Tea was bitter, but that the Tea they had with them was sweet.

3. I watched in one instance the process of making the infusion: Two pots, one of brass and filled with water, the other an earthen one and empty, were put over a fire; a piece was broken off a brick of tea and crumpled up in the hand to separate the adhering leaves and twigs. The handful so obtained was put into the dry earthen pot and stirred up for a few seconds till hot. Then, about a couple of wine-glasses full of potash water (made by straining water through ashes) was poured on the dry tea, and when the heat had almost evaporated the moisture, another spoonful of water (now hot) was added from the brass pot. The tea meanwhile was kept stirred to prevent its burning, and when nearly dry, a second, and then after an interval a third spoonful of water was added; when this, too, was almost dry, all the water from the brass pot was poured in, and a teaspoonful of salt having been put in, the mixture was boiled. As soon as the bubbles showed that the liquid was boiling, it was ladled out with a spoon formed from a gourd into a sort of churn, made from a thick piece of bamboo about two feet long. The churn was provided with a wooden cover, through a hole in which a piston rod worked, the piston being simply a round piece of wood roughly fitting the interior of the churn. The boiling liquid having been poured in, the churn was worked for a few seconds, and then about a tablespoonful of ghee was added to the mixture. The churn upon this worked vigorously for a few minutes, considerable pressure being evidently required to force the piston up and down. The Bhutia next poured back the liquid into the earthen pot (which meanwhile had remained on the fire) and tested the tea. He stated that more salt

was wanted, and added accordingly about an eggspoonful. The whole was boiled again for about a minute and then tested and pronounced excellent. The amount was about equal to the contents of two ordinary quart bottles.

4. Attempts have, I believe, been made to produce from the refuse of Tea gardens a substance resembling Bhutia Brick Tea, but so far, I believe, they have been unsuccessful. It would seem, however, that the endeavour should not be given up, as there can be little doubt that if Planters could manufacture a commodity which would suit the taste of the Bhutias, Assam Tea might penetrate eventually into Central Asia. Bhutia Tea can hardly be the produce of any country but China, and although recent enquiries tend to show that China Tea can be carried wonderfully cheaply into Thibet, yet it is hardly possible that Assam Tea could not undersell it. Even supposing that the Bhutia's more than doubled the real price in their statement to me, and that in Bhutan Chinese Tea can be bought at R1-8 per brick (about 5½ annas per lb.). I imagine an Assam planter, if he could produce a similar article at all, could do so for 3 annas a pound, or even less. This would certainly enable him to sell with a profit, and yet at a price which would probably induce the Bhutias to buy.

5. The obvious objection to any attempts to manufacture Brick Tea is that, even if made, trade with the savage tribes on the Assam borders is too inconsiderable to produce an effect on the Tea Industry of Assam. The objection is perfectly sound as far as these tribes are themselves concerned, but it will not apply if we can once break the Chinese monopoly. If the Bhutias perceive that they can buy the materials for the extraordinary mixture they call Tea at a cheaper rate in Assam than in Bhutan itself, they are certain to make their purchases here instead of in the interior. Once introduced at a cheap rate into Bhutan, it is more than probable that our Tea would pass into Thibet, and its spread in the interior of Central Asia would be then regulated mainly by the cost of its carriage from Assam as compared with the cost of carriage of Chinese Tea from China.

6. The above considerations have led me to obtain samples of the stuff the Bhutias use, and I am sending you a small box containing three bricks of tea and two sealed bottles of the infusion I saw manufactured. You will be the best judge of the method in which to utilize the samples, should you consider the subject sufficiently important to justify your taking action.—H. Z. DARRAH, Offg. Director of Agriculture, Assam.—*Indian Tea Gazette.*

SILK CULTURE IN SIAM.

In a report issued by the Foreign Office on the condition of Siam, it is stated that the culture of silk is strictly confined to the numerous Laos settlements throughout the country, and to the Cambodians in the south-eastern provinces bordering on Cambodia; nowhere are any Siamese known to rear the silkworm. The reason generally given is that whilst the art of silk culture, which is deemed a difficult one, has been transmitted to the Laos through successive generations, the Siamese are in complete ignorance of it. The great centres of the production of silk in Siam are Korat 130 miles to the north-east of Bankok; and Battambong, 200 miles to the south-east. Beautiful cloths, sometimes of great value, are woven in Chiengmai, and a certain quantity of raw silk is said to be exported from Hluang Prabang, on the Mekong river, to Chiengtung, one of the principal Shan States. The production, however, is small in comparison with that of Cambodia and Annam, and the export is, consequently, unimportant, consisting entirely of so-called Korat silk. It is taken to the latter place in small quantities from the neighbouring Laos and Cambodian provinces, such as Buachum, Pimai, Suwanaphum, Sisakat, Khukan, Sangkha, and Surin, and there sold, or more generally bartered for cotton and other goods, to Chinese traders, who re-sell it a Bangkok to the exporters. At present, half the number of families in a village composed entirely of Laos rear the silkworm, but they almost all, without any exception, weave their own cloths. The silk culture is confined solely to the women, who take a share even in the cultivation of the tree. A large proportion rear the silkworm only in the wet season, when the plant is in leaf, and, therefore, obtain the seed from the few who rear a small quantity throughout the year, barely sufficient to keep up the breed, or only a small quantity of leaves is furnished by the plants during the hot season. The tree is called by the Laos, *ton mon*; and the worm, *tua mon*. There are two kinds of trees, and it appears doubtful whether they were originally distinct. The large kind is similar to the mulberry tree, and in its full growth attains a height of from twenty to thirty feet. This tree is by no means common, as it is found very difficult to rear, requiring great care when young, though when it has firmly taken root it requires no attention, and is said to attain a great age. Like the European tree, it has a small white flower in cluster, but it bears no fruit. In Hluang Prabang, about four-hundred and fifty miles to the north, it is said to bear a red berry, and is probably the same as the European black mulberry tree. It is reproduced from cutting, and is found to grow best on dry sandy soil. The common description of tree is much smaller, and consists of a stem about half an inch in diameter, with small branches at regular intervals. Its height is generally about five feet, but it sometimes reaches seven feet. The bark is similar to that of the large kind, and the leaf appears to differ only in size. It is planted on dry ground, and requires constant watering and some care until it has grown to a height of one or two feet, and is measured once a year, in the sixth month before it is cut. The shape of the leaf is cordate or deeply indented. Its size does not exceed two or three inches in the small kind, while that of the larger is often more than double. Both kinds bear leaf all the year round, but very little in the hot season. It is from the eighth to the eleventh month, that is to say, from June to September, that the new trees bear a sufficient quantity of such tender leaves as are most suitable for the young worms. The silkworm rearing season is, therefore, from the end of June to the end of September, and two broods are generally reared. The eggs are hatched in the period of ten days, the worms are then kept on the same piece of cloth on which the eggs have been laid by the moth for four or five days, when they are large enough to be taken off and placed on a round flat tray of bamboo wickerwork about three feet in diameter, with a rim one inch high, in which they are kept until ready to spin the cocoon. The wicker-work is not close, but sufficient space is kept for the litter to pass through without the worm falling off, and the basket is then called *takrĕng*; this precaution, however, is often neglected, and the ordinary baskets used for winnowing rice are commonly used. These are called *kadong* both by Siamese and Laos, but in the north the rim is generally higher, and they are then called *hô*. The worms are not fed for the first few days, they are then fed three times a day. They cast off the skin four times, and the size of the worm at the third casting of the skin is about an inch, and it is then of the ordinary greenish tint. The worms that are ripe are removed to a tray similar to the one described above, but having on its flat surface a number of concentric circles of bamboo trellis work about an inch and-a-half high; there is thus between the circles a series of compartments one inch and a half broad, in which worms spread their web and spin the cocoon in the course of a day or night. This tray, called *tcho* by the Laos, as well as the other ones containing the worms or seeds, are all placed on a series of frames called *khĕng*, made in such manner as to prevent ants or other insects from molesting the worms or cocoons. The contrivance is very simple, and is constructed as follows. A series of four or five oblong frames are formed by four vertical pieces of bamboo, or sometimes rope, about four feet long, which are kept apart

at intervals of about ten inches by horizontal pieces two feet long placed broadwise, and rather less than four feet long placed lengthwise. The whole is firmly attached, and the two vertical pieces on either side are tied together after the topmost tray, and the rope is made to pass through a cup, generally half a coconut, filled with water. The whole is then suspended to a horizontal pole which hangs from the ceiling in the corner of the common sitting-room or bedroom. In size, the Siamese cocoons compare unfavourably with the European kinds, being only about two-thirds as large. But in the Northern Laos provinces, where there are two rearing seasons, one in the late summer and the other in late autumn, the cocoons of the first produce are said to be of a large size. The following is a description of the spinning machine in vogue in Siam. It is very simple, and consists of a thin piece of soft wood about two inches broad; bent in the shape of a horse-shoe; about ten inches from its extremities a piece of wood of like thickness and breadth, and having a small hole in the middle, is fixed horizontally, and about six inches above it is a small winder placed horizontally in the same manner. The two extremities of the machine are fixed on two small flat pieces of wood, having a groove on the inner side, which enables it to be fixed on to the rim of an earthen pot. it thus stands over the mouth of the pot filled with boiling water, in which a number of cocoons have been thrown. The spinner sits before a small fireplace, on which is placed the pot with the spinning-machine fixed firmly on to it, and with a stick having a small slit at the top, shakes the cocoons in such manner as to collect the threads of about half the number in the pot. Having twisted them with the hand into a single thread, it is passed through the small hole and fastened loosely over the winder. It is then pulled out with the right hand, the winder being thus caused to revolve, and is gradually heaped up in a basket close at hand. In the left hand the spinner holds the stick described above, with which to keep down the filament when it becomes entangled. Th is macihne is called by the Laos *mak khueng talok*, and its height is generally about three feet. The method of reeling is as follows:—The thread is reeled on a winder twenty inches long, fixed horizontally on a stand, on which the thread is improved by scraping off with a knife where it appears irregular, and by removing any blemishes. It is then re-reeled on another winder made of two sticks, fixed horizontally on the extremities of a piece of wood about two feet high. This is held in the middle with the left hand, and the thread wound in zigzag fashion with the right over the extremities of the cross sticks. The skein thus takes the shape in which it is generally sold. Sometimes this winder is replaced by another, formed of four cross pieces instead of two, the extremities of which are joined with string; it is then laid horizontally on a stand, is furnished with a handle, and the thread is reeled over the strings. This winder, called *ra wing*, is used both by the Laos and the Siamese. When it is required to twist a double thread or tram another instrument comes into use. A narrow stand, about four feet long, contains at one end a large wheel turned by a handle; a string is passed over the latter and round a piece of iron a foot in length, projecting from the stand on one side and rounded at the end. Some rough cotton is wound over the middle part in which the string catches so that in turning the wheel the iron point revolves quickly. The two or more threads are tied together to the extremity of the iron instrument, and this in revolving twists them firmly together.—*Journal of the Society of Arts.*

RAINFALL PER ACRE.—People scarcely understand by rainfall in inches what this really means, but an inch of rain means a gallon for every two square feet, or 100 tons per acre.—*Gardeners' Monthly.*

TEA CULTURE.—Unless we are wise, Italy will get the start of us in tea culture. A plantation at Novaro has been so successful that the Italian government is arranging to plant largely the coming year. —*Gardeners' Monthly.*

SPIDERS.—Dr. C. Keller, of Zurich, claims that spiders perform an important part in the preservation of forests, by defending the trees againts the depredations of aphides and insects. He has examined a great many spiders, both in their viscera and by feeding them in captivity, and has found them to be voracious destroyers of these pests and he believes that the spiders in a particular forest do more effective work of this kind than all the insect-eating birds that inhabit it. He has verified his views by observations on coniferous trees, a few broad-leaved trees and apple trees.—*American Grocer.* [The many thousands of spiders whose webs can be seen on dewy mornings on tea bushes, are probably doing a good work.—ED.]

SUGAR.—*The Journal des Fabricant de Sucre* gives an account of a new process for filtering beet sugar through sand instead of animal charcoal. By the new system considerable expnse is saved, and a brilliant yellow sugar superior to Demerara crystals is produced. It is impossible to make white sugar by this process only, and if charcoal is done without carbonataion—that is, the separation of carbonic acid from carbonate of lime, and the use both of the lime and of the resultant gas in the saccharine liquid—is substituted for it.—*Home and Colonial Mail.*

MILDEW.—We are often asked what can be done to master the frequent attacks of mildew on plants. One of the most recent recommendations for this purpose is sulphide of potassium, which is a compound of sulphur and potassium—not potash. This used in solution at the rate of ½oz. to the gallon of water is fatal to mildew and fungoid parasites; and is besides destructive to many pernicious insect pests. Lime and sulphur mixed in the proportion of four parts lime and one sulphur may also be used successfully either by dusting it on the affected parts dry, or by pouring boiling water over them and making them into a solution. The solution must be used while fresh, and should be applied with a brush. Some soft soap mixed with it will make the mixture more effectual where scale and the like is concerned.—*Planter and Farmer.*

PLUNGING PLANTS IN POTS—The meaning of the term plunging—well known to gardeners—is that the pot is sunk in some substance that will retain moisture—soil, sand, coal ashes, sawdust, and cocoa fibre refuse being the substances commonly used, and of these the lastnamed is considered the best. The effect of plunging pots is that the soil they contain remains longer in an equable condition, and plants suffer less from the frequent excesses of moisture and drought, to which they are subject when the pots are exposed to the air. It may be easily understood that the daily watering of plants is an unnatural process, and therefore must be more or less injurious, retarding the progress of plants subjected to excess of moisture at one period, and perhaps in a few hours to immoderate drought in the soil, the process of assimilation being checked both when the soil is saturated, as it must be for some time after watering, and also when too dry; both of these evils being reducable by plunging the pots, whether in the house or out of doors. Plants on window sills are especially liable to these fluctuations, and frequently also in plant houses, especially when the sun is allowed to shine on the pots; while plants in pots set on the surface out of doors can hardly be got to thrive unless closely shaded, although watered twice or thrice a day, suffering not only from alternations of drought and moisture, but also of heat and cold, the rapid evaporation through the sides of the pot chilling the roots, which are again subjected to intense heat when the moisture has evaporated. Independent of the benefits resulting from the plunging of pots, the saving of labour is also worthy of consideration, being in nearly all circumstances very great; and nurserymen as well as other plant growers should take advantage of it to lessen their very heavy labour accounts, to which watering in summer time causes a large increase.—*Planter and Farmer.*

WASTE COAL AS MANURE.—Mr. J. A. Price, Scranon, Pa., believes that coal dust will make an excellent fertilizer. Mountains of it, brought from the mines as screenings, are piled up in the coal regions. Its dark colour is in its favour. Dark soils are always more favorable than light ones for many purposes, by reason of their absorption of heat; and its carbonaceous properties ought to give it additional value.—*Gardeners' Monthly.*

NORTH BORNEO.—It is stated that the British Borneo Trading and Planting Company, to which we have previously called attention has proceeded to allotment, so that the Company may now be considered as definitely started. Mr. Walker, who will be the Manager in Borneo, was to leave London about the end of February for Singapore and Borneo, to commence active operations on behalf of the Company. We understand the British North Borneo Company, who have granted the concession, accept payment for the 20,000 acres allotted to the Company in shares. The directors are Messrs. C. Bennett (Brolin Bennett & Co.), E. Locke (Taylor & Locke), J. A. Travers, and J. J. Dunn, the concessionaire.—*Straits Times.*

"COCOES"—(WHERE IS THIS CONFUSION TO STOP?).—At a meeting of the Linnean Society on March 3rd, there was read a paper on "Disease of Cocoes at Jamaica," by Messrs. G. Massee and D. Morris, F.L.S. It appears that a somewhat virulent disease has made its appearance amongst cocoes (or, as they are sometimes called, tanias eddoes or taros) in the parish of Portland, Jamaica, and the matter has been taken up by Government, by whom specimens were sent to Kew for examination. Cocoes form an important item in the food supply of the negroes, and the loss of such a food would be a serious matter to them. It appears that the plants are attacked by a disease very similar to the potato mildew, and which, being a new species, has been named *Peronospora trichotoma*. The authors of the paper have drawn attention to the nature of the disease, and indicated the practical steps to be taken in order to contend successfully with it. It is hoped that stringent measures will be adopted to confine the affected plants within the district in which they were first found and that they will be thoroughly destroyed by burning. Fresh cultivation should be started with plants from a district free from disease.—*Colonies and India.*

AVENUES OF DISTRICT ROADS.—The following letter appears in the *Indian Agriculturist*:—

To the editor.—Sir,—Referring to the letter on "Avenues on District Roads" appearing in the issue of your paper dated 1st April 1879, page 139, I shall feel greatly obliged if you will be good enough to inform me whether any great extent of the roadsides in India have been so cultivated; and if so, the number of miles so cultivated, the aggregate number of trees and plants now growing, the system of cultivation, whether by day labour or otherwise, the average expenditure on each tree till maturity, and the average estimated profit to Government on each tree at felling.

CHAS. STOUTER,

Jany. 30th, 1887. Audit Office, Colombo, Ceylon.

NOTE.—This is rather an extensive enquiry, requiring much time and trouble. We shall do what we can in a future issue to supply the information to some extent; meanwhile some of our readers might help our correspondent.—ED. *I. A.*

To which we have to add that Mr. Stouter of the Audit Office, Colombo, is very comprehensive in his enquiries and the editor of the *Indian Agriculturist* very good-natured in not having referred him to the Agriculture Department of the Indian Government. Since the days of the Mogul Emperors tree avenues, on the great trunk as well as district roads, have been encouraged. Recently a fresh impetus has been given to the enterprise. Be it remembered that it is only in climates which for large portions of the year are rainless that trees can be planted along side of roads without serious injury to the roads. In the hot season in India the shade of the pipul, nim and cassia trees is most grateful.

GOOD; IF TRUE.—According to the London correspondent of the *S. M. Herald*, a sugar-tree more productive than the sugar-cane, is attracting attention in India. It is called the mahwa or moola tree, and grows in Southern Hindustan, and in the northerly regions abutting on the Himalaya Mountains. The mahwa bears about a ton of blossoms, and each flower is little else but a vegetable envelope filled with pure saccharine matter. One ton of blossoms will yield about half-a-ton of sugar. The best managed cane-plantations of the West Indies do not, at the outside, yield more than two and a half or three tons of sugar to the acre. The French and German beet-fields do not produce more than fifteen to twenty tons of beet to the acre, which yield about 7 per cent of sugar, or rather less than an acre of sugar-cane. Five mahwa trees will yield the same amount of raw sugar as an acre of sugar-cane; and an acre which would contain from 200 to 250 trees, would produce enough blossom to give from 100 to 120 tons of sugar, beside which no expense would be incurred either in growing or harvesting. A consignment of the mahwa blossoms is on its way to the Continent, for the opinion of the sugar refiners to be given thereon.—*Planter and Farmer.* [There is sugar enough in the mahwa blossoms to render them acceptable and nutritious food to the natives, and spirits can be distilled from the blossoms. But the statements about sugar obtained from them is from gross exaggeration.—ED.]

BADULLA DISTRICT, 26th March.—Heavy showers, accompanied with much thunder and severe lightning, have fallen over the greater portion of Upper Uva. The electric disturbance has been very great; the thunder clouds seemed to gyrate round and round from Idulgashena or Haputale to Hakgalla, across to Udapussellawa and Maturata, and from Narangalla to Hewa Eliya rock, along the whole Madulsima range to Namunakuly and Ella rock to Leangahawella and Haputale. The showers have been heavy, but partial; still I do not think any part of the district can have escaped getting a portion of the very welcome rain. The long-continued, dry weather, amounting in some places to absolute drought, is almost unprecedented here at this season, and tea and cinchona refused to flush or to grow; the cold, dry wind, sometimes almost a hurricane during the night, followed by scorching dry sun without a cloud in the sky, was trying to all vegetation; only coffee, where sheltered from the wind, seemed to revel in the dry sunshine, and even green bug has departed, for the time being at least. Canker in cinchona has almost disappeared, but only the hardy acclimated varieties are now grown. Uva cinchona has barely "touched" the market yet, and wise planters continue to plant their own seedlings on the principle of the Scotchman's advice to his son: "Keep sticking in a tree, Sandy, they will grow when you are sleeping." No fancy varieties of cinchona are planted here now, costing fabulous prices for seed—say "R150 per gram."!—but there is no estate where thousands of hardy, acclimated, self-sown hybrids and "sports" cannot be planted at a nominal cost, without risk of failure, and without hurt to other products. These trees grow whilst the proprietor "sleeps," but some day he wakes up to find a very valuable property in large, healthy cinchona trees, scattered over his property in places where nothing else would grow, and, even at 3d. a unit of quinine, a very valuable accessory to the other produce of his estate. Let no one think Uva cinchona will shortly be "snuffed out," "cropped out," or "cut out." Cinchona will continue to be a *large* export from Uva as long as the Province lasts.

CINCHONA IN JAVA, INDIA AND CEYLON.

We have already referred to the opinions of Mr. Kessler, on the prospects of cinchona in Java where he holds extensive proprietary interests. Mr. Kessler has now returned from his visit to our hill country and as the result of his observations and enquiries, his opinion is very much strengthened that the future of cinchona lies with Java. The large exports from Ceylon, he considers, will be played out in the course of two or at most three years and by that time, Java planters will be fully coming on the market with their fine barks giving results in sulphate of quinine which will make one million lb. Java equal to several millions from Ceylon, so far as concerns results to the manufacturing chemist. Mr. Kessler is therefore of opinion that the Ceylon cinchona owners stand between two fires :—for them to harvest before 1889-90 will be a necessity, and yet by so doing freely the market is likely to be kept in its present depressed condition—that is, if the 15-16 millions lb. of export can be kept up so long. Mr. Kessler is strongly of opinion that even now, the average of the Java bark exported is much more than 3 per cent of sulphate of quinine, while three years hence, he thinks 6 per cent would be a low estimate of the average result from the large bulk of the exports. The extent covered with cinchona in Java, he thinks has been underestimated. He has scarcely seen anywhere in Ceylon—unless it be on Lover's Leap and in that neighbourhood—cinchona fields equal to those which for their vigour and fine growth distinguish Western and Southern Java ; but then Mr. Kessler although he has learned a good deal from Uva planters, has not visited the estates beyond Badulla. The 100 acre field on Cannaverella, for instance, we should say is as good of its kind for big healthy growth as any in Java. The great difference is however, that Java planters have discarded all inferior kinds and give their attention solely to the better kinds of *Calisaya*, more especially *Ledgeriana*. *C. Officinalis* is almost unknown with them : whereas of course in the climate and soil of Ceylon this hardy species, and its hybrid *Robusta*, is the most successful. Altogether Mr. Kessler's advice to those thinking about planting Cinchona in Ceylon is "Don't", because (as he supposes) the inferior Ceylon barks are bound to be thrown out of competition by the superior Java. Many, however, will doubt this—or at any rate the ability of the Java planters to send away so much bark as will meet an increased demand besides the deficiency created by a great falling-off in Ceylon exports. We shall see.

In respect of tea, Mr. Kessler feels and acknowledges our great superiority : he thinks there is something in our climate, but also that superiority of jât must have a good deal to do with it, and for this reason Java planters are freely rooting out their poorer jât trees and planting anew with Assam-hybrid plants. Mr. Kessler who is now in his way to Europe, has been so much interested in Ceylon and its plantations by this visit that he is likely to send us contributions from time to time on planting topics, more particularly for our *Tropical Agriculturist*.

In contrast to the picture offered of the future of cinchona in Java, is that supplied by Mr. Hamlin, with his very wide experience of the same cultivation in the various districts of India. Mr. Hamlin does not believe that there is at present any chance of Indian planters getting above a total of a million lb. in exports, apart from the out-turn of the Government Gardens, most of the latter at least in the North, being utilised for local manufacture of alkaloids. Mr. Hamlin has left at our office some fine specimens of bark (grown under his own direction) six years old renewed, cultivated at 6,000 feet in the Upper Ouchterlony Valley, of which, trees at 4 years old he gave a very satisfactory report in our *Tropical Agriculturist*. But the show piece before us has been stripped off a Succirubra tree, and is 3 feet long by 10 inches in circumference, while in appearance it is simply magnificent, although in analysis the value is probably *nil*. As show barks for druggists' windows, such pieces ought to sell well however ; and for 20,000 lb. of the same—to be placed on the market gradually,—Mr. Hamlin will be disappointed if the average result is not equal to about 5s per lb. Some years ago, 10s a lb. would be readily paid by wholesale and retail dealers for such show barks. Mr. Hamlin promises a memorandum with the history of the barks in his case of samples and when this is received, we shall send the collection round the mercantile offices in the Fort for inspection.

PLANTING IN NETHERLANDS INDIA.

(*Translated for the Straits Times.*)

A sugar estate in the province of Kedirie which under European management, had only been a source of loss has this year, after it had passed into Chinese hands, yielded a splendid crop, and given a handsome profit. Instances of the kind pretty common in that island, show conclusively that Chinese can make money where European enterprise breaks down.

Recent researches in the island of Java and Sumatra have proved the presence of petroleum springs there. It seems they are of some value. In order to ascertain the best method of turning these productive resources of the country to account, the Netherlands Minister for the Colonies has despatched Mr. A. Stoop, a mining engineer, to the petroleum districts of the United States, to get himself fully posted as to the most practicable methods of working them. Private enterprise has already set to working the petroleum springs on the East coast of Sumatra with every prospect of success.

The Planters' Association at Sukabumie in Java have petitioned the Netherlands Indian Government praying the latter to grant a subsidy for the setting up of an experimental plantation for hill cultivation. A movement has also been started for the additional purpose of securing State aid for trial plantations in general.

LIQUID FUEL.

Details of Trials on San Francisco Bay.

For two or three years past some very interesting trials of the use of oil for fuel, instead of coal, have been conducted by the Central Pacific Railroad Company on the freight and passenger ferry steamers on San Francisco Bay. When, therefore, a short time since the use of this liquid fuel was abandoned by the company, and the furnaces of the boilers again altered to burn coal, it was concluded that oil burning was a failure. It was thought strange, too, because it was understood that the oil was the more economical fuel, doing away, as it did, with the numerous firemen on the steamers, since the oil was fed to the furnaces by an automatic arrangement. A number of reasons

were given by the general public for this abandonment of oil as fuel, among them that the supply was insufficient; that it cost too much, and finally, that it burned the furnaces and boilers out so badly that it cost more than it came to finally.

As the matter is of considerable general, as well as local, importance, we have obtained some information on the subject, which, being mainly official, will be read with interest.

In the first place, as to the character of the liquid fuel itself. It is not a crude petroleum, as many suppose. It is a residue or refuse. The Pacific Coast Oil Co., before selling this material, remove the lighter oils, which enables them to sell the refuse at low cost. The first product removed is gasoline of 84° specific gravity; the second is naptha of 74° specific gravity; the third is benzine of 63° specific gravity; the fourth is what is known as water-white illuminating oil of 48° specific gravity. Then they remove the standard white illuminating oil of 44° specific gravity. This leaves a refuse of about 26° specific gravity, which is the fuel oil used on the steamers.

The Steamer's Records.

The liquid fuel was used on three of the largest steamers of the company, the "Thoroughfare," "Piedmont," and "Solano"—the latter the largest ferry steamer in the world. The records of the runs and results of work on these steamers we obtain from the office of the Auditor of the Motive Power and Machinery Department of the railroad company.

The first steamer to consider is the "Thoroughfare," which runs from Oakland Creek to the depots at the southern end of this city, carrying freight trains across the bay.

Steamer "Thoroughfare," Dec. 1883, to Dec. 1884, with coal:

6,169 tons Ione coal at $3.96	..	$25,617 24
62 tons Carbon Hill at $5.50	..	506 00
		26,123 24
Pay of firemen	..	3,049 61
Total cost of fuel and firemen	..	29,172 85
Miles run .. 22,662½		
Cost per mile in cents—fuel .. 115.27		
Do do —firemen 13.46		
Total cost .. 128.73		

Steamer "Thoroughfare," Jan. 1885, to Aug. 1886, with oil:

2,135¼ barrels of oil at $1.65	..	$ 3,523 16
11,519¼ do do 1.70	..	19,582 72
		23,105 88
Pay of firemen	..	2,227 35
Total cost of fuel and firemen	..	25,333 23
Miles run .. 40,800¾		
Cost per mile in cents—fuel .. 56.63		
Do do —firemen 5.46		
Total cost .. 62.09		

The above shows 66 64.100 cents per mile in favour of oil, or 51 77.100 per cent. In this statement it is shown that 58.14 gallons of oil equalled one ton of coal.

The "Piedmont," a large steamer, is in the ferry traffic between Oakland Mole and San Francisco. She was originally devised for coal, but was afterwards fitted for oil (as were the other steamers).

"Piedmont," Nov., 1884, to Aug., 1885, with coal:

4,029¼ tons Carbon Hill coal at $5.00	...	$24,646 25
1,285 tons Carbon Hill coal at 5.50	...	7,067 50
		31,713 75
Pay of firemen	..	7,658 04
Total cost of fuel and firemen	...	39,371 79
Miles run ... 43,525		
Cost per mile in cents—fuel 72.86		
Cost per mile in cents—firemen 17.59		
Total cost ... 90.45		

Steamer "Piedmont," Sept., 1885, to Aug. 1886, with oil:

4,136 barrels of oil at $1.65	...	$ 6,829 35
15,983 barrels of oil at 1.75	...	27,174 50
		34,003 85
Pay of firemen	...	4,541 76
Total cost of fuel and firemen	...	38,545 61
Miles run ... 44,307		
Cost per mile in cents—fuel 76.74		
Cost per mile in cents—firemen 10.25		
Total cost 86.99		

The above shows 3 46.100 cents per mile in favour of oil, or 3 8.10 per cent. In this case it took 133.63 gallons of oil to equal one ton of coal.

The "Solano" is the immense steamer which takes the overland trains, freight and passenger, across Carquinez straits, between Benicia and Post Costa. The run is very short.

Steamer "Solano," Dec., 1883, to Feb., 1885, with coal:—

1,027½ tons Carbon Hill coal at $5.00	...	$ 5,137 50
2,090½ tons Carbon Mill coal at 5.50	...	12,047 75
5,724¼ tons Empire coal at 3.79	...	21,694 91
	...	38,880 16
Pay of firemen	...	8,476 70
Total cost of fuel and firemen	...	47,356 86
Miles run ... 7,504		
Cost per mile in cents—fuel ... 518.12		
Cost per mile in cents—firemen. 112.96		
Total cost ... 631.08		

Steamer "Solano," March 1885, to Aug., 1886, with oil:

2,395¼ barrels of oil at $1.65	...	$ 3,952 16
16,909 barrels of oil at 1.70	...	28,745 30
		32,697 46
Pay of firemen		8,496 84
Total cost of fuel and firemen	...	41,194 30
Miles run ... 7,308		
Cost per mile in cents—fuel ... 447.42		
Cost per mile in cents—firemen. 116.26		
Total cost ... 563.68		

The above shows 68 40-100 cents per mile in favour, of oil, or 10 68.100 per cent. This gives the result of 94.16 gallons of oil equal to one ton of coal.

Last month the Pacific Coast Steamship Company, desiring to get some idea of details of cost of use of oil, with a view to adopting it on their steamers if possible, had Mr. John Bermingham examine the matter for them. He wrote the following letter to Edwin Goodall, Secretary of the Company:

"Edwin Goodall, Esq.—Dear Sir,—I have examined the condensed results of the relative values of coal and oil on the "Solano," "Thoroughfare" and "Piedmont." There is great apparent saving in favour of oil fuel on the two first-named steamers, and a slight apparent saving of 3 3.10 per cent. in favour of oil fuel on the "Piedmont." I have no means of knowing whether the price charged for Carbon Hill coal is excessive as compared with other well-known fuels consumed here, or to the reverse. But there is one very important element that has not been taken into account by the railroad company's statistician, and that is, the relative speed developed by the "Piedmont" while using the different fuels above mentioned. In journeying

across the bay on that vessel I have been informed by her officers that the trips were made with coal in from 17½ to 18 minutes, while with oil 19½ to 20 minutes were consumed. If *that* be *true*, the difference in speed in favour of the coal would be almost one mile per hour, which means 25 per cent., as it requires that percentage to increase the speed of a vessel one mile per hour ('eight times the power to double the speed'), so if the speed obtained by the use of oil *could* have been brought up to that obtained by the coal, 25 per cent, more oil would have been consumed; or, *vice versa*, if the coal speed had been brought down to the oil speed, 25 per cent. less coal would have been consumed.

"It required from eight to twelve per cent. of the water evaporated by oil fuel to perfect its combustion. The rail-road statistician does not appear to have taken the cost of that water into account.

"The "Piedmont" had to keep her oil fuel burning all the time between trips in order to 'bottle up' steam to give her a spurt across the bay. I know nothing of the relative speeds with oil and coal in use on board the "Solano" and "Thoroughfare," where the oil *appears* to be the most economical.

"Your oil steamers might possibly use that fuel with diminished speed, but you would have to make provision for three tons of fresh water per day for its consumption.

"J. BERMINGHAM."

A copy of the above letter was forwarded to Master Mechanic Stevens, of the Southern Pacific Co., who brings out further facts in connection with the subject in his answer, which is as follows:

"SACRAMENTO, Dec. 3rd, 1886.

GEO. LOOMIS, ESQ., PRESIDENT PACIFIC COAST OIL CO.—Dear Sir,—I am in receipt of your favour of the 22nd ult., inclosing copy of a letter written by Mr. J. Bermingham to Edwin Goodall, Esq., in regard to oil fuel burned on the steamer "Piedmont."

"Mr. Bermingham figures in this instance altogether from theory. At the outset he says: 'There is a great apparent saving in favour of the oil fuel on the two first-named steamers, and a slight apparent saving of the three and three-tenths per cent. in favour of the oil fuel on the "Piedmont."'

"So far he is correct; but he does not take into consideration the saving effected on board the steamer "Piedmont" by the use of oil fuel in the reduction of firemen—an item amounting to about $14 per day. Neither does he consider the $6 per day which it costs to place the coal on board the boat—the oil was handled by the deck hands at no extra expense whatever.

"Further on Mr. Bermingham states: 'There is one very important element that has not been taken into account, and that is, the relative speed developed by the "Piedmont" while using the different fuels above mentioned.'

"The element of speed *was* duly considered; and permit me to say, there was no such difference as the gentleman mentions— coal 17½ to 18 minutes and oil 19 to 20 minutes. True, the time of crossing of the "Piedmont" was somewhat less with coal than with oil, but not to exceed half a minute less per trip run on an average. In the case of the "Solano" the speed was always equal to and usually greater with oil than with coal, and the steam could be increased while under way to any pressure desired.

"In making this comparison there is another important factor which Mr. Bermingham and others who have manifested so much interest in the matter seem to have entirely overlooked: that is, the construction of the "Piedmont" boilers. These boilers were constructed specially for burning coal; they are flue boilers and not adapted for oil fuel; while with the steamers "Solano" and "Thoroughfare" the case is materially different; the boilers of the latter boats are of good design or pattern for burning oil fuel.

"Mr. Bermingham further says: 'It requires from 8 to 12 per cent of the water evaporated by oil to perfect the combustion. The railroad statistician does not appear to have taken the cost of that water into account.'

"Our records show nothing of the kind. They show, however, that the consumption of water with coal and oil was the same per trip run. True enough, it took some steam to perfect combustion, but it was hardly appreciable, though, of course, it amounted to something.

"Referring again to steamers "Solano" and "Thoroughfare," I will say that the saving effected by those steamers by the use of oil was considerable (I believe you have the reports showing just what it was), and if the saving by the use of oil was so great on those boats why should it not be just as great on the "Piedmont"? The reason, the true reason, and the only reason, lies in the difference in the design of the boilers. I will state further that during the time the different boats were burning oil, we were not called upon to make repairs to the boilers; while with burning coal there is not a week when more or less repairs are not necessary.

"I will add, taking Mr. Bermingham's statement, that '12 per cent. of the water evaporated was required to perfect combustion.' Assuming this to be the case, 12 per cent. of the water actually evaporated during the test of oil for six days is 19,968 gallons. Our records of the test show the same number of gallons evaporated in both cases.—Yours truly,

A. J. STEVENS,
General Master Mechanic."

From these statements it will be seen that the oil fuel was the most economical, notwithstanding it has been given up by the company. The only explanation of this is in the surmise that as the company owns an extensive coal mine, coal steamers, &c., they can afford to use coal when others cannot.—*Mining and Scientific Press*, San Francisco.

TOBACCO CULTIVATION IN MEININGEN.—The last harvest of the tobacco cultivated in the Leimbach district according to the American method has recently been sold. Though the average yield is less as to quantity than in 1884 the quality is decidedly better. The price given is 36 Mks. per centner and tax in addition. Such a yield of the soil is not obtainable with any other field produce, not even with sugar beets, and it is to be desired that small agriculturists would, in view of the low price of corn, turn their attention to the cultivation of American tobacco which now is only carried on in a few places in the Salzungen district. The Meiningen lowlands with their sandy soil are very suitable for the cultivation of tobacco. If the new method of cultivation were more widely known it is quite possible that the growing of tobacco, which for ten years has only been carried on at Wasungen, Schwallungen, Breitungen, Wernhausen, and Helmers, would become a prosperous industry. It is beyond doubt that with more careful handling the yield of American tobacco could be materially increased. Though this method of cultivation has been followed for three years, it is still new, for it cannot be mastered at once. The method was first adopted in Germany by Leimbach. German legislation did not permit the American way of cultivating tobacco previous to 1883, and when Herr Hartmann Schmeer returned in that year to Leimbach from America for the purpose of beginning the cultivation of tobacco, he had to obtain the sanction of the Bundesrath.—*Kuhlow's German Trade Review.*

RHEA IN EGYPT.

A correspondent of the *Manchester Guardian*, writing of the progress of this industry says that "there are over 40 millions of established yearling Rhea plants ready for sending to Zagaloun, near to Zagazig Station on the Cairo Suez Railway, and supplies of selected plants from the same source—the Franco Egyptian Rhea Company (Limited)—are not only being forwarded to other intending growers in Egypt itself, but are now ready for exportation to India and Central America." Rhea admittedly thrives best in Egypt, sun, soil, irrigation, and cheap labor being in its favour. It does well so in India; but the plant being at its best in the rainy season, in India there will always be some difficulty in collecting and preparing it for market. It is said that amazing profits can be made from the cultivation of the new plant and it is expected that we shall see, before many months are over, Ramie becoming a formidable rival to cotton and even to wheat cultivation in the purely agricultural land of Egypt. The whole of the produce raised, however, is likely to flow to France for the exclusive use of continental looms, unless English capital and English enterprise bestir themselves.

There is room for twenty Companies of the kind, and the native proprietors would be more willing to invest their money in organisations conducted by competent Englishmen, than embark in any enterprize controlled by French administration. In time small landed proprietors will begin to cultivate this hardy plant to the almost total neglect of cotton, wheat, and rice, which have not proved lucrative recently. It is estimated that the yield of an acre of Rhea fibre will produce from £15 to £20 per acre at one cutting, but in good years from four to five cuttings can be counted upon, or better still, the stems may be cut from day to day as they attain a fixed standard height, and are stripped by hand, when even the highest estimate of profit will be exceeded. The plant is perennial, and the two best seasons for planting out Ramie roots are March and September, although it is possible to transplant the stools at almost any time if water is abundant.—*Fiji Times.*

THE FRUIT TRADE OF THE WEST.

As the orange trade of this island with the States is increasing every year, the following extract from the Boston *Evening Transcript* may prove interesting to the general reader and instructive to growers and speculators who may be erroneously anticipating high prices this year:—"I said in my last letter that estimates of the amount of damage done to the orange trees were merely guesses and that the facts could not be known until the sap started. Since that time I have been pretty well over the State and can give the results of my observations. In the northern portion of the State quite a number of trees were killed or severely injured by the January frost, and Jacksonville shows the effects of the freeze more than any place I have visited. In the central portion of the State about Ocala and Citra, but little damage was done beyond the destruction of the fruit on the trees. The trees are all putting out their new growth and seem as healthy as last February. Lemon trees, however, have been generally killed throughout the State. Early vegetables were scarcely hurt at all, and cabbages, lettuce, turnips, etc., are simply a little backward. Strawberries are uninjured, though they will not come in as early as usual, owing to the long-continued cold weather. Above Palatka to the south, one sees little to remind him of the low temperature of last month, and in another week the new growth of green will assume such luxuriance in all directions that the past will be forgotten and forgiven.

About Enterprise and Sanford effort was made to save the oranges, but all in vain. Immense fires were built and kept burning during the three days of cold, but strange to say, scarcely a man thought of picking his oranges after the first cold night and thus surely saving them. If the "lady from Philadelphia" of the "Peterkin Papers" had been ubiquitous, your readers might be eating some Florida oranges now instead of the once-frozen-never-to-be-forgotton-delusive fruit which is on the market. Indian River I have not visited yet. General Chamberlain of Maine told me on my arrival in Jacksonville that he saw one-half inch of ice on the India River, Feb. 5, when the South was visited by that entirely unnecessary second edition of frigidity."—*Dominica Dial.*

DRIED FRUITS.

We quote from the New York *Merchants' Review*, the following account, by U.S. Consul Mason, of the French process of crystallizing Fruits:—"The fruit is first carefully assorted in respect to size and uniform degrees of ripeness. Pears, pineapples, and quinces are pared, citrons are cut into quarters and soaked a month in sea-water, and the 'pits' of apricots, cherries, and peaches are carefully removed. Even this preparatory process requires a certain degree of skill, since the stone must be removed with as little injury as possible to the form and solidity of the fruit. This work is done mainly by women, who earn thereby 50 cents per day. Thus prepared, the fruit is immersed in boiling water, which quickly penetrates the pulp, dissolving and diluting the juice, which is thereby nearly eliminated, when the fruit is subsequently taken from the water and drained, leaving only the solid portion of the pulp intact. This process of 'blanching' must also be done with exact nicety, the period of immersion in the hot water being determined by the size and ripeness of the fruit. If immersed too long, the pulp is either overcooked or is left too dry and woody. If taken out too soon, the juices left in the pulp prevent perfect absorption of the sugar afterwards, and, by eventually causing fermentation, destroy the value of the product. In this, as in other stages of the process, the only guide is experience. A skilful workman can tell by the colour and appearance of the pulp when it is properly 'blanched,' and this knowledge invariably commands employment and liberal compensation. After being thus scalded, some fruits, apricots for example, are again assorted into two or three classes, according to the degree of softness that has been produced, for the reason that if kept together they would take up the sugar differently, some losing their form entirely, while others would remain sufficiently impregnated. For these different grades sugar-syrups of different degrees of density are required, the softer the fruit the stronger the syrup required for its preservation. For the same reason each of the different varieties of fruit requires a syrup of corresponding strength. Pears, citrons, and pineapples, which remains hard and firm, take best a syrup having a density of from 18 deg. to 25 deg., while apricots, plums and figs are treated with syrups which gauge from 30 deg. to 42 deg. by the aerometer. The requisite syrup having been prepared by dissolving the sugar in pure water, the fruit is immersed in it and left at rest for a certain period in large earthenware pans, glazed inside, and having a capacity of about 8 gallons. The syrup penetrates the pulp, and gradually withdraws and replaces the remaining fruit juice, which, as it exudes and mingles with the transparent liquid, produces a certain filmy or clouded appearance, which marks the commencement of fermentation. When this has reached a certain stage, the vessel containing the syrup and fruit is placed over the fire and heated to 212 deg. F. This corrects the fermentation and raises all impurities to the surface, whence, if necessary, they can be removed by skimming. If the syrup is of proper density, this process of impregnating the fruit with sugar will be complete in about six weeks, during which time it is usually necessary to perform this heating process, as above described, three times. The impregnation of the fruit with sugar being thus complete, it is taken out, washed in pure water to remove the flaky particles that adhere, and is then submitted to one of two finishing processes, as follows: If the fruit is to be 'glacéd,' that is, covered with an ice or transparent coating, it is dipped in a thick, viscid syrup of sugar, and left to dry and harden rapidly in the open air; if it is to be 'crystal-

lized,' it is dipped into the same syrup, but is then cooled and dried slowly in a kiln or chamber warmed to a temperature of 90 deg. Fahrenheit. This slow cooling causes the thick syrup with which the fruit is covered to crystallize and assume the usual granulated appearance. The work is now finished. If properly done, the fruit thus preserved will bear transportation to any climate, and will keep, firm and unchanged, for years. It is packed in light wooden or cardboard boxes, and may be shipped in cases containing several hundred pounds each."—*Produce Markets' Review.*

DR. GEORGE WATT, C.I.E., ON "GANJA."

At the evening meeting of the Pharmaceutical Society held in November, Dr. Watt, in speaking of the propagation of ganja, stated that native experts were employed to go through the fields in order to cut down the male plants while they were in the young state; and that if one single male flower were left in a whole field cultivated for ganja, not a single particle of ganja would be produced, but that bhang would be the result.

A Demarara correspondent (Mr. T. W. Hutton, of George-town), writing on this subject, says:—

"If such is the case, can you afford any explanation regarding the presence of fertile seeds in the accompanying sample of ganja, which is considered by the East Indian dealers here to be a very good one? It is received here in original packages from Calcutta, and is labelled 'Ganja.'"

We have submitted the sample to Dr. Watt, and he has sent us the following reply, dated "India Office, February 16":—

"Sir,—I had much pleasure in receiving your letter forwarding a specimen of 'ganja' for my inspection, and asking me for further information to what I gave at a meeting of the Pharmaceutical Society regarding that narcotic. I was not permitted to see the proof of my remarks made at that meeting, and, having a pressing engagement that night, I had to leave before the close of the proceedings. From both these considerations I was unable to correct a defect in what appeared in the Journal. In the first place, I seem to have forgotten to conclude my remarks with what, after all, was the important point, namely, that the 'ganja' made in all other provinces is inferior to that produced in Bengal. The Act regulating the trade in 'ganja' is only enforced to its full extent in Bengal, and hence the 'ganja' of other provinces costs only about one-twentieth of the Bengal. In Bengal a licence has to be taken out to grow, to trade, and to retail the article; and, over and above these charges, the 'ganja' produced has to be stored in the Government 'golahs,' and when removed has to pay a duty of 10*s.* for every two pounds. Naturally only the very purest article goes into the 'golahs;' adulteration, if it takes place at all, occurs in the retail merchant's shop, for while in the hands of the wholesale dealer it passes under a sealed permit. Every stage of the cultivation is carefully supervised, and in no instance are the male plants allowed to grow up with the female, since it has been ascertained that when fecundation occurs the 'ganja' is injured and greatly diminished. The sample you sent with mature seeds cannot possibly be Bengal 'ganja.' In the second place, I should have liked to correct a mistake made by a Bombay gentleman who spoke at the Society's meeting after my departure. He referred to purchasing Bengal 'ganja' in Bombay. I venture to think not one ounce of 'ganja' ever goes to Bombay. We have no record of 'permits' to Bombay and no 'ganja' can leave the Bengal stores without a permit. Again, the 'ganja' from the Central provinces and that grown in the Bombay presidencies is sold in Bombay for about 1*s.* a pound, whereas Bengal 'ganja' costs not less than 20*s.* a pound. It is thus conclusive that the Bombay 'ganja' cannot be Bengal produce.

"In a paper I read the other day at the Society of Arts, I recommended chemists desirous of making the very best extract of Indian hemp to pay the full price for Bengal 'ganja,' and to import the article from Calcutta instead of from Bombay, when there would be every chance that the defects complained of in the extract as now prepared would disappear completely.

"I observe in your letter that you say the sample of 'ganja' sent for my inspection was obtained from a shipment from Calcutta. There is no record of any 'ganja' having been exported from Calcutta to England. Naturally the difference in price would be prohibitive, or be sufficient to tempt an unjust trader in declaring a consignment as having come from Calcutta when in reality it came from Bombay. Be assured of one point,—while we cannot absolutely prevent smuggling from one province to another, since all the Bengal 'ganja' is kept in a secure store, none of it can leave that store or 'golah' for England or for any other country or province except under a permit, and only then after paying the duty. It is therefore possible to speak with absolute certainty as to whether or not any shipments of 'ganja' left Calcutta for England or Bombay.—I am, yours truly, "GEO. WATT."—*Chemist and Druggist.*

ON QUININE SULPHATE MANUFACTURED BY THE AUTHORS OF THE DISCOVERY OF QUININE, PELLETIER AND CAVENTON.

BY DR. J. E. DE VRY, C.I.E.

At the evening meeting of the Pharmaceutical Society held on Febuary 9, 1887, Dr. Paul read a paper, "The Tests of Quinine Sulphate," published on page 645 of the *Pharm. Journ.* of February 12 last, in which the following sentence struck my attention:—"When we call to mind the fact that cinchonidine is almost always associated with quinine in the bark from which quinine sulphate is manufactured, and also the fact that up to the year 1844, cinchonidine was not known as an independent substance distinct from quinine, it will be evident that there is, on these grounds alone, very good reason for believing that prior to the date mentioned the article known as quinine sulphate was really a mixture of the sulphates of quinine and cinchonidine. It would be possible to mention in support of this view many circumstances recorded by trustworthy observers, but I will merely refer to the fact lately made known *by Dr. de Vry, that the quinine sulphate originally manufactured by Pelletier contained a considerable amount of cinchonidine.*"

As I had the honour to be personally acquainted in 1835 with Pelletier, I am indebted to his memory to protest strongly against the underlined assertion. I really cannot conceive how the editor of the *Pharm. Journ.*, Dr. Paul, could make such a statement, for in his capacity of editor and reader of German periodicals, he should have been better informed by the paper of Dr. G. Vulpius, in No. 29 of the *Pharmaceutische Centralhalle* of July 22, 1886, p. 345. But whatever this be, the editor of the *Chemist and Druggist* can convince himself that I have said quite the contrary in the lecture which I delivered on November 2, 1886 to the Academie de Médecine in Paris, of which I sent him a copy, as also to Dr. Attfield, and some others of my English friends. In that paper I stated the following:—

"Since the discovery of quinine in 1820, chemistry and its application to chemical industry have made immense progress, and we should consequently have the right to expect that the quality of the actual quinine sulphate was at least as good as in the time of the discovery of quinine. Thanks to the kindness of M. Génévois, Director of the Pharmacie Centrale de France, I was put last May in possession of a specimen of calisaya bark from the collection of Pelletier himself, from which I obtained 64 per cent of quinine tartrate. The optical observation proved that it contained 95·4 per cent of quinine tartrate and 4·5 per cent of cinchonidine tartrate, which alkaloid was unknown in Pelletier's time. Therefore the quinine sulphate manufactured from such barks *could not have contained more than 3·26 per cent of cinchonidine sulphate.*"

Consequently, instead of making progress, we have retrograded, for the actual commercial quinine sulphate contains generally more cinchonidine than that manufactured by Pelletier. The cause of this fact is that calisaya bark (*Quinquina jaune*) was orginally exclusively used for the manufacture of quinine sulphate till about 1849, as the first barks from New Grenada were introduced into Europe in 1848 by Auguste Delondre, one of the partners of the firm, Pelletier, Delondre et Levaillant. Many of these barks contained, besides quinine, appreciable quantities of cinchonidine, the consequence of which was that the quinine sulphate manufactured from these barks contained more cinchonidine than that formerly prepared from caliysaya bark. This amount of cinchonidine in French quinine sulphate was the cause that my lamented friend, Dr. C. Zimmer, the well-known quinine manufacturer, issued in 1851 a circular to his customers to warn them against this quinine sulphate, which he supposed to have been *mixed* with cinchonidine sulphate. This, however, was not so, for the presence of such a large quantity of cinchonidine was only the consequence of the use of barks containing much cinchonidine besides quinine, Zimmer's circular contains the following sentence:—

"We know still little about the therapeutic action of this alkaloid (viz. cinchonidine), but whatever results the impending experiments may afford, such voluntary substitution is under all circumstances unaccountable, and makes honest competition almost impossible."

I conclude by expressing the hope that these lines may have convinced the readers of this journal that I never made myself guilty of the assertion attributed to me by Dr. Paul. It is, however, true that in the spring of 1883, I communicated orally to the Société de Pharmacie in Paris that Pelletier never knew "chemically pure" quinine, because the small specimen of "quinine pure" with which he presented me in 1836 contained a "trace" of cinchonidine which I found out in 1856 by the use of the polariscope. But every one will agree with me that a "trace" is quite different from "a large amount."—The Hague, February 16.—*Chemist and Druggist.*

THE LAWS OF NATURE IN RELATION TO HEALTH.

The above was the title of a very interesting address delivered at the annual meeting of the Hertfordshire Natural History Society, at Watford, on Tuesday last, the 15th instant, by the President, Professor Attfield, Ph.D., F.R.S., &c. Subjoined are extracts from the address.—

THE FLUIDS WE DRINK.—After showing the necessity of water taken in one form or another, Professor Attfield said:—

From the standpoint of nature, some little interest—and from the standpoint of man, a great deal of interest—attaches to the use of stimulants in the fluids we drink; for it would seem to be not more instinctive to man to cook his food than to discover in nature, or by more or less of art to manufacture, substances which are almost purely stimulating principles. The instinct of man, in his uncultured and uncivilised state, and in widely separated countries, has led him to discover just those four or five plants, which even now, so far as we know, are the only plants that, like the tea-plant, contain one and the same stimulant. Nearly everywhere, also, man's needs seem to have led him to the process—a perfect natural process, by the way; an accompaniment of the growth of the yeast-plant—by which sugar is converted into the stimulant termed *alcohol*. What is the use of such stimulants? Taken *in excess* they are poisons more or less insidious and harmful. The *theine* of tea, coffee, mate, and guarana is least liable to be taken in excess, and is least harmful. Alcohol is most likely to be taken in excess, and is, therefore, most harmful; on in the epigrammatic words attributed to the Scythian prince Anarcharsis, "The first draught serveth for health; the second for pleasure; the third for shame; and the fourth for madness." If mankind, especially in civilised countries, would consent to live at a slower rate, the second draught would be unnecessary, and probably even the first. But mankind cannot now thus live, apparently.

Man's life was spacious in the early world:
It paused, like some slow ship with sail unfurled
Waiting in seas by scarce a wavelet curled.

Now, with civilisation has come the stimulation of alcohol or theine. The first draught and the second are taken by most of the youth and nearly all of the adult of both sexes, either as theine or alcohol; while, as alcohol, the third and the fourth are taken by sadly too many. Children do not need, and, indeed, rarely take, either alcohol or theine, nor, for that matter either pepper or mustard with their food. These things are mere stimulants. They are not used in the early life of the individual, they were not used in the early life of the race. But swallowed in proper and moderate quantities, at proper times, in these days of civilisation, what office do stimulants fulfil in the system? It would seem, as stated elsewhere by the writer, that they do the important work of aiding the system, whenever necessary, to digest and to store up food, and to utilise its existing stores of fat and of flesh. In other words, the purpose of stimulants is, apparently, to stimulate the system the better to live upon itself, and the better to replenish its store of life-sustaining, work-performing flesh and blood. The imprisoned miner, having no food ordinarily so called, but having stores on his own frame, is able to exist for many days, if only, by a periodical sip of brandy, he can stimulate his organs to utilise those stores. The Indian performs a journey of two or three days on foot without any so-called food; but he really lives and works on the flesh stored in his frame, and lives satisfactorily if only he can chew his coca leaves, and so obtain the stimulus that shall induce his flesh to yield so much extra force. The invalid, unable to take solid food, can generally take stimulating beef-tea, and thus stimulate his own flesh to maintain his life until he again is able to take true nourishment. These are extreme cases of what appears to be the ordinary action of stimulants when taken in proper quantities.—*Chemist and Druggist.*

THE MOOR CULTURE EXHIBITION.

The exhibition, instituted by the Society for the Promotion of Moorland Culture, was opened and closed in Berlin last week. The object of the exhibition—the first of its kind—was to bring before the public the methods of processes by which it is intended to attempt to bring our moorland into a state of cultivation, together with the various implements, machinery &c. by which these methods and processes are to find application. When it is considered that there are 25,000 square kilometers of such land in Germany, the greater part of which is utterly worthless, it will readily be seen that any means whereby such unproductive land may be brought under cultivation (and made to yield such field and garden products as the best of our land which has been under cultivation from time immemorial) would prove of immense advantage both to individuals and the country and State generally. To say nothing of the extra work which would be afforded to thousands of willing hands, the fact of the acquisition to the State of an immense tract of land equal in size to the province of Saxony is one alone of immense importance, for it certainly might be looked at in the light of an entirely new acquisition. To attempt to give a detailed report of this most unique exhibition in the space allotted us would be an impossible task, and we must content ourselves in the present article by bringing under the notice of our readers a few of the most important points that came under our notice while paying a too brief visit to the Exhibition. The first group, and perhaps the most interesting, which attracts the visitor's attention is that containing both deep-ground and surface specimens of the moorland in every part of the country, together with the plants or peculiar products which are found thereon. Here, too, we find the valuabl

collections of the Agricultural High School, as well as collections from the peculiar provinces of several well-known professors. Particularly noticeable was the magnificent herbarium collection of Professor Willmack. In the next group were exhibited the various ways and means by which the moorland is to be reclaimed. By the well-known Rimpau process, "dam culture," the sand obtained by the digging operations in connection with the cutting of the drains is spread over the ground, a proceeding which is said to have attained very favourable results. Various other plans and projects for the cultivation of moors by dams are on view, perhaps the most noteworthy being that of the Schweder Techno-Cultural Bureau at Great Lichterfelde, whose system has already met with a fair amount of success. After the preliminary preparation of the land comes the manuring. The substance of moorland being of a highly organic nature, necessitates the application of mineral matter, and moorland districts are likely to prove good sale spheres in the future for kali salts, tinsel phosporite, and Thomas slack. There are here rich selections of every sort of manure, as well as representations of the working effects of the same. The kainite producing salt works as the Stassfurt State works, the Leopoldshall works, the New Stassfurt works in Loederburg, and the Hereynia kali works in Vienenburg have all contributed to a single group of magnificent raw salts; the ground article being also represented. The New Stassfurt works sent besides manufactured manure, while the Thomas slack came from Nienburg, Schalke, &c. Among the Berlin firms represented we noticed the Berlin Steam Bone-Dust Manufactory, (Dr. Wilhelm Cohn); Professor Orth also exhibited some manure. The manurical effects, however, are principally represented by the show of the Bremen Moorland Experiment Station. But agricultural conversion is not the only method of utilizing moorland; many moors produce that valuable fuel turf, which in spite of coal and lignite is yet thought a good deal of. This department of moorland cultivation is not overlooked by the promotors of the Exibition, and find representation through the collection of Professor Greiner. Turf is put to other uses besides burning; its high absorptive qualities make it peculiarly adaptable as a litter material, and the show of the Gifhorner Turf Bed Manufactory is not the least important one of the Exhibition. Turf also find its way into the surgery, as certain sorts of wounds and cuts are much benfited by the application of this material. This was one of the exhibits which particularly interested the Crown Prince. Particularly noticeable was the application of the turf fibre to weaving. Mixed with 30 per cent of cotton, wool, or hemp, the fibre of the turf-moss turns out a good yarn, which, as we noticed in Professor Gruner's collection is exhibited in different colors and patterns. In addition to what we have already mentioned we find on view various plants and fruits which have been obtained by the applications of the different methods to moorland. Among them we noticed giant specimens of the potato, beetroot, &c. The machinery department of the Exhibition is not the least interesting. Among other firms represented we noticed the H. F. Eckert Co., Berlin, Glogowsky & Son, Berlin, Th. Floether, Gassen, Glaser & Baare, Berlin, Friedrich Hoffmann, Berlin, R. Dollberg, Rostock, and Orenstein and Koppel, Brodnitz and Seydel, and C. W. Hall, of Berlin, &c. &c. As regards the awards, the first prize is a miniature picture of the Emperor in gold enamel, executed by Bastanier. The court jeweler, Paul Telge, presented for competition a silver cup of the renaissance period, bearing an inscriptive couplet to the effect that he who raises Germany out of slough and moor is worthy of the title of a true hero. There are several other valuable prizes which, however, call for no special comment.—*Kuhlow's German Trade Review.*

THE SCARCITY OF CUBEBS.

With a few slight interruptions the price of cubebs has been steadily rising for many months. Genuine berries, almost free from stalks and dust, are now quoted at about 22*l.* on this market, a price which in recent times has seldom been exceeded. The cultivation of the drug must have been a very profitable one during the last few years, although the total value of the crop, compared to that of the staple articles of Javanese produce, is so infinitesimal that it can scarcely be considered an adequate set-off against the evil times with which the Java planters have had to wrestle during the last decade or so.

Considering the enormous prices at which the drug has been sold during the last few years, it is remarkable that its cultivation should not have been extended. Many drugs shipped from India, Ceylon, and South America have suffered such depreciation in value lately, that they cannot leave any large margin to growers; but we believe that if a few planters, say in Ceylon, had commenced cubeb-growing, when the price of the drug first began to advance about six or seven years ago, they would now have reason to congratulate themselves upon the result of their venture.

Hints on the cultivation of cubebs have repeatedly been published in trade journals, and planters in India and Ceylon have been urged to make experiments in the cultivation of the shrub; but in no instance does this advice appear to have been followed, and the cultivation of cubebs for commercial purposes is, we believe, still confined to the Dutch possessions.

The eastern residencies of the island of Java produce the bold grey berries, the genuineness of which has been a matter of considerable doubt, and is generally disputed in this country and in America. The small, dark-coloured, genuine berries are all, we believe, grown in Central and Western Java, notably in Banjoemaas and in Bantam. The shrub is occasionally met with in the wild state, but it is more generally cultivated, sometimes in special plantations, but usually in the coffee-gardens. Some years ago the Dutch Indian Government, with a view to encourage the cultivation, distributed a large number of young plants to coffee-growers throughout Java. The *Piper Cubeba* requires very little attention; it climbs round the large trees which are grown for shading in coffee-plantations, and attains, when full-grown, a height of 18 to 20 feet. The statement formerly often made that cubeb plantations in Java were being uprooted in order to make way for coffee-gardens may, therefore, be regarded as fabulous. Cubebs are also grown largely in the Lampong districts, the extreme southern portion of Sumatra, and in certain parts of Southern Borneo. The yield is collected by Chinese dealers, and exported *via* Batavia or Singapore. Shipments from the former place usually find their way to Holland, while the cubebs exported *via* Singapore are generally forwarded to London or New York. An important part of the crop is consumed in Eastern countries.

The price of cubebs has always been subject to sudden and violent fluctuations, and extreme rates are by no means of exceptional occurrence. Thus we find that in 1859 and 1860 genuine berries occasionally realized 11*l.* to 12*l.* per cwt.; but it may be assumed that in those days the value was more or less artificially kept up by the peculiar commercial policy of the Dutch-Indian Government, which compelled planters to sell to them their produce at a fixed rate, at the same time limiting the area and amount of the production. From that time the value has apparently been declining, for in 1865 the price of cubebs averaged about 77*s.* 6*d.*; in 1869, 40*s.*; and in 1875, 25*s.* per cwt. Between the latter year and 1880 cubebs were a much neglected article, and could be bought at figures ranging from 25*s.* to 55*s.* per cwt. The stock was never a large one—usually averaging 125 to 180 bags in London—and the imports were extremely uncertain. More than once it appeared likely that supplies would cease altogether, owing to unremunerative prices.

In 1879 a craze originated in America for asthma cigarettes, of which cubebs formed an important ingredient, and which were recommended as a remedy

for catarrhal affections. Prior to that period the use of the drug had been chiefly confined to the treatment of gonorrhœa, though cubebs formed a principal ingredient in some proprietary lozenges. Asthma cigarettes soon became extremely fashionable in America, and a few speculators bought up every parcel of cubebs upon which they could lay hands on the European market, with the result of quickly forcing up the price of the drug to 10*l.* or thereabouts. The enormous demand then prevailing for cubebs may be illustrated by the fact that in February, 1880, no less than 737 bags of cubebs arrived at New York in a single shipment.

Stimulated by the high prices prevailing the production in Java had extended considerably, but by this time the American speculators had obtained a tight grip of the article, and manipulated it at will, sometimes flooding the European market with large shipments in order to momentarily depress the value of the drug and secure at a low rate any parcels which second-hand holders might offer. At the same time all sorts of tricks were resorted to in order to keep alive the demand for the article in America; but the asthma-cigarette craze has by this time subsided.

Notwithstanding this the American speculators have continued their game, and as the article is a comparatively small one, they succeed without much difficulty in controlling the bulk of the supply; hence the continued dearness of the drug.

The consumption of the article cannot now be said to be on the increase, in fact, during the last few years, the imports in America have been falling off. At present our stock has been very much reduced, and at the commencement of the month amounted to only 41 bags in the first hand, while from 21*l.* to 23*l.* is quoted for stalky to good genuine berries. In Holland the imports during 1886 amounted to about 200 bags, less than half of which belonged to the acknowledged genuine variety. The Dutch market is now said to be very bare, the stock at Amsterdam not exceeding 1,050 lb., 600 lb. of which are grey berries. The quotations at Amsterdam for genuine berries appear to be slightly in excess of those prevailing here. If recent mail advices from America can be trusted, the stock at New York is also very low, being estimated at less than 7,000 lb., or barely sufficient for one month's requirements.

All indications, therefore, point to the maintenance, for some time at any rate, of the excessive prices now prevailing. It is true that several shipments are reported on the way from the East Indies, but unless these should be of exceptional magnitude, they will in all probability be quickly brought up for consumption.

Arrivals of cubebs take place at regular intervals all through the year, but the bulk of the Java crop leaves that island between the months of May and September, the first arrivals generally reaching Europe in June or July. It is extremely difficult to obtain reliable information concerning the prospects of the crop in Java, but there is an impression that the yield this season will not exceed that of 1886, when only about 200 bags found their way to Holland.

A highly objectionable result of the enhanced value of the drug has been the appearance on the European market of various species of spurious cubebs. Formerly deliberate sophistication was seldom practised, and although occasionally a few fruits of the *Piper crassipes* occurred among genuine cubebs, the only charge which could be fairly brought against shippers was the frequency with which fruit stalks occurred among the berries, owing to imperfect garbling of the drug before shipment. At present, however, we have no hesitation in saying that more than 50 per cent of the berries imported as cubebs are not the genuine article at all.

Adulteration with common black pepper can be readily detected, but it requires considerable care to distinguish the many varieties of false berries now so frequent. Perfectly genuine cubebs have often been classed as spurious, simply because of their altered appearance when over-ripe; but *Daphnidium Cubeba*, *Piper crassipes*, and *P. caninum* are now frequently met with, both in conjunction with real cubebs and without any admixture of the true fruit. A few years ago a consignment of nineteen bags of spurious cubebs was stopped by the New York Customs authorities and destroyed. It was then announced that all cubebs imported into the United States would be subjected to a close examination; but if the parcels which are frequently purchased in London for the alleged purpose of exporation to America are in reality shipped to that country, the vigilance of the American Customs officers must have greatly relaxed of late. On the Amsterdam market spurious cubebs are now very frequently sold at 18*l.* to 19*l.* per cwt., chiefly, it would seem, for export to France. It is only fair to state that the French druggists are said to entertain great objections to the spurious berrics, though why they purchase them at all, knowing them to be false, is not explained.

It is a fact that the administration of spurious cubebs has often caused considerable inconvenience to patients, and, if only for the sake of rendering unprofitable the wholesale adulteration now practised at the shipping ports, it is devoutly to be wished that extended cultivation and increased competition will ere long again bring the price of cubebs within reasonable limits—*Chemist and Druggist*

["Cubebs is a sore subject with me," says a Ceylon planter. "Years ago I resolved to go in for them and got a plant form the Royal Botanical Gardens, Peradeniya, and they declare it to be cubebs, but I can scarcely believe it, and my time has, I am sure, been wasted. It grows well and fruits, but does not bear the kind of fruit that books say it should."]

TEA MACHINERY.—The London correspondent of the *Indian Planters' Gazette*, writes:—There has been a new tea rolling machine on view recently at the offices of the Planters' Stores and Agency Co. Limited in the City where it was seen by a good many planters. This specimen was for hand-power. If there is any justice in patent law, I don't give this machine a long life, so it is almost waste of time describing it, further than by saying that it is a Jackson's roller with obsolete motions in place of his driving gear, and with sundry other retrograde alterations, made in an attempt to do as Jackson does in another way. Apart from these advances in wrong directions, it has several weak points structurally, but without a diagram these would be difficult to describe. Mr. Jackson will probably take no notice of so feeble a competitor unless people having the ordering of tea machinery should have less sense than they are credited with, in which case, 'ware! Mr. Davidson's last improvement in his T Siroccos is a great one, and will increase their popularity vastly. I have seen the one he has over here on show, and its advantages are patent at a glance. He estimates that this type will turn out double the outturn of the first T Sirocco. The original T Siroccos may be converted partially to the new type but not completely; certain great improvements in the new not being applicable to the original type. The heat being saved, less heat is required, and the stoves will consequently last for years. Mr. Gibbs' new withering appliance is so cheap and its possibilities are so great that it is much to be hoped that a few enterprising managers will give it a trial next season. Even should the *drying* of the air by means of the chloride of lime prove to be the failure anticipated by many, still the *heating* of the air by this little appliance and the distribution of the heated air from it to the *machans* and *challonies* is so practical and efficient that it should be put to the test on some gardens as soon as possible. It can be wheeled or carried along over the *machans* as the leaf on each *machan* or portion of a *machan* is withered. This will, if the appliance is successful, at all events save having to carry the leaf from the worst to the best withering machans as the leaf is removed from the latter to be rolled, and will thus save considerable labour and handling of the leaf, apart from any success in the direction of rapid withering of wet leaf, such as is anticipated by inventor.

CULTIVATION OF IXTLE IN MEXICO.

The ixtle, or Tampico fibre, is stout, cylindriform, and of the strongest descriptions of fibre known. It has a yellowish-white colour, and varies in length from one to three feet, according to localities where the plant grows. The fibre designated as *tula* measures an average length of 24 inches, and the *yanmave* averages 30 inches. Consul Cassard, of Tampico, states that the ixtle is extracted from the leaf of the *Agaves Mexicana*, to which species belongs the *maguey*, or aloe, and much resembles the latter in the form and conditions of growth, although smaller in size. It has an elongated, sharp, thorn-edged leaf, containing about three parts of aqueous matter, and one part of solid, which is all fibre. On maturing, the ixtle shoots up from its very centre a long round flower-stem, which, on attaining its full growth, falls to the ground, carried by its own weight. The special botanical name, Consul Cassard says, is not known in Mexico. Ixtle is its Indian name, and the Spaniards have given it the local appellation of *Lechuguilla*. It grows wild in the stony sections of the table lands of the States of Tamaulipas and San Luis Potosi, and its most extensive fields lie in the vicinity of the towns of Tula and Yanmave. Growing with extraordinary luxuriance, in inexhaustible fields, it is never replanted, and the cropped fields lie in barrenness with but a few isolated leaves growing sparsely from the old roots. To become an article of commerce, the ixtle is submitted to a very simple process of curing, which consists in completely purging from its leaf the watery matter, and then in exposing to the sun the cleansed fibres, which are thus dried and bleached. The contrivance used in curing the leaf is very primitive, consisting simply of a triangular smooth edged piece of iron, measuring about sixteen inches long and two inches broad, with a handle at one end and a hook at the other. A board is laid at the foot of a tree, and over it crosswise is placed the iron or presser, one end hooked on to the roots of the tree, and the handle end resting in the operator's hand, with which he strongly presses the leaf against the board, while with the left hand he draws it its full length, repeating the operation until the leaf is completely purged of its aqueous matter. By the above process an Indian is enabled to clean on an average twenty pounds of ixtle per day. The cutting and curing of the leaves have no special season; both these operations are performed while the plants ripen, and this occurs throughout the whole year. A large trade is carried on in the export of ixtle from Mexico. From the port of Tampico alone about 7,000,000 pounds are annually shipped to Europe and the United States.—*Journal of the Society of Arts.*

TAPEWORM REMEDIES.

Chloroform has been found very efficient against tapeworms. Doses of 30 grains have been given, repeated after twenty or thirty minutes, but troublesome cardiac symptoms may be avoided by giving smaller doses (a few drops) every few minutes for a few times. Thompson successfully prescribed chloroform, ʒj. (by weight), simple syrup to ʒj., to be given in three doses, at intervals of two hours, in the morning fasting, with castor-oil to follow.

An Italian physician recommends thymol as a remedy for tapeworm. A dose of about half an ounce of castor-oil is given in the evening, when the patient should abstain from food, and take, next morning, two drachms of thymol, divided into twelve doses, one every quarter of an hour. About half an hour after the last dose has been given a dose of castor-oil should be administered. This is usually followed by the expulsion of the dead worm. Thymol quickly depresses the pulse, respiration, and temperature, and to obviate any ill-effects from this cause frequent doses of brandy or spirits should be given at the same time. The advantages of thymol are said to be that it produces no disturbance of the stomach, is rapid in effect, is both a tæniacide and a tæniafuges and, while certain in action, will do no great harm if an error in diagnosis has been made.

A correspondent of the *Med. and Surg. Rep.* states that he has met with a case in which the administration of the following mixture to a boy of nine years caused the expulsion of a tapeworm ten feet long. No directions as to the preparation of the mixture are given:—

Ol. terebinthinæ	ʒj.
Ol. cinnamomi	ʒj.
Mist. curcurb. peponis	℥xj.

The pumpkin seeds, say 1 oz., should be beaten up in a mortar, and an emulsion of them formed with water, similarly to mist. amygdalæ. The dose of the mixture is an ounce every hour.

Recent trials appear to show that pelleteirine may be used successfully against tapeworm, especially in children. The dose for children from three to five may be from ½ to 1 grain in solution, followed in about half an hour by a brisk purge. The alkaloid does not appear to have the same physiological action on children that it has on adults.—*Chemist and Druggist.*

AUSTRALIAN ARGOL.

In last week's drug sales in London there were sold some parcels of red and white argols, amounting to half a ton, which had been imported from New South Wales, and which formed, we believe, the first consignment which has come to this country. The red argols sold readily at from 90*s.* to 97*s.*, and the white at 100*s.* We have so long been dependent upon France and Spain for this important commodity that supplies from British colonies cannot fail to command the interest and attention of merchants. For many years argol has been regularly received from the Cape, and, so far, the quality of the argol imported from South Africa has been moderately good. But with the development of wine-growing, which seems to be assured in Australia, the supply from that source is likely to be an important factor in the market. The cultivation of the vine was commenced in the Australasian colonies nearly half a century ago, and has since been fostered in a very enterprising manner as well as in a scientific spirit. The methods of cultivation and the processes for manufacturing wine which are followed in the wine-producing countries of Europe have been carefully studied, and both soil and climate seem to be well adapted to place Australian wines, and consequently other grape products, in a commanding position in the near future. Some idea of the importance of the industry may be gathered from the fact that in the Rutherglen district of Victoria there are 3,000 acres devoted to viti-culture, the estimated production of which is 750,000 gallons of wine annually; and this does not represent one half of the present production over the whole of that one colony. In South Australia, where vine-planting was commenced in 1840, there are now about 5,000 acres under cultivation, with an annual production of 500,000 gallons. New South Wales has the credit of having started the industry in Australasia, and the total production of that colony is equal to that of Victoria, there being several vineyards which produce 40,000 gallons and upwards annually. It will be seen, therefore, that with stocks representing at least three years' harvests the yield of argol must be enormous and increasing. The juice of the grape in the unfermented state contains the acid tartrate of potash in solution; but with the change of the sugar into alcohol the solvent power of the liquid is diminished, and the tartrate is deposited as argol within the casks while the wine is fermenting and maturing. The normal composition of argol shows it to consist of acid tartrate of potash, tartrate of lime, and colouring matter, but the custom in some wine-producing countries of plastering the wines introduces a large percentage of earthy constitutents, including barium, so that argols containing half their weight of calcium tartrate have been met with. The argol which was sold last week was of superior quality, and the price obtained for it should induce a constant supply. One sample of the red variety which we received was in

semi-translucent crystalline pieces over a quarter of an inch thick, and of a pale claret colour. Its solution in water possessed a faint vinous odour. The sample yielded 93·5 per cent of acid tartrate of potash, 3·5 per cent of tartrate of lime, the rest being colouring matter, glucose, and vegetable refuse. The sample, therefore, compares well with other commercial argols, which rarely contain more than 90 per cent of acid tartrate of potash.—*Chemist and Druggist.*

CHINA GRASS OR RHEA FIBRE.

At a meeting of the Society of Chemical Industry, held in Manchester, Eng., on the 2nd inst., Mr. A. Sansone, Director of the School of Dyeing in the Manchester Technical School, read a paper on China grass or rhea fibre. He said that after giving the matter considerable attention, and after experimenting for several months both on green and dry stems, he thought that if the fibre were used at all it must be produced at a price as low, if not lower, than that of cotton; therefore the methods of treatment must not be expensive. Division of labor would have to be resorted to in order to accomplish that end successfully. In large plantations it would be difficult to obtain the number of persons necessary for peeling off the bark by hand when they were needed, while if machines were employed a large number would be riquired which would mean a large outlay. He had, therefore, devised methods for doing the work all the year round. One method he proposes is a very simple one. The stems, either green or half dry, or even dry, are simply boiled with a solution of carbonate or caustic soda; the bark can then be peeled off with the greatest ease. With green stems five to ten minutes' boiling would, he said, be found necessary, while the drier they were the longer they required to be boiled. He stated that he had on many occasions peeled many of the stems in his laboratory without the least difficulty. Even dry stems of several months' standing had been peeled off in the laboratory at the School of Dyeing after being boiled in the model boiling kier possessed by the school. Specimens were shown in the different stages, finishing with the bleached fibre which Mr. Sansone had extracted, with the help of some of his pupils, by a chemical process. With regard to countries like India, where the drying of the stems is impossible in the rainy seasons, he proposed that the stems when freshly cut should be placed in pits or cisterns with a solution of sulphurous acid or bisulphite of soda or lime, which could be readily and cheaply produced on the spot. This would prevent fermentation, and would keep the stems fresh until they could be treated by any suitable process of decortication. Green stems obtained by him from Kew Gardens last summer were kept for several weeks in his laboratory, and were at the end found perfectly sweet. They were afterwards treated without difficulty for the extraction of the fibre. He had noticed also that the fibre was even bleached to a certain extent by that treatment. He suggested a method of ungumming and partial bleaching of the fibre at the same time by successive boiling with alkalies, and afterward immersing the material in a cold sulphurous acid or bisulphite solution, this treatment to be repeated once or twice according to the state of fibre required. The bleach of China grass was, he said very similar to that of linen and cotton, and the same precautions should be taken in employing hypochlorites; bleaching, however, of China grass was very easily effected, in fact more easily than in the case of flax. In all cases the hypochlorite of lime should be avoided, and soda or magnesia salts used instead. For scouring the fibre or ungumming the bark such agents as lime, resin, soap and mineral acids could be used just as well as for other vegetable fibers. The dyeing and printing processes offered no great difficulties, but by dyeing the fibre before spinning brighter colors were produced and the fibre was more lustrous. Some colors, however, deprived the fibre of its luster. In conclusion, he recommended the utilization of the wood residues of the stems for industrial purposes. He had made a great many experiments, and considered the material very suitable for manufacture into a kind of wood-pulp suitable for paper-making and for other purposes. By that means two products would be obtained at the same time from the same plant.—*Bradstreet's.*

SOMETHING ABOUT JAVA AND THE JAVANESE LABOURERS.

A solution of the plantation labour question seems to have been found in the introduction of a number of Javanese labourers for the northern plantations. Java —or more probably Java and Madura—including the small islands administratively connected, had a total population in December, 1878, of 19,067,829, and of these 18,824,574 were natives, the rest being Europeans, Chinese, and Arabs. The population is fast increasing. In 1868, it was 15,265,931 and the annual growth had been up to that time large and regular. We have no figures since 1878, but we believe that the increase has continued and is continuing. The area of Java is limited. Many years ago the density of population in the purely Javanese districts was greater even than in Belgium, and although a tropical country in a high state of cultivation can produce more food and thus support more people than one situated in a temperate climate, it is probable that the Dutch are becoming a little alarmed at the increase of their native subjects. No doubt Java could spare, without perceptibly affecting the local labour market, from 50,000 to 70,000 men annually.

Javanese have the reputation of being strong, good laborers. They are Malays, but of quite different type from the same race in other islands of the Indian Ocean and the native states in the vicinity of Singapore. The Javanese is above all things, docile and obedient. The Dutch rule is a "paternal" despotism of the most elaborate kind. A writer on Java says :—

The Javanese knows no freedom. His whole existence is "regulationed." If he is bound to render "culture" service, the administration shows him to what department to apply himself, when and how he must plant. If he is not bound to render culture service, but has the position of a so-called free agriculturist, the administration prescribes the time and method of sowing and planting his land. If he wishes to fix his habitation outside his village, the village chief, may prevent him. If he has a dwelling of his own, the administration decides for him what sort of materials he must use for the roof. If he has a hanging night lamp in his bamboo hut, he must not hang it against the wall.

This elaborate system of regulation designs to make Java profitable to its European owners, is carried out through the native chiefs, who are highly paid but carefully watched servants of the Dutch. But the docile and gentle Javanese do not seem to resent their subjection. They certainly thrive under it. When the islands first fell into the hands of the Dutch they were thinly peopled. Even in 1815 the whole native population only numbered about 4,500,000, so it has more than quadrupled during the present century. The fact is that the Dutch system, which while keeping everyone at work, secures food and the necessities of life to the whole population, is conducive to the material welfare of such a people, though it would gall and embitter a more independent race.

It may be said that the whole population of Java is agricultural. The populations of the three principal towns—Sourabaya, 118,884; Batavia, 97,585; and Samarang, 76,443—are exceedingly small for a state of nearly twenty million inhabitants. Coffee, sugar, and spices, are the chief agricultural exports, and it is not improbable that the increasing demands for food crops, due to the growth of population on the area under tillage, may have something to do with the willingness of the Dutch authorities to allow the emigration of laborers. However that may be, a sufficient supply of Javanese labor would entirely remove the labor difficulties of our Northern planters. They are, we believe, as good workmen as the best Indian coolies, and are even more docile and amenable to control. But it would be a singular outcome of our anti-coolie

movement if it should result in the introduction of a flood of dark-skinned laborers, not hindered by caste prejudices, and probably capable of being trained to perform manual labour of every description.—*Planter and Farmer.*

JOHNSON-GRASS.

The following letter, received by the Secretary of the Planters' Association from Mr. D. Wilkinson, accompanying a small packet of the above grass seed, was read at the meeting of the committee held on Thursday evening last and is now published for general information. It will be noticed that packets of the seed can be obtained from the Secretary upon application to this office.

"To the Secretary,
"Planters' Association.

"SIR,—Having just received from the Department of Agriculture, U. S. America, a small quantity of 'Johnson Grass' *Sorghum Halapense* seed, I beg herewith to forward a packet for distribution through your Association to stock breeders and those interested in the improvement of pasturages in the colony by the introduction of suitable grasses. Perhaps I ought to state something of the history and how I obtained the seed of this very highly recommended species, and for general information, what is known of it.

"In reading the *Australian* in America (by Mr. Dow, special correspondent of the *Melbourne Leader*, a book full of useful and interesting information) in the chapter on 'Grasses,' Mr. Dow says:—'The Johnson-grass has strong, vigorous roots, like sugar-cane, and has an abundance of long broad leaves. It grows to a considerable height when cultivated for hay on bottom lands, while it thrives well as a pasture grass on the up-lands, being hardy and resists drought.' Acting on his recommendation that 'any person desirous of trying any of these special grasses described should apply to the Botanist of the Agricultural Department of State, Washington.' I received a most prompt and courteous reply with some of the seed from F. C. Nesbitt Esq., the Acting Commissioner of the Department, who says:—'I shall be pleased to send you a large quantity, but am forced to restrict myself to a small quantity by mail only, which I hope will reach you safely and prove to be the nucleus of supplying a valuable forage plant to your colony.' From the same authority the grass is thus described:—'It is a perennial rapid grower, having long cane-like roots, or more properly, underground stems, every joint of which is capable of developing a bud. These literally fill the ground. Short pieces of roots planted in rows two feet apart and from one to two feet in the row quickly form a sod over the entire surface. It is exceedingly difficult to eradicate. Do not sow or plant where you expect to cultivate the land. Some plantations of Johnson-grass are more valuable, acre for acre, than the best cotton land. One bushel of seed (28 lb.) is sufficient for an acre. Brush in the seed or use the roller, as it must be covered lightly. For hay, cut it as often as it obtains the height of 24 to 30 inches. On good soil it yields from two to three tons per acre and can be cut three times during the summer in the Gulf States. It is not regarded as being hardy north of where cotton is successfully grown.' In a note just received from Mr. Holmes, whose practical knowledge as well as the time and careful attention he has devoted to the successful introduction and cultivation of useful grasses at once constitute him an authority, he says:—'I have sown a little of your 'Johnson-grass' to test its soundness, but I have little doubt about it as the seed is hard and glossy. It is a great acquisition to our grasses if half what they say of it be true. The only doubt in my mind is whether a grass that stands such frosts in Kansas, &c, will equally thrive under our tropical sun. Still the genus *Sorghum* is, as a rule, quite at home in hot countries.'

"Perhaps I ought to apologise for this intrusion not being a member of your Association, but hope some of your members and perhaps others may be disposed to try and prove whether this grass is adapted to our climate and soils and that it may assist in some degree in the permanent improvement of our stock pastures.—I have &c.,

"D. WILKINSON."

—*Fiji Times.*

OLIVE CULTURE IN CALIFORNIA.

The following extracts are taken from the recent work on the olive by Mr. Cooper, San Francisco:—The common and preferred method of propagating the olive is to plant the cuttings, taken from the growing trees of sound wood, from three-quarters of an inch in diameter to one and a half inch, and from 14 to 16 inches long. These cuttings should be taken from the trees during the months of December and January, neatly trimmed, without bruising, and carefully trenched in loose, sandy soil, a shady place preferred. They should be planted in permanent sites from February 20th to March 20th, depending upon the season. The ground should be well prepared and sufficiently dry, so that there is no mud, and the weather warm. In Santa Baraba, near the coast, no irrigation is necessary, but very frequent stirring of the top soil with a hoe or iron rake for a considerable distance around the cuttings is necessary during the spring and summer. About three-fourths of all that are well planted will grow. My plan is to set them 20 feet apart each way, and place them in the ground butt end down, and at an angle of about 45 degrees, the top to the north, barely covered. Mark the place with a stake. By planting them obliquely, the bottom end will be from 10 inches to 1 foot below the surface. In Europe the trees are planted from 27 to 33 feet apart. My reasons for closer planting will be given in a subsequent article. All trees, as a rule, should be propagated from seeds. The roots are more symmetrical, the tree not so liable to be blown over, and the growth more healthful; but I have not been successful in germinating them, hence I recommend the cutting. If the trees are propagated from seeds, budding or grafting is necessary. I have seen the statement that it was necessary that the seeds should pass through the stomachs of birds before they could be sprouted, also that by soaking in strong lye the sprouting would be secured. I have not seen the result of either experiment, and accept the statement with more or less distrust. I presume cuttings can be obtained from any of the Mission orchards in the southern counties.

PRUNING.—The cutting will throw up numerous shoots or sprouts, all of which should be left to grow the first year. Any disturbance of the top affects the growth of the roots, it would be advisable, however, where there are two or more vigorous shoots of about the same size and height from the same cutting, to pinch the tops of all excepting the one to be left for the future tree, so as to throw more force and vigour into that one. In the following spring, when the ground is warm and sufficiently dry, all sprouts excepting the one to be preserved should be carefully removed by the aid of a sharp saw. A post should be firmly planted, so that the tree can be well secured to keep the trunk straight and avoid any disturbance of the roots, and should be kept until the tree is four or five years old. By adopting this method, a great deal of time will be saved and better trees secured. The lateral branches should be allowed to grow until the tree is two or three years old, but in every case, when any of the said branches are rapidly making wood, they should be removed, and not allowed to rob the trunk.

In the pruning during the first years, have only the one object in view, that is, to force all the woody growth into one main trunk. This being done, the tree will naturally form a beautiful shape. The cultivator must not look at the tree of to-day or to-morrow, but the tree of 10 years hence. All branches to the height of five to five and a-half feet should be removed, so as to admit of close cultivation by horses.

Trees planted at the distance of 20 feet and well kept will in 10 years touch each other. When this condition is reached they will be in full bearing, and therefore will require constant pruning or cutting back. It is much easier and less expensive to gather the fruit from small trees; besides it the pruning is intelligently done, it will improve the fruit and secure a greater quantity to the acre than can be produced under any other conditions.

Some orchards in Europe are planted in "threes," that is three trees in each place planted in the form of a triangle, and three or four feet apart. This method would require the rows to be 33 to 35 feet distant, and would give him about the same number of trees to the acre as by planting at 20 feet, one tree in each place. It is claimed that by planting in this way no staking is required, the trees protect one another from the most violent wind-storms, the trimming is simplified, and less care and labour required in the cultivation.

Fruit-bearing.—Trees growing from cuttings will produce fruit the fourth year, and sometimes, under the most favourable circumstances, will give a few berries the third year. It is the habit of the tree to overbear, and as a consequence will give but very little fruit the year following a heavy crop. This statement is verified by the most reliable books published on the subject in the French, Italian and Spanish languages. There are, however, exceptions to this rule in California. Mr. Davis, who had charge of the San Diego Mission orchard in 1875, assured me that he had gathered from the same tree, two years in succession, over 150 gallons of berries. I have also observed that some trees in my orchards have borne well successive years. The fruit-bearing can be controlled by the pruning. The cultivator will not forget that the shoots or branches must be two years old before they will give fruit; hence partial pruning every year will give partial crops. My oldest orchard was planted February 21, 1872. At four years I gathered from some of the trees over two gallons of berries; in 1878 over 30 gallons each off a few of the best trees, the orchard being then only six years old; in 1879, the seventh year, the crop was not nearly so large. I had planted several thousand cuttings in the spring of 1873, but these trees did not give at six years a result equal to the first planting. The present crop (1880) is quite good, the oldest orchard now being eight years; and I think I do not over-estimate when I state that the yield of some of the best and fullest will be over 40 gallons. Trees large enough to give this quality of fruit planted at a distance of 20 feet, will occupy nearly all the ground, and therefore will give all the fruit that can be produced on one acre. An orchard bearing uniformly the quantity as above, would give the following result:—One hundred trees to the acre at 40 gallons each, 4,000 gallons. This would be an enormous crop, unprecedented, and far beyond any statistics given in European publications. The one-fourth of the quantity yearly would be a very profitable crop. In estimating an orchard, the yield of isolated trees or trees of great age, occupying considerable areas of ground, must not enter into a basis of calculation of the probable production. The tree mentioned in the San Diego Mission orchard as yielding 150 gallons of berries was more than 50 feet distant from those surrounding it. My agent, while travelling in Europe through the olive district, measured a tree growing in the "Alpes Maritimes" that was 8 feet in diameter, 6 feet above the ground, and at the ground 15 feet in diameter. Only a few trees of such trees could be grown on one acre. A. Coutance, Professor des Sciences Naturelles aux Ecoles de Medicine de la Marine of France, compiled a very exhaustive work on the olive, published in Paris in 1877, from which I copy and translate as follows:—"Large olive trees occupy 1,000 square feet of ground—that is, require to be distant from each other about 33 feet; will produce every second year 37 gallons of berries, and occasionally as much as 125 to 150 gallons. One tree, 9 years old and 9 inches in diameter, will produce 16 1-5 gallons; one 12 inches in diameter 24 gallons. The measurement and number of trees occupying one hectare (two-and-a-half acres) is given as follows:—15 trees 12 inches in diameter, 75 trees 9 inches in diameter, 60 trees 5 inches in diameter: total, 150 trees. Product of same, 3,000 gallons of berries. This would be equal to 1,200 gallons to the acre. Another authority gives 2,250 gallons per hectare. Still another gives 2,150. All of the above results once in two years. Several authorities quoted by the same author reckon 200 trees to each hectare. This would be 80 trees to the acre, and distant apart 23½ feet. French cultivators give the quantity of oil contained in a given quantity of fruit as one-eighth, and in weight one-tenth; that is, eight gallons of berries to one gallon of oil, and about 50 lb. of berries to one gallon of oil. Taking the average quantity of the production as given above from a mature orchard, we have in oil per tree two to two and a-half gallons every second year. This result is obtained by thorough fertilising, without which the berries would yield but little oil. Olive trees grown from seeds are not removed from the nursery until about seven years old; grown from cuttings they bear in Europe as early as they do in California. The newness and richness of our soil will probably give, the first 50 years, double the results given in those countries where oil-making has been the business of so many generations. Our climate is congenial to the habit of the tree; it bloome from the 1st to the 10th of May, and the fruit forms from the 1st to the 10th of June. At this season ws have our best weather, free from extremes of either cold or heat. Nowhere in the world are all the conditions so favourable to the perfect fruit-bearing.

Fruit-picking.—The olive usually ripens in November. In some localities in Eastern countries, during favourable years, the fruit-picking for oil begins as early as October, and for pickling in September. In Santa Barbara the crop of last year 1880, as also that of 1878, was unusually late in ripening, not being ready to pick before the middle of January—a delay of fully two months—the cause, no doubt, owing to the extraordinary rainfall of these two years. In 1878 we had after the middle of February and up to the middle of April, a rainfall of over 14 inches, and in 1880 over 16 inches, being more than our yearly average. The fruit should be gathered as soon as it turns purple and before fully ripe, as the oil will be lighter in colour and more fragrant, but somewhat less in quantity. In Europe the common method of gathering the berries is to knock them from the trees with poles. They are then picked from the ground by old men, women, children, and cripples. This plan has many objections, the fruit being more or less bruised, causing decomposition, and the contact with the earth is liable to give the oil an unpleasant taste and odour. The most economical plan of gathering is to pick from the trees by hand, and by the aid of intelligent contrivances, an active man can pick 400 lb. each day. I have arranged on a ranch waggon platforms with ladders securely fastened, so that the fruit from the different heights of even large trees can be gathered from the waggon, which is driven along the rows, and one-half of the trees picked from each side. This plan obviates the necessity of moving ladders, climbing, &c., and relieves the pickers from the labour of carrying the fruit, as the sacks containing the same are always at hand on the platform. The leaves and imperfect berries are separated by passing the whole through a winnowing mill. This process leaves the fruit in the best possible condition preparatory to manufacturing the oil.—*Sydney Mail.*

TEA: INDIA, CEYLON, JAVA, JOHORE, NATAL.

(Geo. White & Co.'s Annual Indian, Ceylon and Java Tea Report.)

London, 2, Great Tower Street, E.C.,
18th March, 1887.

Close of Last Season.—Our last Annual Report was issued on the 20th March, 1886, when, with decreasing quantities offered at auction, the market was gradually assuming a firmer tone for fine kinds,

especially Pekoes. With some fluctuations, these maintained a strong position as the season advanced and they became scarcer, but prices for other grades declined, as the export from Calcutta proving rather above the estimate, our market was over-supplied.

In consequence of the heavy clearances in anticipation of the Budget in the Spring of 1885, a considerable quantity of duty paid stock remained in the hands of Dealers up to the close of last season, so that the monthly returns were no guide as to consumption. A year of steady trade has now, however, disposed of the old stock, and figures have become more indicative of actual movements.

The London bonded stock of Indian and Ceylon Tea on the 30th June, 1886, was 18,345,000 lb. a considerable increase on the amount in the previous year, when it was reduced to 12,359,000 lb. on account of the Duty scare. The stock at the end of last month was more than seven millions over what it stood at the close of February, 1886, though with an increased consumption this surplus may disappear before the close of the season.

The average prices obtained during the season have been about as follows, viz., Ceylon, 1s. 1¾d. per lb.; India, 11d. per lb.; China Congou, 8¼d. per lb.; against 1s. 3½d. 1s. 1½d. and 10½d. per lb. last year, which shows that tea generally has fallen about 2¼d. per lb.

INDIAN AND CEYLON TEA.—The gradual increase in the deliveries of Indian and Ceylon Tea must be most satisfactory to growers, as shewing the hold they are getting on the taste of the British public, while the demand from abroad is also on the increase. Not only have the fine teas from China (partly owing to the crop being thin in cup) had to give way before them, but Indian and Ceylon planters have undersold the medium and lower grades of China Congou, and by sheer weight of quantity forced their produce to the front. The deliveries of Indian from the London warehouses during February nearly equalled those of China Congou, while Indian and Ceylon together exceeded them by over 400,000 lb.

This result has not been achieved without some drawback however, as the low averages obtained by many gardens shew, and the question as to whether "it pays" will become a serious one, especially to some of the smaller properties in India. No doubt the cost of manufacture has been considerably reduced of late in the case of some of the larger gardens, whose produce it is reported can be laid down in London at 7½d. per lb., and so tempted them to go in for quantity. Small gardens, probably, will find it difficult to compete in this way, and perhaps their best chance of success lies in striving after quality rather than quantity.

The Indian crop this season, with few exceptions, has been disappointing in quality, owing principally to unfavourable weather for growth and manufacture, and with the abundant supply of thin and undesirable Tea from all quarters, lower quotations than previously known have been recorded, common Souchong selling down to 6d. and Pekoe at 7½d. per lb.

The shipments of Ceylon Tea arriving before August were not up to the average in quality, and prices were, consequently disappointing. Later on, however, they shewed a considerable improvement, and as they appeared to advantage in comparison with the general run of Indians then coming forward, they secured the attention of the trade and realised good averages until the past few weeks. Recent arrivals have generally shewn a falling-off in the cup, as they consist mostly of first pickings after pruning or Teas manufactured during unfavourable weather.

Deliveries have hitherto kept pace with the increasing Imports in a most satisfactory way, but as larger supplies reach our market, it is to be hoped that growers will continue alive to the great need of keeping up the standard of excellence already attained, as full flavoured parcels are usually sought after and always command good prices. During the current season Ceylon Teas have, in many quarters, taken the place of fine China Congou, both for Home Trade and Export, principally to the Continent. With the prospect of annually increasing crops, it is most important that foreign buyers should be encouraged, as fresh outlet both for Indians and Ceylons are almost a necessity, unless such a low average is established as to stop supplies from China.

JAVA TEA.—The advantage of having more than one market has been particularly exemplified in the case of Java Tea, for on several occasions when Indians have been depressed, owing to the dulness of Home Trade, Continental orders have kept the former steady. Consequently the fluctuations in the price of Javas are comparatively smaller throughout a season than for other kinds, and the averages obtained have been in several cases above those of some Indian invoices. This no doubt is partly attributable to an improved general demand following on the Teas showing better quality, many of them resembling flavoury Indians and Ceylons, to be accounted for from the fact of the plants having in some cases been grown from seed from these countries.

JOHORE AND NATAL TEA.—During the past season several parcels have been shipped from Johore and also from Natal. The former require more care to be exercised in the manufacture before they can take a good position on the London market. The latter, judging from some of the small lots received, give good promise, being well made and possessed of useful quality.

BULKING AND NET WEIGHING.—In previous annual circulars we have referred at length to these important matters, and in the case of the first are pleased to note that it is receiving more attention, both in India and Ceylon year by year. The shipment of large breaks carefully bulked will not only save the time of buyers here, but will also do away with the charges incurred for bulking at the London warehouses, no inconsiderable item in the expense of working a garden now that the average price is so much reduced. Unless it is well and thoroughly done, however, the labour spent in bulking at the factory is thrown away, as the work has to be gone over again in London.

Attention should not only be given to proper blending, but the packing of Tea should also receive more care than is at present often bestowed on it. The appearance of the leaf is, in some cases, spoilt by its being crushed into the chest, or the end of the pile, which is usually dusty, being placed on the top. A good "packer" would be a valuable addition to the machinery on an estate.

Much dissatisfaction is expressed by Dealers, both wholesale and retail, with net weighing, and at a meeting of the Wholesale Tea Dealers' Association a short time since a resolution was passed unanimously that notice should be given that after this season the Trade would only buy Indian Teas upon the ordinary gross and tare system, though nothing definite has yet been arranged.

PROSPECTS OF THE COMING SEASON.—Looking at the coming season from the point of view of the planter and garden owner, the low range established is anything but satisfactory, the more so as there is no probability of much permanent rise. The public has become accustomed to cheap (*i.e.* low priced) Tea, and the 1*s.* 8*d.* and 2*s.* canisters have in many cases been reduced to 1*s.* 4*d.* and 1*s.* 6*d.* The best hope of raising prices from the dead level they threaten to fall to seems to be an improvement in quality. For the past few years the crops, roughly speaking, have been alternately bad and good, and it is to be hoped that this next season will bear out the rule, for as the export increases, quality becomes of the utmost importance, as unless the forthcoming crop should be better than this year's, prices may fall even lower than they are now, and with accumulating supplies from all quarters there is nothing to prevent undesirable Teas falling 2d. per lb. beyond their present value.

MANUFACTURE—Successful manufacture is the important factor in determining the financial results of a Season's workings, for well made tea should cost very little more to lay down in London than rubbish. It is well known that occasionally an excessive flush or bad weather make it difficult to manipulate the green

leaf properly, but (as the art of tea making is now so much better known than formerly) good quality can be made under ordinary circumstances if only care is bestowed on each different process that has to be gone through. This is proved by the produce of certain gardens being so well known owing to desirable quality, and those marks which can thus make a name invariably command pence per lb. more on this account.

Some Planters advocate long withering, some hard rolling if care is taken to avoid the expressed juice being lost, others believe in firing at a high temperature after very full or light fermentation, but so much depends on the state of the leaf when it is plucked that no hard and fast rule can be laid down.

Heavily fermented Teas with bright copper coloured infused leaves and a full rich flavoured liquor which creams over when cool have for a long time been in favour, and always command full prices. On the other hand there has been a growing demand for lightly fermented parcels with greenish infused leaves and sharp pungent liquors, as they are found useful for mixing purposes. Sterling quality in the cup is the thing to be aimed at, as the appearance of leaf is a secondary consideration.

SORTING, &c.—In sorting and classifying it is desirable to make as few kinds as possible, especially on small gardens, so that breaks may be of a saleable size, say from 30 to 100 chests or half-chests. This is especially important as owing to the large number of breaks in the catalogues it is proposed that parcels of under twenty chests or half-chests (instead of eight as hitherto) should be sold as small breaks at the close of the auctions when most of the buyers have left the sale room. Boxes of flavoury Pekoe or Pekoe Souchong, suitable for self drinking, also sell well at times, if not less than thirty in number. The gross should be under 28 lb. to avoid the 1 lb. draft allowed in packages over that weight. Broken Pekoe should not be sent in boxes as they do not sell readily, and thus the extra expense incurred is lost.

PACKAGES.—Complaints as to the wood used for chests have not been numerous this season, but we would again draw attention to the desirability of not marking either weight or tare on the packages, as it causes dissatisfaction to buyers even if they differ ever so little from the Customs weights. A few parcels of Ceylon Tea packed in A. Andrews' patent metal chests, sold lately, appeared to meet the approval of the Trade, as they realized slightly better prices than the balance of the break in ordinary wooden packages. If these should come into general use the difficulty as to even weights and tares would be solved, much to the advantage of all concerned.

SHORT WEIGHT.—Instances of short weight have not been so numerous with Indian Teas as formerly, though there have been many in the case of Ceylons, especially purchases made in Colombo. It is to be hoped that this may be avoided in future, by more careful weighing at the gardens.

FIGURES.—There is still a great discrepancy between the Calcutta exports and London imports, both being apparently inaccurate and misleading. If actual weights were given, especially in the London warehouse returns, instead of estimates, the arrivals and also bonded stock, at the end of each month, could be correctly ascertained.

SALES IN CEYLON.—A considerable business has been done in the sale of Green Leaf in some parts of Ceylon, as managers of young gardens, in accordance with the practice of the Chinese, find it more convenient to realise in this way than to incur the expenses of manufacture on a small scale. The market in Colombo is gradually rising in importance, but up to date transactions there have only been comparatively limited. We are still of opinion that the small lots sold there might, to advantage, be bulked, refired, and shipped in merchantable-sized breaks.

Comparative Quality of the Outturn of the Different Districts for the Past Three Seasons:—

ASSAM.

1886 CROP.—On the average under an ordinary crop a few gardens having sent desirable Tea throughout some others good and bad alternately, whilst the produce of many has all been poor.

1885 CROP.—Quality on the whole good, though crop in some districts very short. Teas received during August and September very fine, and even better than those of the previous season.

1884 CROP.—Similar to previous season, many well made, but light in cup. During August and September, some very desirable Teas were received, quite up, if not superior to those of the past few years.

CACHAR AND SYLHET.

1886 CROP.—Large supplies of undesirable quality have come to hand, as if quantity had been aimed at. Only a few really choice liquoring invoices realized comparatively high rates.

1885 CROP.—Outturn large, but the crop as a rule poor. A few exceptions, however, which prove that fine Teas can be made if proper attention be paid to manufacture.

1884 CROP.—Early part of season undesirable as a rule, with the exception of several favorite marks which have kept up quality throughout. Later arrivals were much better.

DARJEELING, KURSIONG AND TERAI.

1886 CROP.—On the whole disappointing, and in some cases the worst seen for many years. A few really fine flavoured parcels received during September and October, also January and February, realized extreme rates, proving that this District's Teas when fine are much appreciated.

1885 CROP.—On the whole disappointing, many of the invoices being dry and sapless. The few fine Teas consequently commanded very full prices.

1884 CROP.—Quality very irregular, but on the whole disappointing. Early arrivals good, especially some sold in August, but September imports shewed a great falling-off in the cup. Towards the close some choice parcels were received.

DOOARS.

1886 CROP.—The season opened well, but the Teas fell off shortly after. Sufficient useful quality was sent to prove what might have been done under more favourable circumstance. Late arrivals showed every sign of excessive flushes, and lack of care in manufacture.

1885 CROP.—As usual there has been much irregularity shown in the outturn. With a few exceptions the Teas lacked quality, though for a time they were good, being full in the cup and drawing thick liquors.

1884 CROP.—On the whole good, and a great improvement on previous year. Some very desirable full flavoured parcels, especially the autumn pickings.

KANGRA VALLEY, KUMAON, AND DEHRA DOON.

1886 CROP.—With a few exceptions, the former has sent thin pointless Teas, unsuitable for this market. Rich flavoured lots always sell well, and the few received were eagerly bought up at 6d. to 1s. per lb. advance on similar grades, with poor quality. From Kumaon and Dehra Doon only limited supplies have been received, and chiefly of low class.

1885 CROP.—A few choice parcels were received from the former which commanded high rates, but the produce of the other districts has been poor and in comparatively short supply in this market, a considerable quantity being sold locally.

1884 CROP.—From the former some very choice invoices received at early part of season. The quality fell off later, owing to the unfavourable weather. Recent shipments have again been good. From the last two districts quantity received was very limited.

CHITTAGONG.

1886 CROP.—Like other districts, the proportion of useful to fine has been small. For a time some good prices were paid, but the general average must be a bad one.

1885 CROP.—Some useful Teas received, but a large proportion has been below the average and therefore realized low prices.

1884 CROP.—On the whole fair, but quality irregular, similarly to that from other districts.

NILGHERRIES AND TRAVANCORE.

1886 CROP.—Only a limited quantity has been received, and this generally of the worst description. It is said that most of the best Tea made in the former district is used for local requirements. From the latter some very desirable parcels have come to hand, similar in flavour to Ceylons.

1885 CROP.—Supplies only moderate, and as a rule of undesirable quality, far behind that sent some five or six years ago. A good portion of the crop sold locally.

1884 CROP.—In short supply and quality with a few exceptions below the average. These Teas, like Kangras, command very full prices when really fine.

CEYLON.

1886 CROP.—On the whole the quality has been good, and full prices have been realized. The average being about 2¼d. per lb. above that of Indian growth, proves the estimation in which these are held. Thin and undesirable shipments have sold badly, and should discourage garden owners from going in for *quantity*.

1885 CROP.—Still in favour with consumers, and whenever supplies have fallen off, there has been a strong demand and full rates obtained. These Teas have made a great name for themselves which will probably be maintained if the quality is kept up.

1884 CROP.—Still in favour owing to their useful qualities. Some undesirable shipments however have realized low averages. Demand likely to continue for all parcels with full flavour.

JAVA.

1886 CROP.—Some really useful Teas have come to hand, and they are gradually gaining favour with home and export buyers, especially where attention has been paid to manufacture. The quality, however, must be kept up and in some cases improved if they are to take further hold on consumers.

1885 CROP.—Since the introduction of seed from India, and English machinery for manufacture, there has been a marked improvement in quality, many of the teas having full rich flavour.

1884 CROP.—These teas have gradually increased in favour, both with home trade and shippers, as more care has been bestowed in the preparation. Only a portion of the crop, however, is shipped direct to Great Britain.

GEO. WHITE & Co., Tea Brokers.

TEA PROFITS.

Communicated.)

In an ably written *communique* in your issue of the 1st February, under the heading "Tea Profits," the writer makes the perplexed planter ask, "Why is it that while the retail price of tea to the individual consumer remains the same, my price realised is becoming small by degrees and beautifully less, &c.," and then, after showing who do not make money out of the sale of tea, he asks, "Who makes out ot tea in this present jubilee year of grace? Who absorbs the difference between the admittedly poor average prices realized by the producer, and the steady rates paid by the consumer?" He adds in conclusion, "The reason of the failure of the many attempts on the part of the planter to place his tea directly in the hands of the consumer and so realize the intermediate profits for himself seems very obscure, and affords a fruitful field for discussion."

1.—It is assuming too much to say that "the retail price of tea to the individual consumer remains the same." A short time back when the retail tea trade was entirely confined to what would, in an age now rapidly passing away, have been called "legitimate channels," to wit grocery stores, &c., the price to the consumer certainly did remain the same and for a considerable period even after market prices had come down heavily. In those days the reason why the price to the consumer did not come down *pro tanto* was this: The grocer trusted to his tea sales as to the sheet-anchor of his business, his profit on his tea sales was enormous, and to encourage customers to buy their tea from him he used to sell his sugar to them at a positive loss. That, of course, means that tea had to make two profits to the retailer the profit on sugar as well as its own profit. Naturally so long as the grocer had the tea trade in his hands as a monopoly, the retail price to the individual consumer remained the same under those circumstances. But these huge profits leaked out, as huge profits always will, and then commenced the outside competition to be expected in all similar cases in these latter days, when "legitimate trading" as formerly understood by the adage, "let the shoemaker stick to his last," is ancient history. Drapery shops, haberdashers, small newspapers and stationery vendors *et hoc genus* began to dabble in packet tea. Then came reduced ladies, with a wide circle of acquaintance, who were not above personally canvassing for customers for their "really delicious tea supplied direct, so much cheaper and fresher you know than nasty, musty shop tea with a mixed flavour of cheese, tallow candles and bacon." For a time prices still kept fairly well supported, as it was owing to the temptation of the huge profit that so many entered the field—all equally interested in keeping up the profit as long as possible. Then began a new era, that of the big advertizers. These men had to trust to being able to win customers from the classes above enumerated who were already in the field. They had to offer inducements superior to those offered by those in possession of the field. Quality everybody boasted about, so that was used up cry. Economy was left them, on this they "banked" and two shilling teas suddenly burst upon us in all directions. Ubiquitous advertising is a most serious expense, and it is of course impossible to say how much a pound it adds to the cost of the tea to the retailer as that depends upon the number of pounds sold as compared with the expenditure on advertising. It might easily amount to pence per lb. even in a large business. For a time the reduction to 2s per lb. held its own, till the profits even at this lower rate, permitted by the further decline in market prices, tempted other new advertisers into the field, and we have now a Tea Company largely advertising teas at 1s 3d, 1s 6d, and 1s 9d per lb. "worth a shilling more at any shop." Now, as your correspondent points out that at 1s 5¾d exchange, a 6-anna per lb. pekoe souchong would cost delivered in London 1s 2½d per lb if we add the cost of advertising, rent, insurance, office and staff expenses, loss in turn of the scales, making up into packets &c. &c. the above rates as last quoted, do not suggest either steady rates being paid by the consumer, or that any very serious difference will soon remain to be absorbed by the retailer. I do not mean to say that grocers in many cases and the older advertising houses too, do not still make from 3d to 8d per lb. on the actual book cost of their teas according to quality,—and in the case of some grocers, be it added, according to the customer's ability to pay—but when advertising and other expenses are deducted this profit is considerably reduced; and it will not be long before the new advertisers of these, now still cheaper teas cut down the popular rates once again.

2.—The reason of the failure of the many attempts on the part of the planter to place his tea directly in the hands of the consumer is explainable upon several grounds to meet different cases. In the first place the qualities that go to make an excellent planter do not necessarily qualify him to make an excellent retail salesman, up in all the tactics necessary here now-a-days. In the second place to open up a connection now-a-days means indefatigable personal canvassing for customers, a sphere in which a planter would feel very much more abroad than he did in India and which would prove much more distasteful to him, than all the worries of planting; or else, it means tens of thousands spent on advertising, and as planters who have started so far have been without the capital to indulge in the latter alternative they have entered the business only to retire from it in disgust when the nature of and the necessity for canvassing became apparent to them, or else to drag on in a one-horse sort of way without hope or prospects. I do not forget two or three noteworthy exceptions, one in Belfast, one in Dublin and perhaps another there may be, but the rule has been as above stated, and the exceptions had exceptional advantages in their favour—at all events one of the exceptions had—which conduced to success, but which advantages were purely local and out of the normal.—*Indian Planters' Gazette.*

SUBTROPICAL CULTIVATORS AND CLIMATES.*

The *Gardeners' Chronicle* has had the following appreciative notice of Mr. Haldane's book which, we are glad to learn, has been selling very well:—

The object of this book, as stated by the author, is to call attention to some of the lesser-known agricultural industries of subtropical regions, which are sources of wealth to the inhabitants, but which are almost unknown to the ordinary class of settlers in our Australian and other colonies. With the exception of Sir Ferdinand Mueller's *Select Extra Tropical Plants*, we had no book which dealt authoritatively with this subject, and Mr. Haldane's carefully compiled and eminently practical work is destined to have a useful career. In it are given plain hints as regards the cultivation of fruits, alimentary plants, condiments, vegetable wax and tallow, oil-plants, fibres, drugs, tanning materials, dye-plants, as well as tables of the mean temperatures of subtropical countries in both the Northern and Southern Hemispheres. Mr. Haldane, himself an experienced and successful planter, brings to his aid a large and varied experience gathered in many lands, and hence his book is not merely a compilation, but the result of practical knowledge and observation, which fits it in a special manner to meet the requirements of "colonial settlers and emigrants." The chapters on Tea, Coffee, Olive, Fig, Orange, gave within a short compass all that is necessary to enable an intelligent planter to draw his own conclusions as to the suitability of these industries to the temperature, soil, and climate of the country in which he dwells. Cinchona, although it bears a cooler climate than Coffee, is for some unexplained reason left out. The chapter on fibres is possibly the weakest in the book, for while it gives Sorghum dura as the first on the list of textile materials, it omits the celebrated China-grass, Bœhmeria nivea, and passes over the Agave hemps, which latter supply, next to hemp, the chief rope materials of the world. These and similar omissions will, no doubt, receive due attention in a subsequent edition, and by means of judicious pruning in such chapters as those on Tobacco, Cotton, &c., the size of the book need not be greatly enlarged. As a first attempt to deal in a practical manner with subtropical cultivations Mr. Haldane's book is decidedly a success, and the publishers have done everything they could to issue a neat and attractive volume.

FEBRIFUGE.—Several years ago, Dr. Peraire, of Bordeaux, France, recommended a substance known as ursa-quinine as a febrifuge, in doses of a quarter to one grain per diem. The preparation was composed of ordinary quinine and pure crystallized uric acid. Urea itself has also been recommended as a febrifuge.

OYSTER CULTURE IN CHINA.—My attention was specially called to the stalls of the fishmongers, who not only have river and sea fish, salt and fresh, in great abundance, but an excellent store of bamboo oysters; and if you wonder what they are, I may as well explain that artificial oyster culture is largely practised on this coast, and a bamboo oyster field is prepared far more carefully than a Kentish hop garden. Holes are bored in old oyster shells, and these are stuck into and on pieces of split bamboo, about two feet in length, which are then planted quite close together on mud flats between high and low water mark, but subject to strong tidal currents. This is supposed to bring the oyster spat, which adheres to the old shells, and shortly develops into tiny oysters. Then the bamboos are transplanted and set some inches apart until within six months of the first planting they are found to be covered with well-grown oysters, which are then collected for the market. The oyster shells are turned to very good account, being scraped down until they are as thin as average glass, when they are neatly fitted together so as to form ornamental windows, such as we see in the inner courts of wealthy houses.—*Wanderings in China*—C. F. GORDEN.—*American Grocer.*

**Subtropical Cultivators and Climates.* A Handy-book for Planters, Colonists, and Settlers. By R. C. Haldane. Blackwood & Sons, 1886, pp. 308.

DR. DE VRY, C.I.E., the eminent Dutch quinologist sends us an interesting communication in reply to a statement recently made by Dr. Paul. The latter had quoted Dr. de Vry as authority for an assertion that Pelletier's original quinine sulphate contained a considerable quantity of cinchonidine. Dr. de Vry, however, declares that he never said so, and Judges, moreover, from his analysis of some of the same lot of bark as that on which Pelletier worked, that his sulphate of quinine could not have contained more than 3¼ per cent of sulphate of cinchonidine.—*Chemist and Druggist.*

COFFEE.—"OF GREEN BUG we have all a horror. I mean all who have any coffee left to be frightened about. One man tries a *new* cure and finds it to be better than anything he has tried before, yet he never publishes it! I have heard of several so-called *cures* lately, but surely they ought to see the light in the daily papers; and, if *there is any real good cure*, all might then receive benefit and assist in destroying the common enemy."—So writes a coffee proprietor, but he must have overlooked the full particulars we gave the other day of Capt. Bayley's successful experiments on Nonpareil estate, and the cures he recommends?

CACAO PLANTING IN DOMINICA.—On Thursday evening Mr. D. Morris, late Director of the Public Gardens, Jamaica, and recently appointed Assistant Director of the Royal Gardens, Kew, gave under the auspices of the Agricultural Society an able and highly interisting lecture at the Court House, on the important subject of the cultivation of cacao as an industry in Dominica. The Lecturer, who is on his way to England to take up his appointment, has visited most of the islands of the West Indies, and arrived here by the Royal Mail steamer on Friday last week, it being his intention to proceed by the same Company's boat due here to-day. It is to be hoped that the useful and practical hints given by Mr. Morris on this subject will not be thrown away on those planters and gentlemen who listened to him with wrapt attention throughout his lecture; and notwithstanding the promise given by him to reproduce in the form of a treatise the most salient features of the subject, we shall endeavour to place before our readers in some future issue of this paper the principal points of his discourse. To Dr. Nicholls and the Secretary the thanks of all those to whom the welfare of Dominica is dear are due for having in a great measure brought about the lecture. The former gentleman took the chair and the latter genleman organized and carried to a successful termination all the arrangements incidental to the undertaking.—*Dominica Dial.*

DRUGS IN 1756.—Our colonial empire was still in its infancy, although our West Indian colonies were certainly more prosperous than they have been of late years, and the East India Company had taken firm root in India. Canada was still a French possession, while Ceylon, Guiana, and the Cape were Dutch Colonies, and Australasia was practically a blank on the map of the world. Among the products of the New World, gum guaiac, Jesuit's bark, ipecacuanha, sarsaparilla, snake root, Peruvian balsam, and tolu balsam are quoted, each drug at rates far in excess of those now current. Guaiacum resin was at that time considered one of the most active and valuable drugs known, and was used as a remedy in a variety of diseases for which it is now never administered. Cinchona bark, of which so many varieties now appear in commerce that none but a few specialists can be said to possess a really thorough knowledge of the article, is quoted with refreshing simplicity in two varieties only; "Jesuit's bark opt.," at 3*s.* 6*d.* to 4*s.*; and "Jesuit's bark secund.," at 1*s.* 6*d.* to 2*s* 6*d.* per lb. These two varieties are probably the bark known as "Loxa," and now chiefly consumed in France, for until 1752, that is, eighty-five years after the drug first appeared in the London Pharmacopœia, the habitat of the cinchona tree was believed to be confined to the neighbourhood of Loxa, in Peru, where the Jesuit missionaries first administered it as a febrifuge.—*Chemist and Druggist.*

Correspondence.

To the Editor of the "Ceylon Observer."

DEW: NEW THEORIES AND OLD PRACTICE.

DEAR SIR,—Some time ago the scientific world was delighted with a new theory on dew. The old theory that dew came out of the atmosphere, that it was moisture deposited from the air on cold substances in contact with it, was said to be all wrong; for, according to the new hypothesis, dew came not from the air, but from the very substances themselves on which it was found deposited. The new notion was, of course, proved true by many arguments and alleged experiments.

The *Observer* is not usually dry reading, but I so exposed a copy for twelve hours to the heat of a blazing sun, that for once it became very dry indeed. At evening I spread it out on the top of some stakes a little way from the ground, and left it for the night. Next morning I found the under half-sheet, that next the ground, quite dry, but the upper half was as wet as could be and covered thick with large drops of dew. This dewy moisture did not certainly come out of the *Observer*, and, as I keep a rain-gauge, it was not rain. The following night I repeated the experiment with the same result. I may add that the surrounding vegetation &c., was also dewy, but the *Observer* seemed specially addicted to the mountain dew.

1,700 FEET ELEVATION.

P.S.—Your esteemed correspondent "W. F." hardly does justice to the new theory; according to it, dew is not merely the condensed result of moisture from the ground, but from all substances on which it may be found.

CINNAMON AS IT WAS AND AS IT IS—A VISIT TO THE NEGOMBO DISTRICT.

Negombo, 3rd March.

DEAR SIR,—After a period of many years I have come over here on a pleasure trip, and to visit the old places where I was interested in coconut and cinnamon. It is a sad sight to see the once flourishing cinnamon estates, which used to give very handsome income, neglected and abandoned. Two of the crack estates in the Kadirana district are getting on with peeling. I wonder how they manage to peel in this hot and dry weather. I shall feel obliged if the Superintendents of the two estates will let me know through your journal how they manage to peel their cinnamon. Some of the estates in Katunayaka belonging to the natives are kept in fair order. It is surprising how the coconut palm stands the drought in the Negombo district; the trees are looking fresh and green, while at Mirigama and Veyangoda the trees are suffering dreadfully: the leaves all hanging down and you can hardly see the trunks of trees, and the nuts drop and the branches break down. Propping up the bunches in the season does more harm than good. The tender nuts that drop are sold at 25 cts. per 100 to the villagers, who turn it to copra and sell it to traders, and the traders mix it with good copra and sell it to the merchants. Buyers ought to be very careful as to how they buy this season copra, as these nuts that drop down this drought are immature; they are only fit for cooking purposes. I have no faith in the Mirigama, Ambepussa and Veyangoda districts for coconuts; the trees will not last long. The way the trees shed their branches and get them at the top, and at the age of 30 years the trees will hardly give any crop. The great mistake done in this district is planting on the surface; the soil in these districts is of a hard gravelly soil, so for the convenience of the cultivators they take a handful of soil and place the plants. When I was in Negombo I went along with the late Mr. Jeaumax to his property at Veyangoda and warned him as to the way the goyas were planting. Mr. W. H. Wright is doing the correct thing in planting deep. If he plants his coconuts 5 feet deep, he could be certain of his trees bearing in 3 or 4 years, and say in the 8th year he could calculate on a good return. By planting your plants say 4 to 5 feet deep you could put your plants all through the year; as the plants are under ground the sun does not affect them. I shall feel very much obliged to Mr. Wright if he could let me know through your journal the depth he puts down his plants. I took a run up to Ekala. What a change there is in the place—it is quite a little town. I visited some of the cinnamon estates and made enquiries for an old friend of mine; he was away from his estate. I am sorry I missed seeing him. I took the liberty as he was an old friend of mine, and went over his estate. It is kept in perfect order, the cinnamon and coconuts are looking their best. My old friend Mr. Piachaud, deserves credit for keeping his estate in such good cultivation in these hard times with low prices. I went over the the large Ekala estate, one time owned by Messrs. Darley Butler & Co., but now in the hands of natives; it is kept in a most disertable state and the bungalow standing on the hill is no more, where I spent pleasant days with poor Jim Minto. On my way from Mr. Piachaud's I was obliged to pass Mr. Drieberg's estate to get to the high road. I am sorry I missed seeing him and making his acquaintance. Of the little I saw of his property it looks well cared for, the cinnamon bushes stand 8 to 9 feet high. I saw some nice species of cacao on this estate, the trees stand 7 to 8 feet. I went to the Resthouse and was surprised to see the new building. It is a great pity the old building was pulled down; it used to face the canal. I can't say much of the new one. I took boat at the Resthouse and returned to Colombo and enjoyed my trip exceedingly.—Yours truly, S.

[For answer to this, see page 746.—ED.]

ROYAL JUBILEE EXHIBITION, MANCHESTER, 1887.

(SILK INDUSTRY SUB-SECTION.)

To the Editor of the "Tropical Agriculturist."

Leek, Staffordshire, 18th March 1887.

SIR,—I send you by this mail a series of circulars which will explain the honorary work which I am doing for the beuefit of silk culture and also my position as Chairman of the Silk Sub-Section of the forthcoming Jubilee Exhibition at Manchester.

My friend Mr. J. F. Duthie of the Government Botanical Gardens at Saharanpur suggests to me that I should ask you if you would be kind enough to help these Sericultural investigations by advertising in your paper as much of these Circulars as you think would interest your readers and would assist in serving the very important objects aimed at.—Yours truly, THOMAS WARDLE.

Directions for Collecting Silk producing Lepidoptera.

The *Caterpillars* or *Worms* should be collected when full-grown, and whilst alive put into a bottle of spirits (gin, or common white spirit of the country). When dead when they should be taken out, those of each kind kept separate, and then be labelled with a number (as 1, 2, 3, etc.), written in *pencil* on white paper, or scratched on a piece of tin. Several specimens of each kind, with its numbered label, to be wrapped together in a cotton rag and loosely tied up with cotton thread or thin string, and again placed in the bottle (a good, stout pickle bottle, with wide mouth, is best, and easily obtainable), filling up the bottle with spirit and corking it tightly.

The *Cocoons*, in good condition, to be placed together in small batches, labelled with the same number as that on the worms which produce them. The batches should then be wrapped in coarse, cotton rag and marked with the number on label, and tied outside.

The *Moths* to be collected in perfect condition' killed with care, so as not to rub or break the wings. Before they get dry and brittle the wings to be placed over the back, with the underside lying flat and uppermost. Each specimen, when dry, to be placed in a folded paper envelope, and labelled on the outside with the same number as on the worm and cocoon of the kind to which it refers. These moths in the envelopes to be placed in a small square box (a cigar box if obtainable), and gummed paper fixed round the edges.

The Bottles should be wrapped in some soft wool, cotton, or other fibre to keep them from being broken. The bottles, batches of cocoons, and boxes containing the moths, to be packed in a larger box for despatch to England.

Descriptive notes on the food plants, times of appearence, number of broods in the year, and any other useful information should be sent home with each box.

QUERIES RESPECTING PLUMBAGO, CITRONELLA OIL AND KITUL FIBRE.

Galle, 21st March 1887.

Dear Sirs,—Can you or any of your numerous readers inform me, who first discovered the value of Ceylon plumbago as a mercantile export. I have always believed that it was the late Mr. George Winter of Baddegama; but I was told last night, on the authority of a statement made some years ago in your paper, that the late Mr. John Armitage was the first to discover the value of this mineral? I suppose I am right in attributing the discovery of citronella oil, to Mr. George Winter?—Yours truly, X.

P. S.—Talking of discoveries, who first discovered the mercantile properties of kitul fibre which is now so largely exported from Ceylon?

[For full information as to every known fact of importance regarding Ceylon Plumbago, our correspondent may consult a paper written for the Ceylon Branch of the Asiatic Society by Mr. A. M. Ferguson and printed in their Transactions. A very full abstract was printed in the *Observer* and is included in the latest edition of the Ceylon "Hand Book," From this paper our correspondent will see that neither Mr. Armitage nor Mr. Winter can be credited with the discovery of the commercial value of plumbago. Our predecessors, the Dutch, knew something about the mineral and would our correspondent be surprised to hear that the last King of Kandy combined dealing in plumbago with his regal functions! As to kitul fibre, we believe, it first became commercially important in the time of Sir George Anderson, but we are not aware that any particular name is associated with the discovery of this substitute for horse hair and bristles.—Ed.]

TEA AND CRITICISM.

March 28th, 1887.

Sir,—In reading the Annual Report of the Ulapusselawa District P. A. in your issue of 21st instant, it is mentioned in 2nd paragraph under Tea heading :—"So far experience goes to prove that we may look for remunerative returns when the trees reach maturity."

As one interested in our future tea prospects, I fail to understand these remarks and have been asked by a few the mature age of a tea tree. As a cultivator records his fruit trees or bushes when they reach the age of full bearing with the fruit matured in due season, in like manner the tea planter would say, "My tea bushes are fully grown and I can give a correct estimate from the returns of manufactured leaf." A cabbage or lettuce may be full grown when fit for use. When a timber tree reaches maturity it is fit for commercial use and beyond that age a form of decay commences.—Yours,

SIGNET.

CINNAMON AND COCONUT CULTIVATION—PRACTICAL INFORMATION.

Negombo District.

Dear Sir,—Your correspondent "S." is pretty correct in saying that many of the cinnamon estates in the hands of natives are in a disgraceful state: a large number have not been weeded for many years. All that is done is to cut and peel such sticks as nature gives them, pruning once a year, and at the same time chopping down jungle growth. The cinnamon bush being a very hardy plant stands much neglect; would it were otherwise for the sake of those who do give it justice! What is another puzzle is that though many old estates from neglect give barely 50 lb. an acre, the export of the spice, instead of diminishing, increases. Can this be that those estates in Awisawella, Kalutara and Galle, planted in the palmy time of prices are now coming into full bearing? I fancy this is the explanation. We cannot, therefore, look for a rise in prices from diminished production. Prices are so low that the greatest economy in working has to be practised to give the proprietor a very miserable profit. "More power to your elbow" is the means by which the two crack estates he alludes to manage to peel just now. Friction has to be used to almost every stick, yet the colour of firsts and seconds is good, while that of thirds and fourths is rather dull. What would you have—if the wood now being cut and peeled were left in the bushes it would get very coarse, and either all go to fourths or chips; besides, if not cut now, new wood for the year after would not shoot up, thus a double loss would be incurred. Better to risk a little loss in colour than the disagreeable certainty pointed out above. I fancy, too, that Kadirana has had more rain in February than some other parts where cinnamon is grown, and this has given us an advantage; on the 9th a little over an inch fell, and on the 25th almost an inch-and-a-half.

Your correspondent is surprised at the healthy appearance of our coconut trees contrasted with those in Mirigama, Ambepussa and Veyangoda. I think that those places have had quite as much rain as we; and really there has been no drought this year. Certainly, December was dry, but there was about 14 inches in October and 7 inches in November, which though not quite so much as is usual in the north-east, is very good. January had 3·25 and Feb. 2·63. When there has been no rain for three months I then begin to talk of drought. No doubt the water is much nearer the surface in the Negombo district than in the other places enumerated and that is greatly to our advantage and the soil being free the roots have easy access to it. I cannot agree with your correspondent in his recommendation to plant coconuts four to five feet deep. It is against nature and experience; all fruit trees are surface feeders, where they find the nourishment necessary for their growth and fruiting. A young plant will not throw out its roots into subsoil, as it is not fitted to sustain it. But if from any extraordinary combination of circumstances a plant so placed did escape drowning or getting smothered, and did eventually mature a *stem* to the height of the surface of the ground, what it would do would be to throw out roots into the surface soil, and all that portion below would gradually dwindle away; so that the time it took to reach the surface would be thrown away. I have seen many trees that have had earth or even leaves heaped round the stem, throw out roots over the whole of the portion covered, while the roots below have died off and the trees have broken off close to the ground. In my opinion coconuts should not be planted deeper than one foot below the surface. Make the hole as wide and as deep as you like; but fill it up with good earth and manure well tramped, so that during heavy rains water does not percolate into the hole and form a quagmire. If the soil is very stiff, in the second year dig the ground for about three feet all round the hole about

18 inches deep with pickaxes, and lime liberally: this will render the soil friable and the effects of the lime will be felt another foot at least below the dug depth. After other two years, increase the width of the circle dug and lime till the whole surface has been done. Ploughing once a year after this will be necessary. My advice, however, to those who think of planting on say cabooky soil is DON'T. Moderately stiff clay, if well worked, might make a valuable and lasting property.—Yours, TENNAM PELLAI.

COCONUT PLANTING IN THE WESTERN PROVINCE.

Veyangoda, 7th April 1887.

DEAR SIR,—I was very much interested in lately reading in the *Observer* a communication signed "S."; interested, because it contained glimpses of the past. His letter makes it very apparent that "S." is no coconut planter. Comparing the appearance of coconut trees in this and the adjoining districts, with those of Negombo at the present season, he infers that those in the latter district look better because they are planted deeper. To anyone who has given the subject a little thought the reason will be sought for elsewhere—the low-lying ground which constitutes the bulk of these estates and the free sandy soil. "S.", too, seems afflicted with the new-born craze for deep holes for coconut plants and suggests five feet as a good depth. If he were a coconut planter he would have observed that even with holes of the usual depth plants get drowned during the monsoons. What the object of deep holes is I cannot divine. The richest soil is always at the surface and plants always seek for it there. Coconut holes can be made too deep, but never too wide. I would never cut holes deeper than two feet and five or six feet wide, and I will fill them a foot with surface soil and ashes. If holes of less width were cut, the excellent advice of "Tennan Pillai" can, with advantage, be followed and an annually increasing circle be dug round the trees, though as regards the application of lime I would first satisfy myself whether the nature of the soil is such as will render the application advantageous. As to ploughing, I think annual ploughing disadvantageous, as tending to break and disturb the roots formed since the previous ploughing. "S." seems to have an idea that deep holes favour early bearing. The popular belief is just the other way, I believe. A sandy soil favours early bearing, early maturity and early decay, while a soil with more body will be very much more lasting, though trees planted on it will not be so heavy-bearing at an early age. A sandy soil will benefit the father, while the second description of soil will benefit his descendants. —Truly yours, B.

TEA HOUSES AND WITHERERS: COFFEE *V.* TEA FOR THE FUTURE.

9th April 1887.

SIR,—Is it not time now we have got an approved withering machine which may be capable of improvement to do something towards putting a stop to the mania which at present exists for erecting palatial tea-houses? These are made to cost a lot of money, which is simply thrown away. The conversion of coffee stores into tea-houses is also a fruitful source of wasted capital. It was only the other day I was told of a building of this sort, which had, in the transformation process, occupied a period of nearly two years, and was even now not quite completed. I should not like to be the unfortunate person who supplies funds for this costly experiment. The V. A. evidently wants waking up, but possibly there is no V. A in this case. How is it that Ceylon does not produce more men of Mr. Barber's stamp? He is certainly a credit to his class, and it were well for his countrymen, if they made stronger efforts than they do, to follow his example.

With the coffee market in such a satisfactory condition, and the prospect of still better prices, it behoves all who have any fairly good coffee left to preserve and cultivate it, and so come in for a certain run of luck.

The sudden fall in tea prices is rather discouraging, and the rate at which production is increasing, and will increase, is not likely to induce an improvement. G. W.

RUBBER CULTURE.—A Haputale planter writes:—As to rubber cultivation, my advice to those intending to plant Ceara rubber is "don't." To those who have a large area under Ceara rubber trees only, my advice is let it grow, but spend nothing on its cultivation, suchas on weeding. I have not yet found that it pays, even the cost of tapping and curing of the rubber, and some of the trees in my charge are 5½ years old. We have the assurance that the trees give a plentiful supply of rubber when they are older and I have no reason to doubt it. Meantime, I am not aware of its having proved a paying investment to anyone in Ceylon by harvesting the rubber, therefore, I do not recommend its cultivation. It is my honest opinion, there are far too many acres under the product already and as regards rubber anyone with land suitable for rubber would do better to select some other product.—Yours sincerely, J. W.

UDAGAMA.—The papers have not been troubled with many planting reports of late from hence, and your notice in yesterday's *Observer* regarding the intended auction sale by the proprietors, of Ginniedominie land, reminds me that a line on our doings and prospects may be in place. We rank, if I mistake not, as the youngest of the lower districts that rushed into Liberian coffee or certain fortune, and the last, unfortunately, to replace it with tea; and it makes one heave a sigh to think of the amount that, humanly speaking, must already have been realized here had the latter by good luck been made our sheet anchor from the first. But let prices keep up fairly, and to judge by the working of the small quantity of old tea lately cut down, and the promise of several young clearings, we have quite as good a time before us as any district in the island. As to its appearance neither the Kelani or Kalutara valleys can boast much, or probably better things in regard to soil; which here is usually light and stony at the surface, with as good depth of friable subsoil. Where we have our great full is in the even distribution of the rainfall—equal to about 160 inches! For practical evidence of this, the bushes have continued to improve their yield steadily at each flush since January, during a season which, in most other districts—for drought has probably never before been paralleled—"tea looking as if it would die out" or "flushing at a complete standstill" being the general burden, as far as I have read, of your planting reports of late. The flush taken from the old bushes on this estate just before the first general rains come, and the outery was at its height, was at the rate of 600 lb. of made tea to the acre; and this at the next, after heavy rain had fallen, ran up to nearly double. The recent verdict of, I may say as high, and safe, an authority on tea, as there is out here, is that we may calculate on a steady 400 lb.; and with exceptional facilities for cheap transports and work generally, when a property is in bearing, can contemplate the future with a cheerful countenance! Time will, I am convinced on properly opened land, prove his words.

SAMPLE BARKS FROM THE NILGIRIS.

(Communicated by Mr. Hamlin.)

The sample of quill bark 3 feet in length taken from the whole circumference of the stem and which weighs 3½ lb. is a specimen of a large quantity I am sending home this year from the Baimadies estate situated on the Nilgiris at an elevation of 5,500 feet. About 15 acres of 23 year old trees were partly coppiced and the total crop of quill bark now going home will reach about 75,000 lb. If you examine the sample closely you will observe a renewed strip, but as the stem was operated on some 12 years since, the bark has become covered with lichen and moss, closely resembling the original.

The smaller pieces of quill bark were taken from C. Ledgeriana trees. In the *Tropical Agriculturist* of April 1885, I gave the history of these trees which, at five years and eight months old, gave from twenty-one trees, an average of 11·31 sulphate of quinine. I have only now to add that the trees are of vigorous growth and are bearing a very small crop of seed—a few of the trees, now nearly eight years old, have never produced any seed.

[The box of samples may well be shewn now at the Kandy Agri-Horticultural Exhibition.—Ed.C.O.]

SAMPLES OF GREEN TEAS FROM AMERICA.

Mr. James Irvine sends us a packet of samples of green teas from Chicago with the following remark:—

"Here are the samples of tea I promised you with Messrs. J. W. Doane & Co.'s sample memorandum. The prices are splendid."

The Memorandum is as follows:—

J. W. Doane & Co., 61 and 63 Wabash Avenue, Chicago, October 14th, 1886.

(Dollars and cents of a dollar.)

		Value c.	Retailer's Prices.
1	Uncolored; valued ..	28	50
2	„ „ ..	26	50 or 45
3	„ „ ..	23	40
4	„ „ ..	20	35
1	Colored „ ..	30	50
2	„ „ ..	25	40
3	„ „ ..	20	35
1	Basket fired „ ..	29	50
2	„ „ ..	26	50 or 45
3	„ „ ..	24	40
4	„ „ ..	20	35
1	Oolong „ ..	60	1·00
2	„ „ ..	33	60
3	„ „ ..	28	50
4	„ „ ..	25	40

Anyone interested can see these samples at the *Observer* Office.

COCONUT TISSUE AND FIBRE.

(Straits Times, March 21st.)

A product of French origin is now beginning to attract attention in Europe. Several years ago, a French naval officer, Paula de la Barriere by name, took note of the very remarkable compressible properties of the cellular tissue underlying the bark of the coconut tree. From this substance, he has prepared a material passing by the name of cofferdam. The cellular tissue in question has the peculiar property of closely compressing itself, and then again expanding to the fullest extent after a projectile had gone through it, by closing up the hole and thereby preventing the water from forcing its way within through the opening. It acts as an automatic stopper. The discovery is of importance. The subjoined particulars show that it has been quite unexpectedly found to be serviceable in another direction than that of war. We may here state that Miss Wood has discovered a stopping material still more approaching perfection than coconut tissue, as regards its compressible quality. Woodite as this material is called, strongly resembles vulcanised caoutchouc. Experiments have been made in Britain with discs lined with woodite and exposed to fire from Nordenfeldt machine guns at right angles and under an angle of 45 degrees. The woodite facing and the iron discs were literally strewn with projectiles. After the experiments, when the discs were examined not a hole was to be seen. A few discoloured spots only showed the places where the projectiles had impacted. No dents were noticeable. The closing up was perfect. Miss Wood had sought for this material with the object of protecting torpedo boats, the hulls of which are so light and so easily damaged by the smallest projectile. M. Germain, a young French chemist has hit upon the idea of turning the fibres of the coconut to account in solving quite another question. It is well known that very generally electric batteries are at present coming into use, for house bells and telephones for military requirements, and for naval purposes. These batteries contain fluid substances which might spill or leak. Now an empty battery is utterly worthless for the end in view. Moreover, these fluids, however carefully compounded are liable to give rise to stains and burns &c. It is true that, formerly, there was some thought of filling the batteries with acidulated moist sand, sawdust, sponge &c, but these substances increased too much the electric resistance. M. Germain has fixed his attention on the fibre of the coconut, and has thereby achieved important results. He utilises not the inner tissue of the nut, but the outer fibres. The raw material is separated, stamped to powder, and cleaned. The product turned out looks then like powdered cocoa. Its density amounts to no more than 0.08. Its compressibleness is such that, by pressure with the hand only, its volume can be diminished one third. When thus compressed the material possesses a density of 0.22, which is 3 or 4 times that of sponge. Its absorbent properties greatly exceed those of all other known substances. It takes up its own volume of water, and strangely enough, its whole volume amounts then to hardly a little more than that of the fluid alone. It is a bad conductor of heat, but prevents from evaporating or freezing, the substances with which it has been mingled. It is perfectly insoluble in most acids, salts and lyes. Under these circumstances, batteries without fluid adjuncts have been invented. Some have even been put together of great power and remarkable lightness. The electric resistance on application of the coconut fibres, is almost the same as when fluids, without fibres, are used. M. Germain's method of applying electrically the so called cofferdam and woodite, makes it possible to put batteries together, which cannot become exhausted with the additional advantages of handiness and lightness. In course of time, this will lead to light batteries and accumulators, intended as electric motors for cars, torpedo boats, and balloons. The above described discoveries show that waste products often only need research conducted in the right spirit, to become useful and serviceable in the arts and sciences.

THE PREVENTION AND DESTRUCTION OF BLACK WEEVIL IN GRAIN BINS AND GODOWNS.

The black weevil is an insect well-known to grain-dealers the world over, especially in "tropical climates." In India it eats the grains of wheat and maize, and also paddy. It is found in every rice, paddy, wheat and maize bin in Burma.

Like any other insects, the black weevil seems to flourish particularly well in Burma. This is owing to the even temperature of the climate, as it dislikes the sudden changes to heat or cold. It is impossible to estimate the amount of damage caused by this insect in Burma, but it is enormous.

A large percentage of the shrinkage in stored grain may properly be attributed to this awful destruction by this insect. It is not detected unless in very large numbers, but when the grain is cleaned by being passed through a fan or winnowing machine, grain which has been thoroughly cleaned will show a large percentage of dust and a material falling-off in the weight and bulk of grain.

The natives try to combat the ravages of these insects by spreading the grain in the sun and then placing gunny cloths on the grain, when the insect disturbed by the heat of the sun, crawls out of the grain to the top of the cloth, and is then shaken off, and the grain again returned to the bin. This method of temporarily getting rid of the insect cannot be followed when there is a large amount of grain in store on account of the expense of handling the grain. The cheap and simple method of preventing the ravages of the disturbing of the weevil is "Naphthaline powder." The method of application is this: it is but to place the Naphthaline powder at the bottom of the bin or bulk of grain. To accomplish this, take a bamboo about 1½ inches in diameter and long enough to reach from the top to the bottom of the bulk of grain, *punch* the *joints* out of the bamboo so as to enable to pas; a stick from one end of the bamboo to the others have the stick made to fit the cavity in the bamboo; pass the bamboo with the stick in it down through the bulk of grain from the top to the bottom; withdraw the stick and drop into the top of the bamboo, about half a tea spoonful of the powder; the bamboo then can be drawn out as the powder will be safe at the bottom of the bulk of grain. If the bulks are large this should be done to every 10 feet square of the bulk. Repeat the application every 15 or 20 days as the powder evaporates. The weevils that can leave the grain, will do so, and these that cannot leave are killed by the odour of the powder. Naphthaline thus used does no harm to the grain. For such purposes the grain is not affected in the least—rather improved as it is not damaged by this cursed grain pest.

For marketable grain the colour is not affected, and the odour will leave in a short time if fresh Naphthaline is not applied to it.

The quantity of powder used is infinitely small in proportion to the quantity of grain and the powder is entirely destroyed by evaporation, so that for food purposes the effect is *nil*. Naphthaline powder can be had at any respectable Medical Hall for R2·50 per *ounce*; a few ounces will be sufficient for a larger quantity of grain.

I send you this for the good of my old enlightened friends, the Sinhalese and Moormen of your Bonne Island, Ceylon. J. D. W.

TROUT FOR MADRAS HILL WATERS.

Mr. H. S. Thomas, F. L. S., author of the "Rod in India," writes to us:—"As the accompanying papers are likely to interest not a few of your readers, may I beg the favour of your inserting them in an early issue. I have a subsequent telegram from Mr. Le Mesurier, that the trout fry, which are being so handsomely presented, were to leave Nuwara Eliya on the 15th ultimo, but in what numbers, and with what arrangements for ice and carriage, I have no information as yet. If there are enough to justify dividing them into two batches, I think it would be well to send one batch to Ootacamund, and the other to Kodaikanal, on the Pulney Hills. If there is only enough for one batch, I am inclined to think it will be best for the trout, and therefore most to the public advantage, that they should go to Kodaikanal, because the Kodaikanal lake is so very much richer in *ephemera*. They are bred in countless myriads on the rush with which the whole lake is surrounded. The trout are more likely to thrive and reproduce where they are best fed, and if they multiply at Kodaikanal, their progeny can easily be removed to Ootacamund hereafter. Also the trout-like Barilins thrive excellently at Kodaikanal, so that I have taken seven dozens of a morning with a fly. Still, I am afraid that there will be a good many who will think that they ought to go to Ootacamund, simply because Ootacamund is the larger place, just as one gentlemen wants one to put them in the Madras People's Park! I only hope we may get the little strangers safely to their journey's end somewhere, and as it is for the public, not for myself, that the effort is being made, I don't wish to decide the destination without the public having their say and then if we fail once, or twice, I shall hope they will be the more patient of failure till at last we succeed."

Dear Sir,—Your letter to Mr. Kirwan, of the 27th February last has been sent to me for reply. Mr. Kirwan was mistaken in saying that trout fry had been brought out to Ceylon. What we got were trout eyed ova (S. Fario) and so far the experiment shows every sign of being successful. We got them out in two batches of 15,000 each from Mr. Andrews, of Guildford, by two P. & O. Steamers. The first batch was almost a failure, only 562 hatching out, and of these about 500 have survived, and are now healthy young fry. I turned out 200 of these into the stream that supplies our lake here, last week and they seem to be doing well. The rest I am feeding so as to give them a better chance of surviving, when turned out. The second batch was a very successful one, nearly 50 per cent. of the ova hatching out. These are still in the alevin stage, but, so far as appearances go, they will do as well as or better than the others. I shall be very happy to send on full details of our hatching apparatus &c., if you wish it. Judging, however from the condition in which the ova arrived and the rapid manner in which they hatched out, I should be inclined to doubt the possibility of your being able to introduce trout into your hills, by means of ova, unless a different system of packing than that of Mr. Andrew's is adopted. Nearly all our first batch had hatched out before they arrived though very carefully looked after on the voyage, and the second batch only came just in time, (nearly 3,000 hatched out the first night). The longer sea voyage from Madras, and the far longer railway journey to the hills, to say nothing of the trip up country, would, I fear, be fatal to the ova. Nor was this our first attempt. In 1882, and twice since, we tried the same experiment, but each attempt failed and it is only at our fourth that we seem about to succeed. On the other hand, I believe you could transport fry from this to Madras without difficulty, and if you could arrange for their transport, I shall be happy to give you some. The best way, of course, would be for you to get some Indian visitors to this station to take charge of the tank, and to see that the water was constantly changed, and the fry fed now and then. At any rate, if I can assist you in any way in this matter, you may command my services. And now, per contra, may I ask a favour from you, and that is, can you help me towards the introduction of mahseer into Ceylon? Could you send me some fry: and give me full details of how to treat them &c.? Perhaps we could arrange an exchange, and by the same hand that you send me mahseer I could return you trout.

C. J. LEMESURIER.

DEAR SIR,—With reference to my letter of the 20th, I am going to make an attempt to send you a few trout by Mr. J. Howard, the Manager of the Murree Brewery Co. here, on the 5th or 6th proximo. Mr. Howard is away from Nuwara Eliya just now, so that I cannot give you the exact date and name of ship, but will write you again *in re* when he returns to the station.—C. J. LEMESURIER,—*Madras Mail*,

PLANTERS IN DELL.

(Translated for the Straits Times.)

Barring estate incendiarism by Battaks, planters in Deli are getting on very well. They will, however, have soon to look out sharp, now that North Borneo is coming into prominence as field for tobacco cultivation. A new company formed for growing that article there has just raised at Batavia the full amount of the capital required for the purpose. From Siak, too, a keen competion in the same direction may be expected erelong. It is a pity that the economic conditions prevaling in Deli, favour tobacco planting exclusively. The Government neglects doing anything to bring about a healthier state of things in this respect. So long as the east cost of Sumatra supplies the European market with tobacco only, that country will always run the risk of some day finding its most fertile land becoming almost worthless. It is evident that planters there should continue to direct their energies to one main point, namely the possibility of introducing a sound system of rotation of crops. In Java, the exclusive growth of tobacco in certain districts has resulted in whole estates becoming quite worthless. Deli planters would do well to profit by example.

LIME JUICE.—Looking to the value of lime juice in this country the *Grenada Chronicle* wisely advocates a larger cultivation of the lime. This journal has often impressed upon its agricultural friends the advantages to be derived from the production of limes, but hitherto with very little success. There are acres upon acres of land in Grenada unadapted to the production of the present staples that would readily yield the lime tree.

COCONUT PLANTS.—Transplanted plants of one and two years' old will certainly bear in three years and I take it that Mr. Wright's plants were such. I appeal to such veterans as Messrs. Schrader, Lamont, Jardine, Poulier, Joronis Peris, Justice Dias, Piachaud, Shand, Stork &c., to endorse what I have said. Mr. Wright's treatment of cocoanuts with expenditure *ad libitum* must certainly push the plants forward, but I should be glad to learn from the gentlemen I have named or any of them, whether they know of any estate in the country that has 75 per cent of the trees on the land in bearing in 10 years. I trow not; twenty more likely excepting perhaps those in the far famed district of Madampe and Chilaw. Mr. Wright's venture in the vicinity of Mirigama is being cultivated, I understand, in his usual liberal style. When it is giving a return we shall be glad to hear from him how much it has cost him per acre and what percentage he reaps on the expenditure. I have nearly 30 years' experience of this district and I have no hesitation in saying that with all Mr. Wright's "energy" he will not bring 75 per cent of his trees to bear in 10 years. If we live we shall see.

ALLEGED SOLUTION OF THE RHEA FIBRE DIFFICULTY.—If the following statement in the *Indian Agriculturist* should turn out to be correct, the importance of the discovery can scarcely be exaggerated. Rhea is one of the finest of all plant fibres, but it has hitherto been one of the most intractable:—"Many of our readers will be glad to learn that Mr. Charles Maries, of the Durbhunga *Raj*, has solved the Rhea fibre problem. Mr. Maries has discovered a process by which he can decorticate the fibre in the green state with extraordinary facility, after which he works it up to the required standard under his new process. We have seen some of this fibre, and can state with certainty that we have seldom seen Rhea fibre to equal Mr. Maries specimens. It retains all its strength of tension, while the floss is as soft as silk. Mr. Maries, we understand, has shown his fibre to some of our large Calcutta merchants who deal in fibres, and their opinion is a very favourable one indeed. We congratulate Mr. Maries on his discovery, which ought to prove a perfect "mine of wealth" to him. Any one wishing for further particulars should address himself to Mr. Charles Maries, Durbhunga."

"REVUE AGRICOLE."—We have received the first No. of this publication edited by Mr. A. Daruty de Grandpré, President of the Acclimatation Society of Mauritius, and we cordially recommend it to all our readers. The name of the Editor is in itself a guarantee of the quality of the contents, for he is an accomplished botanist and throughly at home in the Agricultural History of the colony in all its details, and in the various subsidiary cultures which might be carried out in Mauritius if only once started. Among the contents there in an excellent summary of the Sugar Industry of Mauritius, and a very well written article upon the manufacture of perfumes which, in the case of Jamaica appear to be a very paying speculation, also one upon the profit that might be derived from the pine-apple which grows almost wild here and might with a very small amount of ordinary care turn out excellent wine and spirits of exquisite quality. The Revue is very well printed and we wish it every success, for it will supply a long felt want.—*Mauritius "Merchants' and Planters' Gazette."*—[The "Revue Agricole" has reached us and we shall have some of the papers translated and printed in the *Tropical Agriculturist*, which we are specially asked to exchange.—ED.]

GUARANTEED MORTGAGES.—In a recent number of *West Indian Quarterly* Sir John Gorrie formulates a scheme by which money might be safely advanced on guaranteed mortgages and help to make estates reproductive. As what Sir John Gorrie says is closely allied to the questions which the sub-committees on State-aided Emigration have to define, the following extract may prove useful:—"As recently there was some talk of buying up Ireland, "why no give the West Indian communities the right to borrow upon the best terms, and to offer security such as has never been offered to lenders on mortgage since the world began? . . . For the want of this privilege the poor islands, which might have been getting their heads above water, have been unassisted in their hard struggle against ruin. Although such a scheme would not be workable at home, or in large representative Anglo-Saxon Colonies, yet it might probably be considered with great advantage in Trinidad, Barbados Demerara, and Jamaica, as well as the smaller islands. Recent events in the former have shown how precarious an industry is which draws its working capital from mercantile sources. These are so subject to the fluctuations of the money market that no dependence can be placed upon their permanence. A failure here or there sufficient to alarm a Bank manager in London may dry up in a night the fountain which irrigated a great estate with the necessary supplies. How much better to depend upon capital advanced upon specific terms which cannot be called up without giving the borrower time to turn round to avail himself of other resources. In an ordinary case he might find the ear of the oracle deaf to the charmer, but if he as a borrower can come to say that he not only gives land as security more valuable than the sum asked for, but that a Colonial Board will guarantee the principal and interest by means of a fund levied, collected, and invested by law and that the interest will be paid in London as regularly as the dividends on Government stock, depend on it, the oracle will be deaf no longer, but open, generous, confiding, and liberal."

THE PRESERVATION OF TIMBER.

In buildings of timber in whole or in part, it is commonly found that from exposure to weather, insects and other causes the timber frequently decays in the course of a few years and has to be replaced. To avoid this extra expense the process of injecting some chemical substance into the timber is worthy the attention of selectors and others, who, in erecting the necessary buidlings are sometimes obliged to use timber of inferior quality owing to deficient seasoning or some other cause, which tends to lessen its durability, and which, if it could be cheaply prevented, would certainly be worthy of being put in practice.

The decomposition and decay of timber is a natural process, which, sooner or later, renders it useless for economic purposes, but for nature's purposes the more rapidly it is decomposed into its component elements and mingles with the soil the better it is for living vegetation. This being the case it is evidently the business of men to retard, if they cannot altogether stop, decay from proceeding. One of the first and most common of the various methods that have been employed is to shelter it from the weather, a method which in the case of all, but more especially some particular kinds, enables it to remain sound for many years, even for centuries, in the case of some species. Pillars of mosques in Kashmir of the wood of the Deodar are found sound after being 400 years in use, and, says Baron von Mueller, bridges of still greater antiquity are in existence. Most sorts of timber, however, decay much more rapidly, some not lasting even a lifetime, and to abate that failing and render the timber more lasting, various substances have been used and processes proposed, some chemicals acting in one way and some in another. By one process the destruction of the sap is aimed at and the consequent drying and hardening of the woody fibre; in another the attempt is made to destroy or alter the albuminous matter in the sap; while other experimentors have endeavored to effect the object by forming insoluble precipitates with metallic salts. To effect the destruction or elimination of the sap heat has been employed from the earliest ages, and the practice of charring the ends of posts to be sunk in the ground has been universal, and is still practised to a large extent, though it does not prove very satisfactory. A much better method of effecting the object is to dry the timber in the warm atmosphere of a heated chamber; by this means the sap may be nearly or altogether expelled, and the timber so consolidated as to become extremely durable if kept dry; but the process, like most others, is expensive. The total expulsion of the sap through the production of a vacuum has been recommended. Various methods for the neutralisation of the properties of the sap have been recommended, among others floating the timber in water for a time has been practised. Half a century ago kyanising timber was all the rage in Britain. Mr. Kyans process was the injection of chloride of mercury into the timber, but the practice fell into disuetude after a short time. Then Burnett proposed the injection of chloride of zinc; Lege and Pironette that of sulphate of copper; Payne's preparation of sulphate of iron and muriate of lime were all experimented with and had their day. Bethell's creosoting process, on the same principle, has led to an adoption of that substance in the northern hemisphere, and also in Australia, though it is generally applied by merely painting the surface of the sawn timber. The *ratiouale* of Bethell's process is described thus:—"When injected into a piece of wood the creosote coagulates the albumen, and thus prevents putrefactive decomposition, and the bituminous oils, being insoluble in water and unaffected by air, render the process universally applicable." This method is one which can be easily practised anywhere. Unrefined creosote can be obtained at a low rate, and merely requires to be laid on with a painter's brush. It can be used for quartering, battens, laths and other timbers required for roofing and other parts of house building. It is especially applicable to stables and other outbuildings; increasing the endurance of the timber, and saving it from the attacks of ants, other noxious insects and fungoid parasites.

Lime is another useful preservative. It has been observed that old lime boards hardly ever decay, and when posts in the ground are surrounded with lime they remain sound for a great length of time. The scientific method of using lime is to form a solution of it in water in which to immerse the timber, which causes similar chemical changes as when subjected to the action of the metallic agents or to the process of creosoting, precipitating albuminous matters, and thus rendering them inactive. The timber also takes up lime as caustic lime, and on the subsequent exposure of the wood to the air the excess of lime which remains in the wood gradually absorbs carbonic acid, and the woody fibre throughout the whole mass becomes coated with insoluble carbonate of lime, and the wood may be said to be mineralised to some extent. As described in the *Garden*, "pits or ponds may be constructed, varying in size and position with the locality in which they are made and the quantity of timber to be soaked, a common pond being quite sufficient for the purpose; all that is essential is to have sufficient size and depth to hold the timber requiring to be soaked." Thus in the building of a farm house, if a pond is not available, a reservoir capable of containing the timber required may be easily formed, its sides and bottom planked or merely clayed, so as to retain the water, of which a comparatively small quantity will suffice to cover the timber when immersed. The water is first to be run into the tank, and then sufficient lime to completely saturate the water and some to spare, for as the water will only take up a definite portion, an excess of lime will do no harm. It requires only 88 grains of chalk or stone lime to impregnate a gallon of water, so that a bushel of lime will suffice for several barrels of water; but as it is best to err on the safe side an excess of lime should be used.

It need hardly be expected that many persons will take the trouble to prepare their timber so that it may last during two or three generations instead of only one, still there are many things, such as tools, implements and machines, that are much exposed to the weather which would repay any outlay that might be incurred in such a simple process. The timber ought to remain in the lime water for ten days or a fortnight.—*Leader*.

FISH WASTE.

TO THE EDITOR OF THE "INDIAN AGRICULTURIST"

SIR,—As British Vice-Consul in the Loffoden Islands, I have pursued with much interest Dr. Aitken's excellent article on the important subject of fish waste, and I heartily agree with all he says in favour of fish as a manure, and also with his remark that a "more perfect utilisation of the refuse would enhance the value of our fisheries and prove a national gain."

Dr. Aitken's description of the wonderful richness of the Norwegian fisheries is not exaggerated, but there are one or two slight inaccuracies in regard to the manufactures which I may correct in passing. The oil in cod-fish is contained exclusively in the livers—in the flesh the quantity does not amount to 1 per cent, consequently the only oil obtainable from cod is the *liver* oil, which is used for medicinal purposes and for *leather dressing*, not for lubricating. As a lubricator it is useless, for exposure to the air deoxydizes it, and it becomes quite viscous. In the herring the livers are exceedingly small; the oil, therefore, is contained chiefly in the flesh, and the percentages vary from 3 per cent to 10 per cent, according to the season and the fatness of the fish.

During my visit to England last winter there was some discussion in *The Times* on the subject of fish *manure*, as Dr. Aitken so properly terms it. Fish *guano* is the excreta of birds whose diet consists solely of fish. Fish manure is refuse dried by machinery and ground to powder, it is less soluble than the guano, or huano, which is the Spanish term. Sir J. B. Lawes drew attention to the wonderfully similar chemical composition of cattle and of fish, both of

them, he asserted, containing 33 parts in 1000 of the essential ingredients—nitrogen, phosphoric acid, and potash.

One of the common sayings of my farmer relatives is that, "You must give back to the land what you take from it, otherwise crops are unprofitabe," and this, in spite of protestation to the contrary is just what agriculturists fail to do. The cattle eat the produce of our fields, and the best of the food goes to build up their frames, the bone, the flesh, the blood, the hoof, and the horn. What farmers return to the land with such unwavering belief in its virtue is simply the waste consequent on this process, the slag of the iron, so to speak, with the minimum of the valuable ingredients and the largest bulk, but cattle cannot be killed for the purposes of manure, and the circle is broken because the flesh and valuable parts, which in our turn we eat, are not returned to the soil as they ought to be, consequently we can only fall back upon the equivalent of oxen, &c., in flesh and bone, viz., fish, which nature has provided for us in abundance, if we will only trouble to avail ourselves of it.

Sir J. B. Lawes, in writing to *The Times*, 29th December 1884, said:—"The chemical composition of fish does not differ much in some of their most important ingredients from that of stock fed on our farms." In 1000 lb. of sprats, Professor Way found 20 parts of nitrogen, 8½ of phosphoric acid, and 4½ of potash. In the animals of the farm at Rothamsted, we found 20 parts of nitrogen, 10 to 12 parts of phosphoric acid and 4½ parts of potash. Although varying in their relative proportions, it will be observed that these important ingredients are almost the same in fish as in cattle or sheep, amounting in each case to about 33 parts per 1000. In the case of agriculture long experience has shown that exhausted soil can be restored to fertility by the application of manures.

The experience of each succeeding year teaches me that there is more than sufficient surplusage of fish in the sea to provide this country with all the fertilising material it needs. Indeed, in the same letter of Sir J. B. Lawes, he speaks to this effect, viz:—"So long as fish live upon each other, the sea resembles a soil covered by forest untouched by man. A growth of firs will follow a growth of oaks, the land is at the same time continuing to increase in fertility, Cod-fish eat herrings, and they in their turn eat smaller fish, but there is no exhaustion of ingredients." In one square mile of the Loffoden fishing ground, it is calculated that the cod-fish devour more herrings in one week than are exported from Norway in one year, viz, 800,000 barrels.

In my small district alone, the firm of J. Jensen & Co., whose advertisement I notice in your columns, have collected, received, and converted into a portable manure in 1885 no less than 19,000 tons of refuse, and it is safe to say that double or treble that quantity would have been at their disposal had they possessed means of dealing with it. In September and October they could have commanded 1000 tons per week of herrings alone—the surplus from curing stations—had their plant sufficed to deal with it. J. Jensen & Co. have grappled with and conquered the innumerable difficulties attending the manufacture of such intractable articles as fish heads, backs, and entrails into a dry, portable manure, and working day and night for greater part of the year, they cannot at present deal with more than 500 tons of refuse per week, from which 400 tons of water are extracted, leaving 100 tons of dry and portable manure. As far as I can learn, there is not such another establishment in the world, but there are places where the trade might easily be conducted, and on a much more important scale, were the same appliances used.

In the waters of the West Indies, on the coasts of South America and Africa, around the Mauritius, Newfoundland, Labrador, Vancouver's Island, and Japan, fish abound in such exhaustible numbers that it would pay to establish factories and employ the natives to catch fish simply for manure. The agriculture of this country is suffering untold things from inadequate fertilising of the soils and unless our farmers bestir themselves to obtain manures which will restore to the land what has been taken from it the present unsatisfactory condition of things will remain unchanged.

Unless land is made to produce the larger possible crops, there is waste in every degree. Labour, interest, rent and farming here will never hold its own against foreign competition.—I am, &c. THO. S. WILSON, British Vice-Consul.—*Indian Agriculturist.*

DRUGS.—The most notable features in the drug and chemical markets are the extreme scarcity of carbolic acid, an advance in bleaching powder, and increased firmness in opium. Reports from Norway confirm those we have already published of the failure, so far, of this year's cod fishing.* The cinchona sales this week have hardly realised anticipations, and quinine tends flatter. Our special report from Buda Pesth indicates a probable scarcity of belladonna.—*Chemist dan Druggist.*

To many mechanical minds a square hole auger would appear an impossible achievement, but a correspondent at Wooster, Ohio, saw the machine manufactured by a company there in operation. It makes a square hole, 2×2 inches, with smooth walls, clean, sharp corners and no splinters, and works easier than a 2-inch round auger. The cutting is done by a rocking motion of a cutter head with knife attached, which cuts upward. The work is smooth and rapid, all waste being got rid of so that choking cannot take place.—*American Grocer.*

DR. BEYERINCK, one of the most distinguished naturalists in Holland, has been investigating the origin of the masses of gum collecting on the limbs of certain kinds of trees, especially plum, apricot and others bearing stone fruits. He finds that the exudation is due to a disease produced by the presence of parasitic fungi; and when healthy trees are inoculated with the gum thus produced, they speedily contract the disorder, which is highly contagious. The disease is disseminated by the drying of the gum by oxidation, and its circulation in the wind, which thus wafts the germs for many rods, so that one diseased tree may infect a whole plantation.—*American Cultivator.*

ONE elementary principle which the many cultivators fail to appreciate is, the grand and important one of DRAINING. Misconceptions with reference thereto are common because easy. What is absolutely false often strikes the mind more readily than the truth. What conclusion is more natural than to think if you thoroughly drain a piece of land that it cannot hold water for the same length of time as undrained land? But it is an immense fallacy nevertheless. Countenance is lent to it by the well known fact that if you draw off a body of water from a swamp by an open drain, that swamp cannot have water in it so long as if it were undrained. This obvious fact notwithstanding, it is the well-drained land that will furnish moisture the longest time during a spell of dry weather to vegetation of any description growing upon it. There are many who know this; there are plenty of Queensland facts that demonstrate it; and there is clear logic and sound reason in the premises which support it. Take a square foot of soil that is firm and close and see what amount of moisture it contains; then try a similar quantity of open and porous soil and it will be found to contain much more moisture. Nor will the porous soil give out its moisture half as freely as the close soil. But what—says one—has this to do with drainage? Everything. Well drained land will be porous, and sodden land closed. The material of a sponge could not hold much water were it pressed into close quarters. Close material of any kind is a conductor of heat and gives out its moisture quickly in consequence by evaporation; and hence sodden lands rapidly, lose their moisture through evaporation, when well drained lands will not and cannot.—*Planter and Farmer.*

---

*Noted with reference to Codliver Oil, of course.—ED.

PEACHES AND NECTARINES.

Many years ago the peaches and nectarines grown in South Australia were very fine both for size and for flavour, whilst the beauty of their exteriors could not be excelled. These fruits were grown chiefly in the gardens upon the plains because the rich land amongst the hills had not then been taken up so extensively as at present. After a time the fruits began to deteriorate and to decrease in size, the trees became sick, and at last the fruit was worthless and the trees were chopped out of the ground. Why did the trees become diseased, and why did they fail to yield crops of good fruit even when young trees were reared in their places? Perhaps it was through neglect of the ordinary rules of the gardeners' art. The trees were allowed to bear at three to four years of age; to produce excessive crops; the land was never enriched, but the spade was freely used and the fine fibrous roots were chopped off in the digging; the trees were never pruned, or, if pruned, the work was done any way and without method. The curl-leaf fungus became introduced along with new varieties of peaches; also the shothole fungus and other destroying agents, and no trouble was taken to cure the diseases, so that at last they became so common that no peaches, apricots, or nectarines could be grown with satisfaction anywhere. Some people say that these trees are not long lived, and that this is the reason; but there are trees that are over 30 years old at Kangaroo Island and in the old-settled south district, where the fruit is as good, as large, as handsome, and as abundant as ever. The growers in these places seem to know the value of mulching, the danger of overdigging, the beneficial effects of judicious pruning, and the folly of allowing the tree to produce overabundantly. Perhaps the opossum performs a beneficial work here, for they knock off large quantities of green fruit. As the cultivators had already in their orchards more fruit-trees than they could fairly manage, they were not anxious to introduce new sorts; and the result has been that in these old and still productive orchards they have no serious diseases amongst the trees. Neither the peach nor the nectarine require exceedingly rich soil to grow in, but they must not be starved, and in summer they must have a sufficient supply of water. Both kinds of flower upon wood produced the season before, so that in pruning it is necessary to bear this fact in mind. They can be grafted or budded upon almonds, plums, or apricots; but the union is never satisfactory, and the only proper plan is work the tree upon stocks of their own order. There are a great many varieties of peaches, but it is not advisable to plant more than three or four sorts, including those that are earliest and those that are latest in ripening. Nectarines are not so numerous in varieties, nor are they so popular as a fruit, from the fact that they are surpassed by the peaches in every respect and are in season at the same time. Still, they are very superior to many other fruits, and are worth a place in a fruit garden.—*Adelaide Observer.*

PRODUCTIVENESS OF THE ORANGE TREE.

There are but few trees or plants in nature to be compared to the orange for fruitfulness; very few so prolific and commercially valuable. Besides its delicious fruit, enjoyed both by the rich and the poor in nearly all countries, it produces several other most valuable products. There are five distinct and highly esteemed perfumes obtained from it. *First.*—The true orange flower odour, obtained by digesting with fat by the process called *enfleurage*. *Second.*—Oil neroli petale or oil neroli begarade, by distilling the flowers of the sweet and bitter orange respectively. *Third.*—Oil neroli petit grain, by distilling the leaves and unripe fruit. *Fourth.*—Oil of orange Portugal, obtained by rolling the fruit in a metal cup covered with small spikes, for puncturing the oil glands. It is called an *ecuelle*, which wounds the fruit and causes the oil to flow. *Fifth.*—Commercial oil of orange, obtained by expressing or distilling the orange peel. Besides these valuable products the dried peel is largely used in medicine. The essential oils enter into the following perfumes:—

Essence of Orange Flowers.—Orange flower pomado 16 ounces; pure spirit of wine, q.s. or 16 ounces. Place the pomade and alcohol into a jar of half-gallon capacity. Digest by means of a water-bath until the pomade is barely melted; shake well together, and repeat the shaking frequently until cold. Allow this to stand a fortnight, then drain off the essence. If this falls short of one pint, repeat with a sufficient quantity of spirit to make up that measure. A second washing can be done and another pint of essence obtained, which though much weaker will be found useful in a cheaper perfume.

Spirit of Neroli.—This is made by mixing oil neroli petale, 4 drachms; pure spirit of wine, 16 ounces. Mix and dissolve.

Eau de Portugal.—This was at one time a very popular perfume. Essential oil of orange peel, 8 ounces; essential oil of lemon, 2 ounces; essential oil of bergamot, 1 ounce; otto of rose, ½ ounce; rectified spirit at 75°, 1 gallon. It is most charming and refreshing during the heat of summer or in the heated ball-room. In the ever-popular perfume "Eau de Cologne," as is well known, the predominating odour is lemony-orange. The following formula for which is given in the new French Codex:—Ol. Portugal (orange flowers), 10 parts; ol. bergamot, 10 parts; ol. lemon, 2 parts; ol. neroli petali, 2 parts; rosemary, 2 parts; alcohol, 1,000 parts. Dissolve and filter. This is much simplified, and may with age give a better result than the old complicated formulæ. Throughout the whole range of perfumes known to us we think there is no perfume so fully answers the word "refreshing" as the lemon and the orange. The violet and the jasmine may be lovely, the rose and sweet-brier delicious, the musk and others, when artistically blended, charming, but none have the invigorating effect upon the olfactory nerves as that possessed by the orange, lemon, and citron family. There are very few compound perfumes (bouquet) of any merit that do not contain one or more of these odours as part of their composition.—*Burgoyne, & Co.'s Monthly Export Prices Current.*

THE TREE TOMATO.

So much interest has been expressed with reference to this fruit, which is occasionally seen in our own markets, that we have thought it desirable to copy a coloured illustration which appeared in the *Revue Horticole* in 1880, p. 150 (see p. 383), and to request Mr. Morris, the Assistant-Director at Kew, to give us the benefit of his experience. This he has kindly done in the subjoined letter:—

"A full account of this plant was given by myself in the *Gardeners' Chronicle*, vol. xxi., n.s., April 10, 1884, p. 510. It is of shrubby habit, with broadly cordate and pubescent leaves, sometimes a foot long. The flowers are borne in sub-axillary cymes, of a pale fleshy colour with bright yellow stamens. They have the odour of Violets. The fruit is about 2 to 2½ inches long, and about 2 inches in diameter. When ripe it is of rich orange colour. In the West Indies it is called Tree Tomato; in Peru (its native country) it is known as Tomato de la Paz. It sometimes appears in Covent Garden Market, as I am informed by the Editor, under the erroneous name of Granadilla, as an importation from the Azores.

"When in Jamaica I was very favourably impressed with the value of this comparatively little known fruit, as it answers in every respect the purposes of the ordinary Tomato, while the plant itself is perennial and easily grown. The fruit is also produced abundantly during the winter months, from November to March, when ordinary Tomatoes are not easily obtained. Unfortunately the plant is not hardy in England or in corresponding latitudes, nor will it stand extreme tropical heat. It is, therefore, sub-tropical, and flourishes best in hilly districts in the tropics, with a mean annual temperature of about 68° Fahr,

"During the last three years several hundred packets of Tree Tomato seed have been distributed to various correspondents in the Colonies, and very favourable accounts have been received of the introduction of this fruit to Ceylon, Southern India, and Eastern countries. Lately Dr. Shortt, of Yercund, sent to Kew a pot of preserve made from the Tree Tomato fruit grown in Southern India.—D Morris, Assistant Director, Royal Gardens, Kew."

To this we may add that the fruit is occasionally grown in this country, as we remember to have had specimens sent us for identification, and they have also been exhibited before the Scientific Committee. As is the case with most cultivated plants, there is a considerable amount of variation in the size, colour, and form of the fruit. Those now figured are more pointed than we have usually seen them.

In the *Revue Horticole* for 1881, p, 470, is a second coloured plate, representing two varieties obtained from seed of that originally figured. One of these is yellow, and we mention the circumstance as we have just received from Messrs. Viccars Collyer & Co., of Leicester, a fruit under the name of Melon-Pear, which is clearly the fruit of a Solanum, very nearly allied to, if not identical with, the Tree Tomato and with the "egg plant." The specimen sent is seedless, and does not admit of absolute verification, but we have no doubt that the fruit in question is the produce of a Solanum. Assuredly it is not a Melon and not a Pear—sufficiently good reasons to the framers of popular names to call it a Melon-Pear. It has, it is true, much of the fragrance of a Melon. We are promised further specimens with flowers and leaves at another time, when the identification of this so-called Melon-Pear can be rendered certain. According to an article in the March number of the American *Gardeners' Monthly*, this plant is called, in Central America, Pepino, or Cucumber.—*Gardeners Chronicle.*

SERICULTURE IN INDIA.

The following extracts from a letter to the Journal of the Society of Arts from Mr Cunliffe Lister will be of more than passing interest:—

"Chinese *tassar* waste is worth to-day at least 25 per cent more than Indian. I use considerable quantities of both. It is quite a folly to suppose that that tassar or any wild silk can be reared to pay, because in all cases it will cost as much, and in many (more particularly *tassar*) vastly more than mulberry, and when done, the cocoons are only worth about half as much. Wild silk has a future, but it must be limited beyond all question to what the jungle can produce at little cost, and that I consider is not a very large quantity.

Tassar might be the fashion, and might, for some special purposes, be as valuable as the *bombyx mori*, but it would be of a fictitious value, as its fibre lustre and dying properties are not comparable.

Some twenty years ago I read in Dr. Ure's *Dictionary of Arts and Manufactures* that there was a species of silk (the *eria* worm) grown in Assam that was so abundant and cheap that the natives over a large extent of country were clothed in it, and that it was so durable that mothers hand down garments to their daughters. This description of Dr. Ure's so exactly suited and described what was wanted, that in March, 1865, I wrote to my agents in Calcutta "with a monthly crop it should be produced almost as cheaply as cotton—that it can be produced for little or nothing is beyond dispute, or why are all the poor natives clothed in it?" From that day (now more than twenty years ago) I have never been able to obtain any supply worth notice; each year I have imported a small quantity, but nothing of any importance. At the present time Manchester prints have to a great extent superseded it amongst the natives. Before going to India, in 1884, I had two acres planted with castor-oil, in order that when I arrived there I might have some eria worms reared under my own supervision, but I soon found that it was a mistake, as they required the same labour and attention as the *bombyx mori*, and the cocoons were only worth half the money, as they could not be reeled, and must be used as waste; so I had my castor-oil plants dug up and planted with mulberry.

Wild silk can be used, when produced at a low price, but can never be a large article of commerce, like the *bombyx mori*. In 1874 I bought 1000 acres of land, at a cost of £3,000 or £4,000 in Upper Assam, for sericulture, but it was afterwards found that labour was too scarce and dear, and I then turned it into a tea garden. Some years after that, in 1878, I made another attempt at sericulture at Mádhopur, in the Panjáb, the Government being exceedingly anxious to promote cottage cultivation. At that time I had but little practical knowledge of the proper method of treating and rearing silkworms, and very foolishly, as it turned out, imported during two or three years a large amount—above five thousand pounds worth—of the best Italian and French seed, which was given out to the cottage native rearers, and for which I got absolutely nothing in return. It might have just as well been thrown into the sea. A very large sum was spent in various ways (most of it very foolishly), but all in vain. It was a complete failure; and well it might be, when we consider the miserable huts in which the worms were reared, and the imperfect knowledge and want of cleanliness of the rearers. There must be ventilation, absolute cleanliness, and abundant space, if silkworms are to be reared with any chance of success. All these conditions are wanting in a native cottage. Although I joined the Government in offering prizes for the best cocoons, and everything possible was done, no expense being spared, it was all in vain, and I had to begin again this time, I hoped, with a better chance of success.

In August, 1882, the Government of the North-Western Provinces gave me a grant of about 3,500 acres of jungle in the Eastern Dún, on certain conditions; one being that I was to have 3,500 acres more when I had planted a thousand with mulberry, and as I have planted about two thousand acres I am entitled to a further grant. The Eastern Dún was pronounced by the doctor of the district as so malarious during the rains as to render its cultivation exceedingly difficult and dangerous, and at first I had no end of trouble from that cause. It is, however, much better now, and as the jungle is cleard away and it is brought into cultivation, it will in time, I have no doubt, be as healthy as any other part of the Dún. I have built a large number of rearing houses for silkworms, a shed for reeling the cocoons, also a large number of workmen's houses, or coolie lines as they are called, also bungalows for the managers; in fact everything has been done to insure success, and to show, if possible, how far the first time in the history of sericulture (at least so far as I know) it can be carried out and made to pay on a commercial scale. Hitherto it may be said to have been altogether cottage cultivation. It is no doubt a large and costly experiment, but I have great hopes of succeeding. The mulberry plants grow most luxuriantly, but we have not yet had sufficient experience to say whether the climate will suit all descriptions of silkworms. Until this year, on a small scale, European seed has done very well, but this year the crop was destroyed by a thunderstorm, and I am disposed to think that there must always be considerable risk attending sericulture, even under the most favourable circumstances.

The Bengal multivoltine worm which I have tried to rear during the rainy season has not so far done well. It may be the climate, or it may arise from bad and diseased seed. If the multivoltine of Bengal should fail, some other species from China or Japan will have to be tried, as it is very important to have two crops in the rainy season, as without that the remuneration would be comparatively small. As time goes on and my plantations grow, and are capable of giving a sufficient supply of leaf for rearing on a large scale, it will be possible then to have a thoroughly practical result that can be relied upon.

There are many problems yet to solve,

(1.) What part of India is best adapted for the purpose? as you must in all cases have abundant labour, cheap land, and above all, suitable climate.

(2.) What is the best system? cottage cultivation or large rearing establishments under European supervision, similar to what is now being tried in the Eastern Dún.

(3.) Will the climate and soil that suit one species of worm suit another? For instance, will the damp climate of Bengal agree with the Italian or Chinese worm?

(4.) What is the best kind and what is the best system of planting mulberry? In the Dún the trees are planted about fourteen feet apart, and the intermediate space is filled with plants, which are plucked and then removed when the standard trees are grown.

These and many other questions, time, experience, and careful observation can alone solve.—*Indian Notes and Queries*

COFFEE: ASSESSMENT OF COORG LANDS.

On the 26th ultimo, the Honorary Secretary, Coorg Planters' Association, wrote to the Secretary of the Chief Commissioner of Coorg, Bangalore, on behalf of the Association, to acknowledge the receipt of the minute (vide *Madras Mail* of April 26) dated 18th March, by the officiating Chief Comissioner, on its memorial praying for a reduction of Assessment on all coffee lands in Coorg. He said:—"As this minute has been published in extenso in the *Madras Mail*, we feel called upon, to reply to an official document so misleading in its statements and inaccurate in its data, as we trust that, although the Government may not see their way to relieving us of a portion of our present assessment, still we shall be able to point out to them that our claims to the same rest upon a far better foundation than the Acting Chief Commissioner would infer. The minute points out the many mistakes that have been made by planters in the selection of land—capital borrowed at too high an interest, planting without shade, want of manure, &c,—but it forgets to add that coffee planting in Coorg was entirely a new industry 25 years ago, and we were only following in the footsteps of the planters of other districts, not knowing what systems were best adapted to the different parts of the country, and having all our experience to gain, which we have certainly done at last after many years, but with heavy loss to the majority of the pioneers of coffee in Coorg. It makes but small account of our losses from leaf disease, borer, or drought, and other climatic causes, without which we should have no reason to complain, and coffee would not only be a thriving industry in Coorg, but we should now be a prosperous body of men receiving a fair return for our capital and labor, which is very far from being the case at present. The reduction in the assessment may seem too small to have any perceptible influence on the future of coffee, but it would have enabled the planter to devote the money thus saved to the purchase of manure, and the improvement year by year of portions of his lands already much impoverished for the want of it. We grant that concessions have been made in individual cases, but too late in the majority of instances to have any effect, and thousands of acres have been abandoned, and thrown back on the land of Government from which they now derive no benefit, and it is to prevent in some measure this further throwing up of lands, and consequent loss to Government, that we proposed a reduction of the present assessment to an amount which the land would be better able to bear. Little new land has been taken up in Coorg during the last five years, but on the contrary, many applications have been allowed to lapse, there being no capital in the country to open up fresh land, and hardly a single estate has changed hands except to go into that of the Agents, who have been compelled to take them over much against their will, and would gladly part with them at a heavy sacrifice if purchasers could only be found.

"The statistics given in this minute of the average amount of production and cost of cultivation are most misleading and inaccurate. So far from the average yield per acre being 5 cwt., it is not one and a half, talking it all over, as is shewn from the official figures given, which are 37,544 acres as under cultivation by Europeans in 1884-85, and which yielded 2,006 tons, or an average of 1 1-12th cwt. per acre, so that it took 18 acres to produce a ton. Again the average nett amount per ton for coffee in London for the past four years has been nearer £50 than £60; but to take the figures given by the Acting Chief Commissioner, we have at the latter price £36 per ton, or at present rate of exchange R520 for cost of cultivation, which for 18 acres to the ton is R29 per acre, whereas the lowest sum on which coffee can be cultivated at a profit is from R60 to R120 per acre, and the better the cultivation the larger the crops, and consequently improved chance of obtaining a profit. The margin therefore left of 25 ber cent, out of the London receipts as shewn in this minute, for interest on purchase money of the estate, and capital borrowed for carrying on the cultivation, as well as to provide a profit to the proprietor, has all vanished, and there is nothing left but a heavy deficit. A more accurate statement would, however, be an average on the better class of estates only, over a series of years of 4 cwt per acre at £55 nett per ton, which at present rate of exchange would give R140 per acre for cultivation, manure, cost of carriage to the coast, and curing, and when this is all deducted it will be found there is very little left for interest on capital and profit to the proprietor. If the crop should, however, fall below this average, which is too often the case, there remains nothing but heavy deficit, as the estate must be cultivated, whatever the crop may be, or allowed to go to ruin. We must decline to touch upon the point of the expensive mode of living referred to in the minute, but it would appear to be a most uncalled for reflection upon a large body of gentlemen, who have barely enough to support themselves as such, and whose incomes have been reduced year by year as the prices of coffee have fallen in value. The Acting Chief Commissioner assured us that, although Government were unable to reduce our present land taxes, still it would be their duty to see that the wants of the planters were attended to, more particulary as regards our communications, which he allowed were in a very unsatisfactory state. We maintain that this by no means sufficiently states the case, but that they are in a far worse condition now than they were fifteen years ago, and that, with the exception of the bridge over the Cauvery at Siddapur, which unites North and South Coorg, and its connecting line, little or nothing has been done to open up the country. The road through North Coorg, a most important feeder, although commenced in 1862, is still unmetalled and unbridged, and the causeway quite unfit for wheeled traffic. We respectfully trust, therefore, that something will really be done to improve the state of the communications in Coorg, which are year by year becomiug worse instead of better under the present regime.—*Madras Mail.*

INSECT POWDER.*

The Dalmatian insect powder, Chrysanthemum cinerariæfolium, B. et H., known also by its Dalmatian name *buhach*, has been cultivated for several years past on a large scale in certain portions of California, the cultivators being Dalmatians who have settled there.

The best soil for this plant is loam, with a large proportion of sand. This kind of soil is particularly suitable for sowing, but it should be well mixed with old dung. The seed itself is mixed with sand and distributed over the soil as uniformly as possible, after which the soil is raked to the depth of about half an inch, and then gently pressed by passing a roller over it. Until the plants spring up, the beds must be irrigated every evening, unless it rains. But great

* Abstract of a chapter on the subject in *Die Tropische Agrikultur*. Von Heinrich Semler, in San Francisco. 8vo. 1886, vol. i., p. 207. Reprinted in the *Journal of the Pharmaceutical Society* from the *American Druggist*, January.

care must be taken not to overdo it, as the plant is very sensitive, throughout its whole life, towards undue moisture of the soil. After the plants have sprung up, they need not be watered more than twice a week. Weeds must be kept away until transplantation takes place, which occurs when the plant is about 6 inches high. It is then set out precisely like Cabbage, about 20 inches distant from every neighbour, and afterwards needs no further attendance.

Buhach is a biennial (?) plant, therefore it flowers in the year subsequent to that of sowing. The flowers must be cut off just when they are about to open, as they contain the largest amount of essential oil in this condition. The cut flowers must be carefully guarded against dampness, and must be dried in the shade, never by exposure to the sun or to artificial heat. After the period of flowering is over the plants are cut off 4 inches over the ground, reduced to powder, and this powder mixed with that of the flowers, in a proportion not exceeding one part of the former to two parts of the latter. [This is the statement made by the author of the work from which we quote. It is made in such a manner that it appears to be the regular process followed, there being no intention at all to utilise the flowers alone.] The finer the mixed powder of herb and flowers is, the more effective will it prove to be. If any one wishes to prepare the powder himself, and does not possess a suitable mill, he may use a mortar covered with leather. The quantity thus worked in a mortar should however, not exceed about 1 lb., to avoid heating the powder. When the substance appears to be communicated, it is transferred to a fine hair-sieve, and the refuse remaining on it put back in the mortar. It is very difficult to reduce the stems to powder in this manner, which—as the author naïvely but truly states—is not a serious disadvantage, as the flowers are the most valuable portion of the plant. Insect powder should be preserved in glass or metallic vessels, which should be closed air-tight.

Insect powder may be used either in form of dry powder, or by fumigation, or in form of alcoholic extract, or mixed with water, or in form of infusion.

The work from which we quote advises to make the first-mentioned method of using insect powder cheaper by mixing it with flour, saw-dust or wood-ashes, which do not interfere with the insecticidal powers. [Of course, this may be done by the user of the powder, provided the dilution is carried too far.] The mixture ought to be made at least twenty-four hours before it is to be used, and should meanwhile be kept in air-tight vessels. Experiments have been made which show that such mixtures acquire greater efficiency by keeping. It was found, for instance, that a mixture of one part of insect powder and eleven parts of flour, applied, immediately after being mixed, to certain caterpillars, was just sufficiently strong to kill them. But the same effect was produced by applying to them a mixture of one part of insect powder and twenty-two parts of flour which had been mixed twenty-four hours before. [The explanation of this may be that the volatile oil of the flowers probably becomes more thoroughly diffused through the mixture in the course of time.—ED. *Am. Dr.*]

The employment of insect powder by way of fumigation is exceedingly effective, particularly in closed rooms, where the dense smoke produced by it, which is not at all disagreeable to human beings, soon kills all insects, particularly those having tender or soft bodies. This method is especially valuable for the purpose of killing mosquitos in rooms. All that is necessary is to place a burning coal in a spoon or other receptacle, and to sprinkle insect powder upon it. In larger rooms, the spoon may be carried about, or several may be thus used in order to distribute the fumes properly. After a few minutes every mosquito will be found dead; and, if the fumigation be kept up for about half an hour, the same fate will have overtaken also—according to the author—any fleas that might have been present. [He says nothing of bed-bugs, but it is certainly worth while to try the above method for getting rid of this troublesome pest, which is spreading gradually into houses of opulence and comfort, where such disgusting visitors had been previously unheard of!—ED. *Am. Dr.*]

The third method of employment, in form of alcoholic extract, is the most advantageous for use in the fields and garden.

The principal drawback connected with the use of insect-powder is this, that its effect, when applied in substance, is only certain when it comes in actual contact with soft-bodied insects. In the case of hard-bodied or haired insects it often produces only stupefaction for a time this drawback is to a great extent removed by employing the alcoholic liquid extract, which may be prepared by percolation, or, according to the author, by macerating 1 lb. of insect-powder for four or five days with 2 pints of alcohol in a warm place, then separating the alcohol and adding 1 pint of glycerin. This liquid extract is to be diluted with water before use. For hard-bodied insects it may be diluted with twenty parts, for more sensitive insects with thirty to forty parts of water. If it is to be used out-of-doors it is self-evident that it should not be applied while rain is threatening, nor during the hot part of the day. The best time is early in the morning while the dew is on the ground, or during cloudy days.

If a decoction of insect-powder is desired, this may be readily made by pouring boiling water upon it, and macerating in a covered vessel until cold.

In many cases a simple mixture of insect-powder and water will be found quite effective. A good proportion is, according to the author, ½ oz. to 2 gallons. [This seems to be altogether too weak.]

The decoction, however, is much more effective. It must be used as soon after preparation as possible, and at a time when its effect will not be interfered with by the condition of the atmosphere.

It should be stated that the majority of insects do not die immediately after having come in contact with insect-powder or one of its preparations. They are at first only stupefied, but death usually ensues after a few hours, and in some cases not until after several days.—*Gardeners' Chronicle.*

THE UPAS TREE.

BY REV. L. J. TEMPLIN.

Among all the deadly poisons of nature, that of the Upas stands pre-eminent for its terrible virulence. Much of fiction has gathered around this subject, and wonderful stories have been told concerning this tree. About 1775, a Dutch surgeon, Foersch, who had travelled extensively in Java, published an account of the Upas poison valley. According to this author, such were the deadly exhalations from the Upas tree, that no living thing could exist nearer than fifteen miles of the tree. That the whole country within a radius of this distance of the locality where the trees grew, was a lifeless, barren waste, strewn with the bones of animals, birds and human beings that had inadvertently ventured within the deadly influence. The poison was obtained, we are told, in the following manner:—Criminals, condemned to death, were given a chance for life and freedom, on condition of their procuring some of the Upas posion. An old priest lived on the confines of the "valley of death," whose duty it was to prepare the Upas hunters for their duties, and administer the consolations of religion to them before they started on their perilous journey. Here they rested till a favorable wind blew towards the tree, when, furnised with a leathern mask or cowl, and a box to contain the poison, they set out on their dangerous mission. If a man possessed a robust constitution and vigorous health, he might return in safety; otherwise not. The priest stated, that in the thirty years he had officiated, only about one in ten who had gone forth on this errand, had returned alive. Nearly all of this has been proven to be pure fiction. No such poisonous exhalations taint the air for miles around, though the deadly character of the juice of the tree has not been, and cannot be, exaggerated.

According to Thunberg, the famous Swedish botanist, "the Upas tree, an evergreen, is easily recognized at a great distance. The ground around it is sterile, and looks as if it had been burned. The sap is of a dark brown colour, and becomes liquid by heat, like other resins. Those who gather it, have to employ the greatest care; covering the head, the hands, the whole body, to protect themselves from the poisonous emanations of the tree, and especially from the drops which fall from it. They avoid even approaching too near, and they provide themselves with bamboos tipped with steel heads, having a groove in the middle. A score of these long spears are stuck into the tree, the sap runs down the grooves into the hollow bamboo, until it is stopped by the first joint of the wood. The spears are left sticking in the trunk for three or four hours, so that the sap may fill up the space prepared for it, and have time to harden, after which they are drawn out. The part of the bamboo which contains the poison is then broken off, and covered up with great care." Again, this author says: "Persons passing beneath the branches bare-headed lose their hair. A single drop falling on the skin produces inflammation. Birds can with difficulty fly over the tree, and if they by any chance alight on its branches, they fall dead. The soil around is perfectly sterile to the distance of a stone's throw." This poison is used to put on the arrow points, and also in the execution of criminals. When the point of a lance that has been dipped in this poison pierces the skin the individual is "instantly seized with violent trembling, then with convulsions," followed by death in a few minutes. The Upas is found in different parts of the East Indies, in Java, Borneo, Sumatra and in the Celebes. The leaves are figured in many books as those of Antiaris toxicaria. Rumph describes it under the name Arbor toxicaria. The tree grows with a rather thick trunk 60 to 80 feet high with extended spreading branches. The bark is rough and knotty and of a brown color. The wood, which is hard, has a pale yellow color, and is marked with black spots. This tree belongs to the same family with Strycnos Tienté, S. nux vomica, S. Ignatii, S. Colubrina, from which the alkaloid strychnine is obtained. These two poisons—strychnine and the Upas poison—are the most virulent of all poisons known. From the S. tienté is obtained the Rajah Upas, or poison of princes. This is a climbing plant that rises spirally around the colossal trunks of trees, and over-tops them at a hundred feet from the ground where they spread their large, green, glossy leaves and hang their fragrant clusters of white flowers in the air and sun light. It is only in the root of this plant that the deadly strychnine, the only active principle it contains, is found, while that above ground is harmless; even the sap containing no dangerous properties.—*Cannon City, Col.*

[Our correspondent is mistaken in classing the Antiaris with the same family as Strychnos. The last is an apocynaceous plant—the same family as the common Periwinkle, and Oleander. Some of these are very poisonous. The Antiaris or Upas belongs to the same family to which belongs the Mulberry and Osage orange—Urticaceæ—and few of these are noxious. The Editor of this once had a plant of the Upas tree under his charge for a year. It was between 3 and 4 feet high, and growing in a 12-inch pot. He had to handle and care for it the same as other plants. His "skull and cross bones" are still in their proper places, nor does he know that he was ever in the slightest danger of having them misplaced by reason of any deadly emanations proceeding from the plant.—Ed. *G. M.*]—*Gardeners' Monthly.*

[We can only wonder at the patience of the Editor of the *Gardeners' Monthly*, with such exploded rubbish as this Rev. Mr. Temple reproduces. Every intelligent schoolboy now knows that the valley in Java owed its pestiferousness not to the libelled upas trees, but to malarious gases from the soil.—Ed.]

PLANTING THE RED CEDAR.—It is proposed to plant extensively the Red Cedar in Bavaria. The superiority of the wood of this tree (Juniperus Virginiana) over all other kinds of cedar is well known.—*Garden.* [This Virginian juniper ought to succeed in the hill country of Ceylon, where varieties of junipers flourish. —Ed.]

THOSE HARDY COCONUTS.—By a casual expression we judge that the recent learned editorial in a Philadelphia newspaper on planting coconuts along the Jersey coast, was made up by an "intelligent correspondent"—that is to say, a wise reporter in a fifth story of a printing office—from a paragraph in a London paper referring to the fruiting of the Chili Pine, or Araucaria imbricata. These fruits were said to be "twice the size of the ordinary coconuts," and the "intelligent correspondent" aforesaid, who (in imagination) saw the trees along the cost, got "coconut" in his mind, and thus became a mixed being.—*Gardeners' Monthly.*

SOLOMON'S MINES.—"Foma Dabu" writes from Oloncurry, Queensland, to the *Mining Journal*:—"In looking over the correspondence in your valuable journal of the 19th December, 1885, the following enquiry interested me immensely:—'Solomon's Gold Mines—Where are they?' Whilst proceeding to Australia in the month of October, one of my fellow passengers on board, who had for years been a railway contractor in India, said to me, in course of conversation. 'As you are a mining man, I know you are interested in anything connected with ancient mining; what is your opinion about Solomon's gold mines, and where are they situated?' My reply to the last question was 'Either in India or Africa; which, I can't say'. He said 'I know it's India, for I believe I have found the Ophir of Israel, and shall some day work it. It's situated in the side of a hill, and was worked as an open cast of quarry, but is now overgrown with tropical trees and plants, but its base still shows a reef of quartz 20 ft. wide, grand looking quartz for the production of gold.' The place mentioned by this gentleman is not the Mysore district, but in Ceylon. This may not be interesting to many of your readers, but it shows the Ophir of Israel is looked for in various parts of India and large reefs found in different parts.—*Madras Mail.*

THE GREAT FORESTRY QUESTION.—Often the Editor of a magazine like ours must be tempted to cry "what is the use" and put down his pen in despair; yet time tells often that his labors have not been without result. Years since we started to show that the so-called forest science, initiated by Marsh in his "Man and Nature," was a complete farrago of nonsense. It is pretty well understood now that trees are a result and not a cause of climate.* The hobgoblin being out of the way, there was nothing left for city foresters to worry about but the short supply of timber in the near future. Thus it became a practical question only, and trees will be planted wherever it will pay to grow them. Necessarily, as we then had to say, there was nothing left but sentiment to care for the old forests. We cannot by all the legislation on the law-year's shelves prevent forest fires in old forests, and the sooner these forests are gone and new ones planted the better for all of us. These views also are prevailing, and though we personally get little credit, it is some satisfaction to feel that the work has by no means been lost. The very fact that the strange idea has become so much a part of the general thought of the world, till its parentage has been lost, is the more encouraging. *Forestry* says:—"The writer who says that our hope of a timber supply does not lie in the direction of preserving the old forests, but in producing the new, comes pretty near hitting the nail on the head. Little good can come from allowing timber to stand until it has seen its best days and begins to decay and lose strength. It is not the 'primeval' but the young forest that needs protection." This is not only our idea, but the exact language.—*Gardeners' Monthly.*—[We heartily concur.—Ed.]

* The opinion which we formed forty-five years ago in Uva, when requested to spare the forest so that a river near Kataragama might not dry up, and from which we have never swerved.—Ed.]

FOR IMPERMEABLE PAPER, dissolve one and one-half pounds of white soap in a quart of water; then dissolve two ounces of gum Arabic and six ounces of glue in another quart of water. Mix the two solutions; warm the mixture; dip the paper in the liquid; pass it between two rolls (a clothes-wringer, for example), and put it to dry. In default of rolls, hang the paper up that it may drip well, or, better, pass it between two sheets of dry paper. Then let at dry in a mild temperature.—*La Nature.*

A CURE FOR PHYLLOXERA.—It was stated at a recent meeting of the Académie des Sciences that after numerous experiments, MM. Couasnon and Salomon had ascertained that this insect will not resist a temperature of 45° C. (113° F.), and that even the eggs of the creature are destroyed by immersion in water of that temperature. Supposing the statement to be correct, it is evident that the plan would be very serviceable in the case of pot-Vines. In the meantime, it is a long while since we have seen any Vine-louse either on the roots or the leaves.—*Gardeners' Chronicle.*

DR. GEORGE WATT, C.I.E., who acted for the Indian Government as Superintendent of the Economic Court of the Colonial and Indian Exhibition (Indian section), communicates an interesting note on Indian hemp, supplementary to the statement made by him last November. Dr. Watt's suggestion that only the Bengal "ganga" should be used in medicine is a valuable one. There are few official drugs which are so uncertain in therapeutics as Indian hemp; but this uncertainty may, it appears, be entirely removed by using a drug which has been carefully cultivated. The price of Bengal ganga may be prohibitive, but the whole subject should be considered by authorities.—*Chemist and Druggist.*

AUSTRALIAN vinegrowers will be sorry to hear that another vine pest has appeared. This is known as the black rot, and is believed to have been brought into France from America, where it has wrought terrible havoc about the Missouri. It has now broken out in the department of the Hérault, France. This disease appears first in a small red spot on the grape, and rapidly infects the entire cluster. The fruit then dries up completely. When the disease first attacks the foliage, the spot is black. Vines growing in rather damp soil, or in regions liable to flooding by overflowing rivers, are most liable to this disorder. The American vines are the cause of this pest coming into France. It is not known exactly how to meet this new plague, but sulphur has been advised.—*Leader.*

PORTLAND CEMENT.—This material may be used for repairing the woodwork of hothouses and all kinds of structures where heat and moisture cause decay in wood. The lower part of the door-jambs and the sills soon become decayed and dilapidated, and I find by experience that these can best be repaired and rendered durable with the above cement. Take 1½ yards of Portland Cement, mix well together, and make soft like mortar, then remove all the decayed parts of the sills or uprights of any parts in the woodwork, put a few nails into the old wood to hold on the cement, then place a straightedge in front of the dilapidated parts, and fill all the holes up with cement; bevel the surface of a sill so that water can run off. I have used cement for repairing wood for fourteen years, and have found from experience that the treatment will preserve wood for many years although partly decayed.—WM. SMYTHE.—*Gardeners' Chronicle.*

THE "PITURI" TREE.—A Southern India contemporary is glad to learn that the valuable Australian tree known as *Pituri*, is about to be introduced on the Nilgiris. It is greatly valued by the natives of South Australia, pieces of the wood being carried by them for hundreds of miles for barter. It is chiefly used as a medicine, and as a masticatory, somewhat in the same way as tobacco, by mixing a little of it with the ashes of acacia leaves. It is very pungent in flavour with a pleasant aromatic odour. The scientific name is *Duboisia Hoopwoodii*, and Mr. G. Goyder, who made an analysis of it, writes as follows regarding it:—"*Duboisia Hoopwoodii*, F. Von Muller, the *Pituri*, Inland desert regions from New South Wales and Queensland to near the West Coast of Australia. This plant deserves cultivation on account of its highly stimulating properties. *Duboisia myoporoides*, of East Australia and New Caledonia, has come into use for ophthalmic surgery. The alkaloid of the latter (*Duboisia*) is allied to *Pituria*, the alkali of the *D. Hoopwoodii*. Important for midriatic purposes in medicine. The tree attains in deep forest glens a height of sixty feet, but flowering already as a shrub. Mr. Cornish, its discoverer, expresses the hope that, taking into consideration the great value of this plant, it may be protected by the pastoral lessees and the travelling public. Mr. Cornish found the plant only between lat. 24 and 25 degrees S. and long. 138 and 139 degrees E." It ought to prove a great acquisition if the plant succeeds in the Nilgiris. —*Indian Agriculturist.*

INCIDENTAL ADVANTAGES.—What one may do has often advantages never foreseen. A miner, for instance, goes into a dry and arid country, wholly unfit for horticulture, and what he needs to support him has to be brought hundreds of miles; yet when he has done all he can and deserts the place because it produces nothing, that which he has done enables thousands to live on it after he has been obliged to leave it. Thus the early miners in California had to leave after the precious metals were exhausted, but the ditches they dug were what the farmer wanted. Many of these ditches which were constructed at enormous cost in the heyday of placer mining, now that the placers are all worked out, constitute a perennial source of increase and wealth to the husbandman, who has succeeded to the miner and come to stay. One of these ditches, called the Bear River Ditch is 70 miles in length and cost 2,500,000 dollars to build, in the year 1851; it carries about 3,000 miners' inches of water, or about 45 cubic feet per second. It was constructed to bring the water of the Bear river down to the rich placer mines of Placer county, and was used for mining exclusively, but not now at all. Running, as it does, through the fertile foothills of that county, it is a permanent guarantee of fruitfulness to the vineyards ard farms which are being planted at either hand, on lands which lie below the level of the ditch.—*Gardeners' Monthly.*

AN exceedingly fine specimen of the Japanese persimmon (*Diospyros*) has been forwarded to us from the orchard of Messrs. Johnston Bros., Wellington Point. It measured 15 in. in circumference, and weighed 17oz. This specimen was from one of the seedless varieties, and consequently can only be propagated by grafting upon seedlings of the other varieties. In flavour and appearance the fruit is not unlike a luscious apricot. It is a tree that should be in every garden, as it is handsome in appearance and comes quickly into fruit; if we remember rightly, the tree from which this fine specimen is sent to us is only three years old. The tree attains a height of about 12 ft. and when in full fruit is a most beautiful object. It requires no particular attention besides being provided with a good garden soil. There are several species of *Diospyros* which are useful to man. The name signifies the character of the fruit, for it is from *dios* (divine) and *pyrus* a pear. The Chinese date plum is the *D. kaki*, and is well known now in our gardens; the *D. lotus* is the European lote, or date plum, to which was attributed the power of causing oblivion when eaten; the *D. ebenus* is the ebony wood of commerce, and and *D. virgiana* is a lofty tree 60 ft. high, the persimmon of the settlers in the Southern States of America. Those settlers who are planting orchards in this colony should on no account omit either the Chinese date or the seedless persimmon from their list when ordering from the nurseryman. May is quite early enough to transplant, unless they can be obtained in pots. One advantage these fruits have is that they are so fearfully astringent that neither insect, flying-fox, nor boy will touch them until quite ripe, and they can be gathered when still astringent, and will ripen in the house or during the journey to market.—*Queenslander.*

THE NEW ENEMY OF COFFEE:—GREEN BUG.

["OBSERVATIONS ON THE GREEN SCALE BUG IN CONNECTION WITH THE CULTIVATION OF COFFEE," BY E. ERNEST GREEN, PUNDALUOYA—PUBLISHED BY THE CEYLON GOVERNMENT.]

This little pamphlet has hitherto—somewhat unaccountably—escaped our notice. It has been compiled at the request of Government by Mr E. E. Green, whose efforts have resulted in a very interesting life history of the most recent pest which has affected coffee cultivation in Ceylon, and —like the locusts that ate up all that the hail had left—has devoured all that was left by the leaf-disease in the northern districts, and to a considerable extent in other coffee-growing portions of the country.

This scale bug is named *Lecanium viride*, to distinguish it from the *Lecanium coffeæ* and the *Lecanium nigrum*, which constituted the old black bug known in Ceylon from the very early days of coffee planting. The presence of all these scale bugs is alike followed by the black fungoid growth which induced the commonly-used term black bug. Mr. Green gives us a description of the *L. viride*, and compares it with the other species, in size and appearance, and adds a plate of beautifully executed coloured figures both natural size and highly magnified. The greater destructiveness of the green bug compared with the others is explained by the difference in its reproduction. Impregnation of the female of the brown and black *Lecanium* is direct—the male insect being a small winged insect, and "the eggs are not hatched until after the death of the parent insect whose body shrivels internally whilst the external scale becomes firmly attached to its support and forms a protection to the eggs and young larvæ." This was well-known to all our planters but the *modus generandi* of the green bug is very different and will, no doubt, be new to many of those who have been accustomed to consider the old and new bug as one and the same insect.

"The eggs of *Lecanium viride* are hatched under the body—and during the life of the parent insect, which possibly produces several successive broods. (Since writing the above I have found immature eggs inside the body of the parent insect after the first brood has been hatched). This may account for the greater numbers and destructiveness of the species under notice. The eggs which vary in number, but are seldom more than twenty, are hidden by the body of the living insect, and are hatched in that position. The young larvæ is only visible to the naked eye as a minute speck. It is very active and moves freely from leaf to leaf deserting the old, and spreading over the young shoots where it finally settles itself, and soon developes the scale characteristic of the mature insect. It is in this early larval stage, probably that the pest is chiefly propogated, as besides its own powers of locomotion, it is liable to be transported by wind, in the feathers of birds, and upon coolies' clothing. The young insect (as I have proved by experiment) will live for many days without food, and might easily be unconsciously transported from one district to another over considerable distances."

Here then we have an explanation of the extreme apidity with which the green bug has spread over the country and the extraordinary destructiveness with which its career has been characterized, rendering it by far the most formidable enemy with which the planter has had to contend. Mr. Green puts forward a supposition as to the impregnation of the female insect which we recommend to the attention of entomologically inclined readers. We merely quote the paragraph with the remark, that as far as can be learned from the text—the only reason he has to give for adopting it as probable, is the fact of the male insect being at present unknown :—

"It is probable that the insects now existing though externally resembling the female form, are asexual, and that their broods are produced by the phenomenon known as 'Partheno Genesis,' by which several successive generations are fertile without the aid of the male element (as is known to occur in the development of aphis and a few allied insects). Professor Huxley states that the number of successive broods has no certain limit, but is, as far as we know at present, controlled only by temperature and the supply of food."

"Effect of the green scale bug upon coffee" is unfortunately too well-known in Ceylon to need reproduction in our columns. "The results of manuring and liberal cultivation" may be condensed into a single sentence "manure has been of use only where the trees have not quickly succumbed to the effect of the bug; on poor soil the tree seems to be permanently injured upon the first appearance of the pest—and manure entirely fails to revive them."

"Will trees badly attacked by the bug, eventually throw it off and survive? It is difficult to obtain reliable information upon this question; but there seems to be no doubt that in some few cases the pest has disappeared from once badly infested coffee." Here a few facts are mentioned as proof which need no comment and it is when we come to "proposed remedies" that our readers will be interested. Writing of the remedies for the old bug, Mr. Green says that maana grass has no effect; caustic lime is equally useless, the same in regard to wood-ashes. If the caustic lime could possibly be applied to every insect it would prove fatal, but that is an impossibility. Acting on a suggestion of the late Mr. Neitner in his "Enemies of the Coffee Tree," that tar applied to the roots and "taken up into the system of the tree throws off the bug." "I have tried the solution of Phenyle brought into notice as an insecticide" a few years ago. It is one of the extracts of coal tar, and probably contains most of its active properties in a form that can be more easily taken into the system of the tree. The mixture used consisted of one desert spoonful of phenyle to two quarts of water. The soil around the root of the tree was thoroughly broken up with a digging fork, and the liquid applied from an ordinary watering can. My experiment was limited to a single tree, and scarcely a sufficient time has elapsed to judge of its success. But it has seemed to me that the pest upon that tree has been gradually disappearing although the surrounding trees have not altered their condition. Dec. 31st.—after an interval of a month I now find that this tree has entirely thrown off the bug, although on neighbouring trees the pest has rather increased than otherwise."

This is so far satisfactory as phenyle could be obtained in large quantity at a very small cost and we should like to hear more of this experiment and of similar ones on a larger scale. Mr. Green has also heard of the success of an application of Schrotky's cure for leaf disease 15 per cent carbolic lime, 3 bushels to an acre, in ten days the bug turned white and died, and after 3 months the coffee is looking remarkably healthy.

"Origin of the Pest:"—First attracting attention in Matale in 1882, it had reached Pusselawa in 1884, Ramboda in 1885, and Badulla 1886. The only suggestion as to its introduction is one Mr. Green has heard from another person, namely, that it came with Liberian coffee from the West Coast of Africa. We append a communication on this point from a planter, who, we believe, first pointed out that the green bug must be a different species from the old one—even though he had not then seen it—arguing from what he had heard of its habits and effects at low elevation and in dry weather. Finally we learn that, "this species of scale bug is by not any means confined to the coffee tree. I have found it flourishing upon cinchona though it does not seem to injure any except the very young trees. I have frequently observed it upon orange and lime trees, upon guava, and a large number of wild plants. I have occasionally seen it on tea bushes, but not in sufficient quantities to effect the healthy growth of the plant."

Mr. Green deserves the thanks of his fellow-planters for giving them the benefit of his labours in this investigation, and we may hope that he will from time to time let us hear of any new discoveries he may make elucidating questions effecting the planting industries of the island. The communication from a planter to which we have referred, is as follows:—

"I see Mr. Green in his monograph on the green scale bug has just touched on my pet theory of its introduction with Liberian coffee from the West Coast of Africa. There is no doubt in my mind that as regards time they made their appearance together. In this respect my assertion is supported by Messrs. Alex. Ross and J. Holloway and also by W. A. Lyford whose experience of it lies chiefly at Amblangodde. The bug came with Liberian plants into Pundaloya and was visible on them long before it spread to the other coffee. Still this does not prove anything, and I think the Government having induced Mr. Green to tell us all he can about it should now send the "life history" to our Consuls on the West Coast of Africa and request their investigation, and report. The Consul for Imperial Germany told me he would willingly do all he could in that direction if copies were put into his hand. It would indeed be a curious instance of the 'irony of fate' if Liberian coffee which was to revive the fallen fortunes of coffee planters should prove to have been the indirect means of destroying them altogether. Possibly Mr. Shelton Agar might be able to tell us whether he noticed any black or green bug on the coffee he saw in Liberia. Scale bug of kinds and black fungus may be met with in almost all tropical countries, and probably everywhere in the world."

Our latest news is of a bad attack of the green bug on 150 acres of fine coffee in Dikoya which had always been well cultivated and generally treated with cattle manure; the prospect of a fine crop this year was very good, but just as the spike of blossom appeared it got all nipped off by the green bug. We have already referred to the way in which this enemy has disappeared from many Uva estates after being supposed to have fairly established itself. We have also noticed successful experiments by Capt. Bayley's manager with kerosine and caustic lime, in getting rid of the pest, which was also killed out by the frosts of the present season in Udapussellawa. There is no doubt that the owners of good coffee should be on the alert to fight this enemy in one or other of the ways as may be found most suitable, mentioned by us or by Mr. Green—giving their neighbours the benefit of their experience.

We have just learned from Mr. Shelton Agar that he never saw or heard of green bug, or bug of any kind, on coffee on the Liberian Coast. He found some coffee leaves there affected after a fashion that reminded him of our leaf disease and sent them to Kew for report. The answer was that there was nothing approaching to the *Hemileia vastatrix*, and that the cause of discoloration was one of no moment.

CREOLE CORN MEAL.—An experiment was being made by a well-known Georgetown (Demerara) establishment, to introduce creole corn meal into the local market. The meal is made of corn grown in Demerara and ground by a mill imported especially for the purpose, and it is recommended by the *Argosy* as being "of decidedly superior quality to the ordinary run of corn meal imported from the States." It is offered for sale at less than the price of the American article.

FIXATION of atmospheric nitrogen of soils, says the *Agricultural Students' Gazette*, is a vexed question, and still undecided. A large number of experiments, extending over two years, the results of which have recently been published by Mons. M. Berthelot, tend to show that argillaceous soils have a very distinct power of absorbing and fixing atmospheric nitrogen. The soils experimented with were placed under different conditions, in closed flasks, in a well-lighted room, in a meadow under shelter, and on a tower 28 metres high, without shelter. In all cases there was a gradual increase of combined nitrogen, and this not in the form of ammonia nor of nitrates, but apparently of amido compounds. Berthelot believes the action to be due to micro-organisms, for when the soil was sterilised by heating to 100° C. it no longer took place; cold also stopped the absorption. He calculates that at least 20 to 32 kilograms per hectare are thus absorbed by clay soils per annum. Mons. Joulie also has published the results of some experiments which appear to prove that when crops are growing on soils there is a very considerable fixation of atmospheric nitrogen.—*Indian Agriculturist.*

NORTHERN PLANTATION EXPERIMENTS.—The *Cooktown Independent* speaks as follows of Mr. Dick's planting enterprise on one of the branches of the Endeavour River:—"There are four acres under coffee, chiefly Liberian, the plants varying from 2½ to 5 feet in height, according to age, (from 1 to 3 years transplanted). There are nearly 100 in bloom, with here and there the gorgeous little berries peeping out from among the leaves. Every plant looks healthy, and the whole forms a pretty little scrap of landscape, quite new in the Far-North of Queensland. There are 4½ acres filled with a great variety of tropical fruit trees, including several species of oranges, citrons, tamarinds, mangoes, lemons, figs, apples, cinnamon, nutmeg, (in flower) annatto, (in seed) grenadillas, mulberries, jack fruit, pomegranates, mangosteens, pa-paws, a magnificent tree laden with Brazilian apples, and a couple of very healthy looking tea plants in bloom. There are a few peach trees, each about 5 feet high, but neither they nor the vines seem to thrive very well. Mr. Dick had previously grown fine sugar cane on the levels and as an experiment tried it on the high lands and ridges, resulting in equal success, and proving beyond a doubt that there is scarcely an acre of his 640, which will not grow almost any known tropical production. The soil is execellent and well watered throughout, but only about 30 acres are yet cleared for cultivation, the rest being used for grazing. Considering the cost of labour and the expense of bringing plants and seeds from Ceylon, India, Batavia, and China, Mr. Dick has done wonders with his limited means, and has paved the way for capitalists to prosecute tropical agriculture on a large scale." We cheerfully endorse all this, for we had the pleasure of inspecting the favoured locality in May, 1883; and formed our own opinions on the suitability of the soil, climate, and locality, just as expressed above. —*Planter and Farmer.*

FRUIT GROWING IN FLORIDA.

Fiji is far behind Florida as a fruit-growing country, as evidence the following statements in the *Scientific American* supplement of 26th Nov., headed, "Profit of Fruits and Vegetables grown in Florida." The writer commences:—"I now speak from my own knowledge of what can be done at Crescent City, Putnam Co., Florida. Of the orange, banana, and pineapple, I can speak with more certainty than of any other product. Upon each acre of ground seventy-five orange trees may be successfully grown. Some persons plant more than this number per acre, but I will assume 75 as a basis of my statement; when in full bearing it is far within the truth to estimate 1,500 oranges as the annual yield of each tree, and it is not at all difficult to realise $ 10 per 1,000 for them, which gives the aggregate of $ 1,225 per acre. The orange tree may be brought to bear in six years; the first crop will be light.

Pineapples are propagated by setting out the shoots of mature fruit; some thousands or more plants may be successfully planted upon one acre, and, at $15 per 100, would yield an annual income of $1,050 per acre.

The banana is propagated by planting out suckers, and will bear from the second year, and annually, thereafter, for an indefinite period. It requires no cultivation, and only needs to be let alone to grow, and constantly enrich its owner. About 500 plants may be successfully grown on one acre. As each plant produces from five to seven bunches of fruit, it follows that the return to the grower at, say, fifty cents per bunch would be $1,500 to $1,700 per acre. To convince my readers how far within the truth I endeavour to keep, I will say that a party, in Bradentown, Florida, has just sold his banana crop, from off one acre, for $3000.

The coconut is a good paying tree; the yield annually is about 150 nuts per tree; they come into bearing seven years after planting the nut, and there can be put about 300 trees upon one acre. They require no cultivation. Under these circumstances an acre would yield, at a net return of $3 to a tree, $900 per acre.—*Fiji Times.*

FRUIT TREES IN CALIFORNIA.—The number of fruit trees in California is: Apple, 2,700,000; peach, 1,200,000; pear, 500,000; plum and pruen, 600,000; cherry, 400,000; apricot, 500,000,; orange, 1,600,000; lime and lemon, 500,000. It is estimated that there are 70,000 acres of grape-vines.—*Planter and Farmer.*

MANILLA HEMP IN INDIA.—There is reason to believe that this fibre has been placed in a position of importance to which it is not entitled. Traditon has no doubt handed down the fact that it is of great strength and durability, and capable of sustaining a great strain. It is possible that in Manilla, where probably fibre-yielding plants are not plentiful, and in its native soil, the *Musa textilis* takes a high place among fibres, but the results of its cultivation in India have certainly not realized the expectations entertained of it. We have in these columns from time to time noticed the results of experiments with this plant in different parts of India, and in no one case do we recollect these results to have been satisfactory in any sense of the term. The Government of India has doubtless spent a great deal of money in the conduct of these experiments, and it is our opinion that they should now cease. Sufficient time has been given to the Manilla hemp, and after many trials, it has been found wanting in two of the essential qualities necessary for the successful cultivation of any economic plant in this country, viz., low cost of production, and cultivation without artificial irrigation. There are numerous plants, indigenous to the country, which yield a fibre in every respect equal, if not superior, to that of Manilla hemp, and which can be grown with the minimum of trouble, and at a very low cost, in addition to which they have the further advantage of being known to the people. When one of our commonest fibre-plants, *Sun* hemp, (*Crotolaria Juncea*), yields a large crop per acre, at less than one-third the cost of a better quality of fibre, it is time the *Musa textilis* was given up.—*Indian Agriculturist.*

96

CUBEB VINE.

Another new product suitable for Ceylon cultivation has quite recently been brought to my notice by a Mincing Lane broker, who inquired why no attention has ever been given by any planters in your island to the growth of the cubeb vine. The *cubebs* of the druggist are the product of a vine having all the appearance of, and grown in a similar manner, to the pepper vine; and as we all know that pepper was largely grown in Ceylon by the Dutch for the purpose of packing amongst their cinnamon, there can be no good reason why cubebs may not also be produced. From some cause not understood in Europe the production of *cubebs* in Java has seriously declined during the last six or seven years; whilst on the other hand the demand for them, at any rate in the United States, has considerably increased owing to their recent use in the cure of asthmatic affections, and in many cases of catarrh. From the very low price of 30s. per cwt. the article has advanced steadily until it stands now at £21 to £23 per cwt! A trade report on this article says:—"The consumption of the article cannot now be said to be on the increase; in fact, during the last few years the imports in America have been falling off. At present our stock has been very much reduced, and at the commencement of the month amounted to only 41 bags in the first hand, while from £21 to £23 is quoted for stalky to good genuine berries. In Holland the imports during 1886 amounted to about 200 bags, less than half of which belong to the acknowledged genuine variety. The Dutch market is now said to be very bare, the stock at Amsterdam not exceeding 1,050 lb., 600 lb. of which are grey berries. The quotations at Amsterdam for genuine berries appear to be slightly in excess of those prevailing here. If recent mail advices from America can be trusted, the stock at New York is also very low, being estimated at less than 7,000 lb., or barely sufficient for one month's requirements. All indications, therefore, point to the maintenance, for some time at any rate, of the excessive prices now prevailing. It is true that several shipments are reported on the way from the East Indies, but unless these should be of exceptional magnitude they will in all probability be quickly bought up for consumption." No doubt the present high price will not continue, but the production for some reason does not seem to be on the increase in spite of these figures. The eastern residencies of the island of Java produce the bold grey berries, the genuineness of which has been a matter of considerable doubt, and is generally disputed in this country and in America. The small, dark-coloured, genuine berries are all grown in central and western Java, notably in Banjoemaas and in Bantam. The shrub is occasionally met with in the wild state, but it is more generally cultivated, sometimes in special plantations, but usually in the coffee gardens. Some years ago the Dutch Indian Government, with a view to encourage the cultivation, distributed a large number of your plants to coffee-growers throughout Java. The *Piper Cubeba* requires very little attention: it climbs round the large trees which are grown for shading in coffee plantations, and attains, when full grown, a height of 18 to 20 feet. The statement formerly often made that cubeb plantations in Java were being uprooted in order to make way for coffee gardens may therefore be regarded as fabulous. Cubebs are also grown largely in the Lampong districts, the extreme southern portion of Sumatra, and in certain parts of southern Borneo. The yield is collected by Chinese dealers, and exported *via* Batavia or Singapore. Shipments from the former place usually find their way to Holland, while the cubebs exported *via* Singapore are generally forwarded to London or New York. An important part of the crop is consumed in Eastern countries. In the belief that the cultivation of this climber might be profitably carried on in the low districts of your island, such as Kurunegala, Kalutara, Yatiyantota, and other such localities, I paid a visit to Kew Gardens, where I

interviewed Mr. D. Morris on the subject. This gentleman showed me colored engravings of the plant and also a living plant, not very vigorous, in one of the glass-houses. He grew the plant in Jamaica, and knows of no reason why it should not thrive in the low, hot, moist districts of your island. It is propagated by cuttings, which take root very rapidly. He thinks it probable Dr. Trimen may have some in the Peradeniya Gardens, but supplies might be obtained from Batavia through some commercial agency, or better still through the Director of your Botanic Gardens, as the Dutch Government are jealous of any rivalry in this direction, and might throw obstacles in the way of private efforts. It would really seem as though this industry is worth attention. The outlay on an experiment need be only very trifling. I was not able to ascertain data as to yield or age for bearing.—*London Cor.* Local "Times."

THE CULTIVATION OF COCOA IN VENEZUELA.

Report by Consul Bird, of La Guayra, Venezuela.—*Theobroma*, a Greek word signifying *food of the gods*, is the botanical name of the cocoa plant. As Striffler has said—"The *feculæ* and oleaginous matter that are *par excellence* the alimentary substance dispensed by the vegetable kingdom are often found combined in the same vegetable, and nature, responsive to the necessities of our ephemeral existence almost always adds to this combination some aroma, thus blending the agreeable with the useful. This triple combination is especially noted in the cocoa, and for this, Linnæus, in his enthusiasm, gave it the name of *Theobroma*. Indeed, it only wants the property of sweetness to give us an idea of the fabled ambrosia that, with the delicious nectar, furnished aliment for the mythological deities." This genus comprises some sixteen species that pertain to the warmest zone of America, and that it would be unnecessary to enumerate. We will only consider the two most important that are cultivated here, a knowledge of which will suffice for the cultivation of all.

The red cocoa, commonly known as violet cocoa. is a plant thirteen to sixteen feet high, with upright and slender branches. The leaves are slightly pediculate, eight to ten inches long, oblong or ovate-oblong, alternate, perfect, smooth, and of the same colour on both sides. The flowers are small reddish or yellow, and numerous stigmas caulinareus, pendulous, or axillary; the fruit reddish, high-coloured or yellowish, smooth, ribbed like the musk-melon, forward somewhat like the cucumber, but pointed at the extremity: beans larger than the almond.

The green variety, commonly called white cocoa; is a plant six to ten feet high when cultivated; but in its wild state attains to a height of twenty-five to thirty feet, with outspreading branches. The leaves are very similar to those of the variety just described. The flowers are also similar, though somewhat violet-coloured; fruit of clear green colour very wrinkled and resembling the fruit of the balsam-tree, though, of course, much larger. The beans are smaller and less nutritious than those of the former variety, though equally esteemed.

All authors agree that—(1) the cocoa is indigenous to the soil of America; (2) it flourishes in the shade of the forests, and is developed with luxuriance at the bases of mountains, where it is watered by running streams or near rivers, where the soil is alluvial or mixed with sand and clay; (3) it requires a temperature that does not fall below 75 deg. Fahr. It may therefore be deduced that for its perfect development cocoa requires shade, warmth, and moisture. In low land, on the banks of streams—that is to say, in alluvial soil—it can always be safely, if carefully, cultivated. Although in such cases it is liable to inundation, yet all danger will be avoided if the land is well drained and kept free from the drifts and deposits of the waters. An excess of moisture will rot the roots and destroy the plants; and so, if the land does not drain well, it is necessary to open trenches in the direction of the greatest declivity.

Cocoa needs the shade of trees to maintain a humid atmosphere and to preserve the moisture of the soil. In a hard or clay soil, not naturally moist, it will be impossible to grow it unless so located that, by means of small trenches, water may be turned upon it every fifteen days during the summer months. A virgin soil is considered best, but fertile fallow land, suitable for corn or bananas, is adapted to its cultivation. In the territory of Loba, province of Mompos, Colombia, are to be seen some hundreds of cocoa trees upon a hill, growing vigorously without irrigation. This, however, is rare. It may be laid down as a safe rule that where the palm and banana grow naturally the soil is well adapted to cocoa and coffee.

The general rule is that all fruit possesses the full germinative quality when well ripe; but the cocoa is an exception to this rule, since beans matured, though not fully ripe, are considered best, and as in this stage it is much easier to hull them, they are preferred. Seed pods chosen for the purpose should be a brighter colour than the green pods, and on thumping them with the finger will emit a sound like that of a ripe water melon. The beans will be found loose in the shell. The pods should be carefully opened with a knife and the beans emptied into a tub of clear water, to remain for twenty-four hours, in order that the cuticle around them may be softened and easily pulled of. As they are divested of this cuticle they should be thrown into another tub of pure water, from which they should be planted within six hours; if allowed to remain longer they turn red and are lost. The beans that, after being peeled, swim on the surface of the water are worthless.

The beans are planted in a nursery or the orchard itself. A good nursery is, however, considered most proper and reliable. It should be five feet wide and as long as necessary. It should be well ploughed or spaded, covered with a brush arbour to shade from the sun, and laid off in cross-ridges eight inches apart. The seed should be planted four inches apart on the top of the ridge, and a little more than half underground, and all covered with banana leaves. They should be watered every morning and evening. Before planting they have a whitish or violet colour. After ten hours the leaves may be removed, when it will be observed that the seeds are rising out of the soil, urged thereto by the germinating roots. If they assume a greenish colour it is an indication of perfect germination. The irrigation must be continued, in the absence of rain, for six months, when the plants are ready to be set in the orchard. It is found best to plant the nursery in this climate in November, to transplant in April or May. At the period of transplanting a rainy reason should be selected, each plant taken up with the earth attached and carefully set in its place. If properly done at a propitious time, there is no danger of losing a single plant.

If the seed are to be planted in the orchard, three should be placed in each spot in the manner before described, and covered for eight days to protect them from the sun. When the plants are twenty inches high, two plants may be drawn out and the most flourishing one left.—*Planter and Farmer.*

AGRICULTURE ON THE CONTINENT OF EUROPE.

(*Special Letter.*)

Phosphorous or phosphoric acid, is the most important of food element of plants, and consequently an invaluable fertiliser of the soil. Now the greater part of phosphoric acid, taken from the land by the crops, is not returned thereto, and so is a dead loss for agriculture. A little intelligent attention could readily save a large portion of this great waste, estimated at several thousand tons annually.

A man weighing eleven stones, represents in his organization 38 ounces of phosphoric acid. During a twelvemonth, he requires for his life-wants about 2 lb. of it to replace a similar amount equally eliminated.

A population of 38 millions, such as that of France, borrows then from its alimentation some 80,000 tons of phosphoric acid per annum. If the death-rate of this population be reckoned at 23 per 1,000 inhabitants, the amount of phosphoric acid in their remains represents a proportionate total of the acid, definitely abstracted from arable land.

Per contra, the annual dejections of a city's inhabitants constitutes a partial restoration of the acid to the soil some forty per cent of it is however totally lost for agricultural wants. The extraction of the fertilising elements from the soil—chiefly phosphoric acid—without any being restored thereto, was one of the main causes of the decay of the empires of Greece and Rome; of the power of the Arabs and of the prosperity of Spain. When the sources of their food-supply were exhausted by a vampire system of cultivation their power and prosperity followed suit.

Moderns are more fortunate than their ancestors in being able to secure to-day inexhaustible supplies of phosphoric acid. French agriculturists are indebted to the late M. de Molon, for his discovery of natural beds of phosphate of lime. Messrs. Thomas and Gilchrist have utilized the slag, cinders or scoriæ, this once useless out-put of metallurgic industry, but now invaluable for its richness in phosphoric acid resulting from the dephosphorization of iron. The employment of phosphorus has become to-day the *pabulum vita* of crops. Continental farmers rush after the fertilizer almost like diggers to a gold mine.

There are three natural groups or sources of phosphates; nodules, incorrectly called coprolites peculiar to stratified rocks, and containing 34 to 60 per cent of phosphate. When ground down to a fine powder it is easily absorbed by plants. Its action is almost equal to that of phosphoric acid when rendered soluble in water. The second group is called *apatite*. It is one of the constituent elements of an eruptive rock, in the middle of which it is disseminated more or less frequently, but ever variable. It is almost pure phosphate—as high as 95 per cent crystallized, very hard, and imbedded in a vein enclosing potash. The third source is included under the generic name of *phosphorite*. In structure, it partakes of the shapeless coprolite and the crystllized apatite. The latter and phosphorite even when reduced to an impalpable powder are less assimilable than the pulverized nodules. Their principal employment is for the production of superphosphates due to their richness in phosphoric acid and carbonate of lime. However, they are the nodules from the South of France, Nassau, and Spain, which furnish agriculture with four-fifths of its commercial phosphates.

As already stated, the nodules when in a state of powder, are rapidly taken up by plants. The apatite and phosphorite present a greater resistance to the action of the internal juices of the plant, which take up—by the process of diffusion—through the external envelope of the root, the phosphoric acid of the soil. Obviously, the practical consequences flowing from these remarks is, to reduce the fertilizers to a state of extreme division, before applying them to the soil. And let the dose be liberal, say 2½ cwt. per acre, which will tell on four or five consecutive crops.

The apatite and phosphorite can be quickened in their action if when reduced to powder they are made into a compost and watered with urine. But as the nodules and slag powders answer so well, and are so cheap, there is no necessity for recurring to the others. In the case of organic superphosphates, the only superiority they can claim over the powders is that of being more immediately soluble. But against this advantage must be placed the greater expense. M. Wagner of Darmstadt has clearly proved by his experiments the necessity of employing the powdered cinders in a state of great fineness. At Quareux in Belgium, the employment of nitrate of soda with the pulverized slag has given important results in the culture of oats. The cinders reduced to powder cost fr. 45 per ton, and represented about 28 per cent of phosphoric acid.

The agricultural problem consists to produce much at a little outlay; but remunerative crops cannot be produced without abundant manurings, no more than could a good dinner be prepared from nothing. Heretofore, soluble phosphates cost half a franc per lb; now the insoluble acid in the form of powder costs fifty per cent less. The slag gave wonderful results when applied to grass land. Near Freising in Bavaria, a dose of 8 cwt. of the cinders per acre and costing only 9 fr. doubled the yield of hay. Associated with nitrate of soda equally gratifying results were produced.

The movement of opinion for the extension of experimental farms is rapidly extending. The Government accords sometimes material aid for the execution of the experiments, but more usually lends its agricultural representatives to superintend their carrying out and to report the results. Ordinarily, a spirited proprietor places some acres, and all corresponding facilities at the disposal of the officials. These experimental acres are ostensibly devoted to the solution of local or rather regional questions, such as the most suitable seeds, time and manner of sowings, manures, and the influence of climate &c. thereon. Each experiment is tested pending four years and controlled by an impartial official. It is on these lines that M. Hardon has placed five acres of his farm near Melun to test wheat-experiments; at first, the farmers kept aloof, but now they watch the proceedings with something like the interest of a horse race. Nothing is concealed; all accounts and progress are open for any person to consult, and a register is kept for visitors to make suggestions or record their impressions. In a few years when the reports on these disinterested experimental lands are co-ordinated, they must give rise to a consensus of practical conclusions, equivalent to a positive code for agriculture in general and for the localities in particular.

Science has long ago established the indispensableness of nitrogen in the production of plants, and that agriculture appreciates practically by the importance of that element in the manures furnished to the soil. But what is still uncertain is to know, if the atmosphere, which is an inexhaustible store house of azote, and offers it gratuitously to plants, is the source of nitrogen for the vegetable world. The whole subject has just been discussed at the Congress of Scientists held at Berlin, so we have all that is known up to date on the question of the absorption of free nitrogen from the air.

We know that an electric spark converts the azote of the atmosphere into nitrate of ammonia, and which the rain brings down with it to the soil; but it is calculated that during a year an acre of ground does not receive more than 9 lb. in this form. Practice, however, has not the less affirmed, that certain plants, clovers especially, had the exceptional power to utilize free nitrogen for the formation of their tissues, while at the same time enriching the soil. The results of Schultz's experiments at Lupitz seem to roughly confirm this opinion. On the other hand the researches of Boussingault are decisive respecting the non-absorption of free nitrogen from the air.

Boussingault raised leguminous plants on a soil deprived of nitrogen, and so they had no other source of deriving it save from the air. On analysing the plants, he only found in their tissue a quantity of azote equal to that existing in the seed, and so only obtainable during the process of germination. This was precise negative evidence.

Now the importance of these issues is plain; if a farmer pursues a system of culture counting on the air to supply the nitrogen, he may come to grief. Dietzell unlike Boussingault, operated on the arable soil itself, and arrived at the same results as that distinguished chemist. Joulie and Berthelot in France, and Frank in Berlin, obtained results opposed to Dietzell. Doctors differ. Joulie asserted that rye, clover and rye grass absorbed free nitrogen from the air. Berthelot only occupied with the soil itself, stated, that after a lengthened lapse of time a sterile soil, if possessed of a certain warmth, became rich in nitrogenous compounds. Frank, with a remarkable exactness on the same soil, cropped and uncropped found that nitrogen had been absorbed, but how or

from where, he could not state. He considered the soil to be merely the seat of the phenomena, and modified by the covering of vegetation; that is to say, the more the soil was aërated the less was the absorption of azote. Thus, two apposite phenomena are recognized; the elimination and the fixation in the soil of nitrogen which vegetation favors.

About a year ago M. Frank discovered certain bulbs or nodules at the extremity of the rootlets of plants. Some believed these bulbs were mushrooms; some that they were animalcules. Frank considered they were humus in a stage preparatory to being taken into the tissue of the plant; others, a kind of magazine of albuminous or plasmic matter prepared in advance by the plant for the wants of fruit time. M. Hellriegel sustains these fungi-like bulbs absorb free nitrogen, which at best is but a gratuitous assumption. He confounds cause with effect, since the bulbs only are formed, or at least appear when the plant has reached an advanced stage of its growth, when the leaves are in full development and active function, and the organs of assimilation at work.

Conclusion: The question of the free absorption of atmospheric nitrogen by the soil or by the plant, has not advanced a single step towards a definite solution. More rigorous experiments are necessary, and in the meantime let farmers rely on fertilizers and not the air for azote.

Extreme attention continues to be given by vine-yard proprietors to the phylloxera. No further preservative or remedies have been found to supersede autumnal irrigations, followed by rich spring manurings, or sulphuret of carbon or the graftings of American vine cuttings. Mildew and its varieties has not been very serious; it was tormenting rather than a subject for anxiety. Besides it is a meteorological calamity, not like the phylloxera—"always with us"—like other miseries.

In Belgium, the sugar-beet crop has suffered from the malady of "black heart." It is a disease produced by a fungus, which settles in the heart of the leaves, down even to the neck of the bulb, and produces black rot. Only cultivating beet on the same land, once in three years, and removing the necks of the roots, and making a compost of them with live lime and earth will get rid of the nuisance.

The agronomic school at Nancy has conducted a series of experiments on the temperature of soils. Turf has proved to be the warmest, and sandy the coldest soils: the latter is the most sensitive of all to fluctuations of temperature becoming the warmest in day-time and coldest at night, hence the most subject to suffer from spring frosts. As a general remark it is the water in the soil regulates the temperature: vegetable tissues are bad conductors of heat.

GEOLOGICAL DISCOVERY IN THE SALT RANGE.—We see from the February No., Vol. XIX., Part I., of the records of the Geological Survey of India, that Dr. Warth has made a very important discovery of fossils in the Salt Range, which proves that the bed in which they lie belongs to the carboniferous age. The Salt Range according to Dr. Waagen, from whose paper on the Palæozoic glacial beds of the Salt Range we quote, "formed the northern shore of a continent extending from Afghanistan throughout India, and at the Salt Range there was probably the mouth of a great river, down which large masses of ice floated, whilst in other parts of the world the coal measures were being formed, and the ice masses drifted along the shore depositing large boulders, gravel and fine silt." All this points to a galical period at first restricted to the Southern Hemisphere, and spreading later on to the Northern one. But we must refer our readers to the Records for the rest of Dr. Waagen's interesting note, and only quote his concluding sentence—"It has been made possible to ascertain all this by the assiduous investigations of my old friend Dr. Warth, who has thus made one of the most important discoveries that ever could be made in the Salt Range."—*Indian Forester.*

BRAZIL: DEPARTMENT OF AGRICULTURE; SUGAR; LABOUR; SLAVERY.

Central Sugar Factories.

Notwithstanding the guarantee of interest on the capital necessary for the establishment of factories destined to the preparation of cane sugar by means of perfected machinery and processes, a large number of concessionees were unable to carry out their privileges by domestic or foreign capital, through which 35 concessions were declared lapsed. One privilege for a central factory at S. Fidelis, Rio de Janeiro, was granted with such favors as were allowed under Art. 6 of Regulamento No. 8,357 of December 24th, 1881, except an interest guarantee, or free entry. With this concession the number now in force is:—

With an interest guarantee:

33 factories with a total capital of ... 21,800,000$

Without guarantee:

19 factories ..... —

—

52 do

The 33 factories are thus distributed:—

Province	*No.*	*capital*
Alagôas	1	500,000$
Bahia	6	5,600,000
Espirito Santo	1	500,000
Minas Geraes	1	300,000
Municipio Neutro	1	400,000
Parahyba	1	500,000
Pernambuco	11	6,950,000
Rio de Janeiro	5	3,450,000
Rio Grande do Norte	3	2,100,000
S. Paulo	1	500,000
Sergipe	2	1,000,000
	33	21,800,000$

of which 2,400,000$ has a guarantee of 7 per cent and 19,400,000$ a guarantee of 6 per cent.

The production of sugar and rum of the factories for the crop 1884-85 is given as follows:—

	Sugar kilos.	*Rum litres.*	*Value.*
Pernambuco	2,349,175	301,395	336,127$
Rio de Janeiro.	2,905,800	1,723,200	60,795
S. Paulo	429,600	480,000	112,221
Minas Geraes	183,300	302,400	—

Immigration.

During the past year 22,727 immigrants arrived at this port, considering as such all third-class passengers, of which 10,567 accepted accommodation at the Ilha das Flôres Government station.

There were 14,271 departures for the following destinations:—

S. Paulo	5,163
Rio Grande do Sul	4,643
Minas Geraes	1,434
Sta. Catharina	1,368
Rio de Janeiro	1,006
Paraná	429
Espirito Santo	167
Pernambuco	53
Pará	26
Bahia	23
Amazonas	19
	14,271

At Santos, S. Paulo, there arrived 6,681, thus increasing the total arrivals in the Empire to 29,408. Of the arrivals at Santos 3,705 remained in the province of S. Paulo, the others leaving for Paraná, Sta. Catharina and Rio Grande do Sul.

New works during the year at the Government station cost 10,410$ and the board of the 10,579 immigrants arriving three cost 35,747$, or 834 rs. per day per individual; say 2$502 per capita for the three days allowed the immigrant. Only 3 deaths were reported,

The *Colonization Society of* 1849 *in Hamburg* has not faithfully executed its contract which was to introduce annually 1,000 immigrants. Under a clause in the contract which allowed the completion in the following year of the total for any one year, the company need only bring into the country a sufficient number last year to complete the contract for the preceding. Not even so was the total made up, for only 954 immigrants arrived for 1884 and none for 1885. A fine was imposed for non-execution of the contract in 1884, but as no penalty is marked for complete evasion of the contract in 1885, against which the subvention for six months had been paid, the minister suspended further payments to such a time as the company shall fulfil its engagements.

The Government proposes to spare neither efforts, nor sacrifices to attract colonists and immigrants, and if furnished with means proposes to organize a regular propaganda in favor of European emigration to Brazil; to aid in the transportation of the emigrant from his residence in Europe to his destination in the Empire; to reorganize the service of surveys and sales of public lands, so that the immigrant may meet ready and convenient establishment.

The propaganda will promote emigration by rendering Brazil favorably known and will do away with so-called official immigration agents. Exercised under the responsibility of the Government, openly, without tricks or prevarications, the propaganda will certainly produce excellent results, as happans with other countries which have used it as a powerful instrument to attract immigration.

Circumstances render necessary the advance or payment of passage money. This may be effected in various manners, viz., payment in full of passage to the immigrant; by a reduction on the fixed price; or by the advancing of the cost, in full or in part, with an obligation of re-payment. However onerous the assistance may be to the State it cannot be avoided, as the sincere desire of the Government is to develop immigration. It is not meant to pay, nor to indiscriminately advance passage moneys; the payment of full cost might be exclusively restricted under the law of September 28th, 1885, to immigrants who establish themselves on agricultural settlements, the reduced price could be extended to a limited number of immigrants who may establish themselves in the country as proprietors, and the advance with the obligation of re-payment would be extended to such as fix themselves in nuclei created by Government, and subject to colonial regimen for a certain time.

The prompt and convenient settlement of the immigrant being the principal pre-occupation of the Government, the pre-eminent necessity arises for its preparation as to sales of well situated and appropriate lands, surveyed and divided, to the immigrant. This is the base stone of the administrative plan of the Government. To promote the arrival of the immigrant, to pay or advance his passage money and then give him an unfit establishment, is to advance a step and immediately retreat, to the sacrifice of the legitimate interests of immigration.

With these seemingly practical measures, the minister believes the service of immigration may be fairly organized, to which a necessary addition will be the reform of the location of services law, to the end of abolishing imprisonment for non-compliance with contract by the colonist, and the nullification of contracts made abroad to have force in the Empire.

The Government will present a law for reforming the land law of 1850. The principal acts of the administration touching the subject of immigration were the continued suspension of the payment of passages, because the minister on assuming office found there were at the department applications to introduce 40,000 immigrants, while the Government only had disposable 1,926 lots of land, surveyed and divided, or only about room for 10,000. Various commissions were organized to expedite the surveying of lands.

Slavery

The minister is happy to announce that law No. 3,270, dated September 28th, 1885, for the gradual extinction of slavery, has been met throughout the Empire, as to its execution, with the same zeal and respect as was extended to law No. 2,040, dated September 28th, 1871. All classes of society are persuaded as to the inevitable necessity of a solution of this great problem, with such precautions as are necessary in a subject so intimately connected with interests of the greatest importance, in a manner definitive and safe, although slow.

Although the number of 60 year old slaves was not known with certainty, the following table will furnish an idea of the average of emancipations under law No 3,270 of September 28th, 1885:—

Provinces.	*Emancipations.*
Rio de Janeiro	11,035
Espirito Santo	1,224
Parahyba	602
Pernambuco	3,204
Alagòas	1,072
Maranhao	665
Paraná	278
S. Paulo	363
Goyaz	213
Sta. Catharina	108
Minas Geraes	18,595
Matto Grosso	231
Rio Grande do Sul	213
Rio de Janeiro, Municipality	3,055
	40,668

(This table adds up 40,858.)

[It is only just to call special attention to the fact that the efforts of Sr. Prado to collect full statistics for the above table have been met with something like obstruction. His native province, S. Paulo, shows unfavorably in this matter; for with a very large slave population, only three districts of that province reported in season for the preparation of the minister's *relatorio*.—EDS. *News*.]

The law of 28th September, 1871, has been scrupulously observed and the following table shows the emancipations under its clauses, up to the latest information:—

Provinces.	*Emancipations.*
Amazonas	52
Para	566
Maranha	1,408
Piauhy	710
Ceara	1,805
Rio Grande do Norte	320
Parahyba	783
Pernambuco	2,249
Alagoas	734
Sergipe	659
Bahia	3,202
Espirito Santo	422
Municipio Neutro. (capital)	754
Rio de Janeiro	4,115
S. Paulo	2,791
Parana	200
Sta. Catharina	355
Rio Grande do Sul	1,406
Minas Geraes	4,230
Goyaz	97
Matto Grosso	138
Total	24,165

(This table adds up 27,166.)

There have been six distributions of the emancipation fund employed, and the seventh, amounting to 2,000,000$ was authorized on April 7th last.

The total cost of freeing the slaves is stated to have been as follows:—

Emancipation fund	16,443,682$372
Contributions from freedmen and others	972,902,663
	17,416,585$035

On 30th June last, the slave population was estimated to be 1,133,228, or 107,578 less than in the preceding year; from the total, however, the sexagenarian slaves do not seem to be deducted.

The statistics are as follows:—

Provinces	No. 30th Sept. 1873	Arrivals.	Departures.	Deaths.	Emancipations.	No. 30th June 1885
Alagoas	35,002	7,248	10,422	3,761	3,957	25,046
Bahia	169,766	14,766	21,171	14,879	15,660	132,822
Espirito Santo	22,284	5,900	2,503	3,769	2,150	19,762
Goyaz	10,771	1,665	1,916	1,418	1,314	7,788
Maranhao	52,733	6,638	9,654	13,929	3,887	31,901
Minas Geraes	340,444	107,615	105,349	49,316	17,119	276,275
Matto Grosso	6,547	499	585	756	889	4,816
Municipio Neutro	47,084	17,149	9,695	9,447	15,182	29,909
Parahyba	27,651	509	3,951	3,677	1,708	18,824
Para	31,216	5,502	4,593	3,962	7,945	20,218
Parana	11,867	1,312	2,511	1,368	2,404	6,836
Pernambuco	92,745	21,132	17,690	13,271	10,546	72,370
Piauhy	24,016	2,477	5,414	2,392	3,189	15,498
Rio Grande do Norte	13,165	2,520	5,997	846	1,633	7,209
Rio Grande do Sul	99,401	10,806	26,486	9,692	46,787	27,242
Rio de Janeiro	303,807	92,568	60,485	63,938	21,052	250,896
Santa Catharina	15,220	1,773	3,103	1,939	3,730	8,221
S. Paulo	166,427	77,585	42,744	31,699	16,299	153,270
Sergipe	35,187	8,654	11,698	4,753	3,105	24,325
Totals	1,505,273	386,354	345,931	234,812	177,656	1,133,228

The above table is stated to be defective. Nine provinces forwarding defective returns, or none at all, while Ceara and Amazonas are omitted.

The emancipations are thus classified:—

With conditions	69,430
Without conditions	108,226
	177,656

and the slaves in the Empire on the 30th June, 1885, were:—

Men	598,635
Women	534,593
	1,133,228

The free-born children of slave mothers numbered on the 30th June last 439,831, of which 219,071 are of the masculine and 220,760 of the faminine gender.—*Rio News.*

BRITISH NORTH BORNEO AND ITS RESOURCES.

The following interesting paper was read at a meeting at the Conference Hall at the Colonial and Indian Exhibition on the 25th October, 1886, by W. B. Pryer, C.M.Z.S, F.G.S., Australia, Her Britannic Majesty's Consular Agent for Sandakan, Resident in the service of the British North Borneo Company, &c., &c. Sir Rutherford Alcock, K.C.B., was in the chair:—

Mother-of-pearl shells and Pearls occur more amongst the seas of the Sooloo Archipelago than on our own coast, though off Port Elphinstone there are large banks of them; the Ada Bank, in particular, hardly at all worked at present.

The Oyster, scientifically known as *Meleagrina margaritifera*, which yields the finest shell, is also the one in which pearls are found. The collecting is done by divers, who, without any aid go down to extraordinary depths in the sea, twelve fathoms and over. When the depth is greater, or where sharks abound a sort of drag or trawl is used. Pearls of all sorts and sizes are always being found, and are brought chiefly by Chinese for sale in China, where they fetch a higher price than in England.

Keema is the fish of a large clam shell or bivalve *Tridacene gigas* which often attains dimensions of four feet or more; wherever there is shallow coral-bottomed sea, they abound in quantities, and are but slightly collected. Many of these Keema shells are to be seen in the fountains and grottoes in the Exhibition gardens here; off the coast of Tawi Tawi there is one which the natives say is as big as a house. Bajau huts are not very large however.

Borneo camphor is obtained from a large forest tree, which has to be felled and split up for the purpose. It is worth from 35s. to 70s. a pound, and, like many other expensive things, has a higher price in China than elsewhere. It is obtained from one of our commonest forest trees, but which has to be of great age before it attains the proper stage of ripeness. In many places the natives do not understand its collection, which is somewhat of a mystery. The Quarmote River is said to be such a district, and it is reported that one party who went there got several thousand dollars' worth. A very large value of this camphor is, no doubt, not entered at the Customs, but is simply taken out of the country in luggage boxes and so forth.

The quantity obtained from one tree is usually within 50 dols. worth, but a good deal more is occasionally obtained. The natives say that if a man obtains over 600 dols. worth from one tree he will die within the year. This is based on the law of compensation I suppose.

The one forest of many millions of acres, with which the greater part of British North Borneo is covered, is mainly composed of valuable timber trees of which the best known are billian or ironwood, serayah or red cedar, kapor or Borneo camphor, kruing or wainscoting, Penargah or Borneo walnut, bintangor, peune or mastwood. Chindana, marrabow and many others. Billian is the one of these for which, perhaps, the best demand exists, it is well known both in Singapore and Hongkong, which have been supplied hitherto mostly from Sarawak, in which country now, however, supplies are falling off. Billian planks are greatly esteemed on account of their extreme durability, large orders for them for planking wharf frontages at Singapore have had mostly to be cancelled owing to the want of appliances and capital in Sandakan, to carry them out, notwithstanding the profit that would have accrued. The supply of this wood in British North Borneo is very large, of the forest trees in the district from the Segaliud to the Segama, a considerable percentage are billian, in some places thirty trees in a hundred are of it. The last valuable discovery in Province Dent, is of this timber there in large quantities. Owing to its weight, great difficulty is experienced in handling the logs, but the number of rivers which everywhere permeate the forest greatly facilitate its transport as well, of course, as that of all our timbers. With regard to our timbers generally, my hearers may judge for themselves by looking at the benches in this hall and elsewhere in the building as well as at the planks and mouldings here shown, and the exhibits in the British Borneo Court. In view of the rapidly increasing demand for planks and other woods in Australia, India, China, the Mauritius and elsewhere, the increasing difficulty experienced in Singapore, hitherto the chief source of supply, in obtaining wood for their mills, and the enormous resources possessed by North Borneo, there seems little doubt but that we shell in time come to the front as one of the chief timber exporting countries in the East, when the matter is once fairly started. I have made an estimate of the timber growing by rivers either running into Sandakan Bay, fairly accessible from Sandakan, or at all events from which timber could be obtained in Sandakan with less difficulty than Singapore now experiences in getting her supplies, and the

result is so enormous that I am really afraid to quote it. The river service of the district may be imagined when I say that I have included 73 rivers and tributaties in my estimate, all reachable within a very few hours steam from the town of Elopura. In most part, of the East, even where the country is least inhabiteds there are comparatively few places where the natives, fields and clearings do not line the rivers, thus driving the forest far away back, whereas with us, owing to the lack of inhabitants, the land is clothed with fine forest trees down to the rivers edge, magnificent timber in fact overhanging many of the rivers for miles of their courses; only 10 of the 73 rivers are inhabited at all and even on most of these the clearings are but very few and far between. The opening of even many tens of thousands of acres of land for agricultural purposes would not have much effect in clearning away this vast forest, and it may safely be said that, presuming the larger trees in the nearer districts to have been felled and shipped off, so many years would elapse before the wood in the more remote districts was used up, that the places which had first been exhausted would again be covered with large timber trees. Not that there is any chance of these nearer districts being exhausted: in our generation at least.

Agriculture.—Notwithstanding, however, great the benefits may be that British North Borneo may derive from a properly organized concentration chiefly upon one place of her trade; from the development of the timber resources, and from the proper opening up of the gold fields, agriculture will in the future prove to be its mainstay and chief source of prosperity and revenue, and I have always felt that the future success of the country is bound up with the development of the agricultural resources of the Sandakan Bay district. The whole of the vast acreage referred to as at present covered with timber, is exceedingly well adapted for the growth of tropical products, but the soil to the south side of the bay is that which can be best spoken of from actual results, and in addition to this there is also the proximity to the town of Elopura where supplies of all kinds, from fresh food to labour are always procurable, as well as the facilities of transport afforded by water-carriage there and the fact of its already being a fairly large shipping port, which counts for a great deal when undertaking the planting of cheap prodcuts such as sago, Manila hemp, &c. With the exception of tobacco, no systematic attempts have yet been made to prove the capabilities of the soil. With regard to tobacco, however, a crop raised on the Suan Lambar river in Sandakan Bay, which was sold last week, brought very high prices.

The following figures will give some idea of what tobacco planting means. The dividend paid by the Deli Maatschappÿ Company for 1882 was 65 per cent; for 1883, 101 per cent; 1884, 77 per cent; 1885, 107 per cent. The Tabak Maatschappy Arendsburg, Rotterdam, paid 22 per cent in 1881; 25 per cent in 1882; 50 per cent in 1833; 60 per cent in 1884; and 100 per cent for 1885. The Amsterdam Deli Co. paid 10 per cent in 1882; 30 per cent in 1884; and 60 per cent in 1885. Besides paying these enormous dividends, I understand that the immense estates of the Deli Maatschappy Company, have been entirely paid for out of profit, and only appear in their accounts as valued at one florin. The emoluments of many of the gentlemen connected with these Companies, also, are said to be something enormous, being principally calculated on the part profit system. I did hear that one gentleman made over £40,000 last year. Profits by individual planters also, are extremely large. When in Singapore last spring, a private planter was buying up most expensive things, horses and carriages and what not right and left.

There is no question as to the similarity of British Borneo tobacco to that from Sumatra.

Besides tobacco, pepper, Manila hemp, sago, Indian rubber, kapok, gambier, coconuts, and cocoa are among the things that hold out most hopes of profitable cultivation. Tobacco and sugar cane are probably the best plants as regards the richness of the soil; tobacco, I have already spoken of, sugar cane also flourishes in Sandakan Bay in a way said to be unprecedented in the experience of several sugar cane growers who have visited us, and the juice yielded by it has been demonstrated to contain an unusual percentage of saccharine matter. At present prices for sugar, it is of no use thinking of profitable cane growing, I suppose, but if sugar cane can be grown anywhere to a profit, Sandakan Bay is that place, with its good soil, favourable climate, cheap labour, and facilities of transport and export.

I have spoken of the profitable results of tobacco growing; pepper is hardly less profitable in places where it thrives; Sumatra used to be the chief producing country, but the long-continued Acheen war, has destroyed this industry beyond hope of recovery. Pepper is thus spoken of by Mr. Crocker, in a memorandum written by him on its proposed cultivation in North Borneo. "In June, 1880, Singapore and Penang black pepper was selling at 3¾d. to 4d. per lb. in London; in June, 1881, prices had advanced to 5d and 5½d.; in June, 1882, it was 5½d.; in 1883, it was the same, but in June, 1884, it had advanced to 6½d. per lb., while last year the price had reached 7¾d. to 7⅞d." As there are no signs of a cessation of trouble in Acheen, the pepper trade in that country is more likely to decrease than increase. It is as difficult to find countries with soil and climate as suitable for pepper growing, as for tobacco like that from Deli, but there seems to be a great similarity between North Borneo and Sumatra in these respects. Mr. Crocker was chiefly the means of introducing pepper and gambier planting into Sarawak, and as a result the revenue of that country has increased largely chiefly owing to this reason, from 158,000 dols. in 1875 to 276,000 dols. in 1884. This is another of those hard facts which have a particular signification for the shareholders of the British North Borneo Company.

For the benefit of those who have never visited the East, I may mention that pepper grows much in the same way as the hop vine, and like it, is trained on poles, the only difference being that whereas the hop vine is cut down yearly, pepper when once it begins to bear goes on continuously, and the poles up which it grows must be calculated to last for many years. The initial expense of working a pepper plantation is, therefore, somewhat large, as the woods selected must be of a very durable description. The vine begins to bear at between two and three years of age; the pepper corns are in bunches something resembling currants. The gardens must be well raised, and well drained; as the pepper roots cannot stand damp ground. Tobacco land for instance, would not suit pepper. At 8 dols. the picul, Singapore price, pepper paid remarkably well. Last June the price, however, was but a trifle below 20 dols., and since then the growing scarcity of the article has had a strong effect on the market, and prices rapidly advanced over 4 dols. a picul more.

I have myself devoted no small attention and expense to trying some of the more noteworthy plants, pepper included, and most of them (coffee excepted) were looking remarkably well when I left Sandakan. There was always a good deal of difficulty in getting pepper slips, the Chinese, the principal growers in Singapore, being by no means inclined to let their virtual monopoly be infringed upon. Finally, however, by the courtesy of a Sarawak gentleman, I received some from there.

The cultivation of gambier is usually associated with that of pepper, and is also found to be very profitable.

Manila Hemp, or Abaca, a well-known and highly-priced fibre, extracted from the stem of *Musa textilis*, a plant of the Banana tribe, is the means of causing a large annual inflow of wealth to the Philippine Islands. *Musa textilis* has not been found to grow satisfactorily in any part of the world, except in the neighbourhood of the Philippines, which have therefore, up to the present, had virtually a monopoly of its production. As yet but very little has been tried in North Borneo; but if once it is largely grown there, there is little doubt but that we should soon supplant the Philippines, where shipping and commerce are both exposed to so many restrictions and duties, not to speak of extortions, that those connected with

them would far rather go elsewhere if they had the chance. A correspondent of the *Hong Kong Daily Press* writes as follows, with regard to the profit to be made on Manila Hemp:—"I have before me a prospectus for the production of hemp in the Philippines, showing a profit of something like 80 per cent per annum. It is well known that the profit on hemp cultivation in the Philippine Islands is over 100 per cent per annum; but English capital once invested in any business in these delightful islands is seldom or never seen again; this I know from sad experience.

The quantity of fibre obtained from each stem is very small, and up to the present time the process of extraction has been a very lengthy hand-labour one; but a machine, lately invented by Mr. Death, considerably simplifies it. The stem being so bulky, the main consideration in the manufacture of Manila hemp is that of porterage, and the sites of plantations should, therefore, be selected chiefly with a view to this end, in places affording a maximum of water carriage. The stems are not properly ripe for cutting under fifteen months of age, but when once ready, the stool continues to yield a ripe stem every two months or so continuously,

Indian Rubber is growing scarcer yearly, and as wherever it has been found the practice has been to cut it down and destroy it, its production seems likely to decrease, and its price to increase considerably. Our Indian rubber is obtained from a creeper, a species of *Willoughbeia* which grows wild under forest shade, so that if young plants are put out at the foot of each forest tree, no further expense need be incurred in connection with its cultivation beyond a slight watch being kept to see that bands of native collectors do not visit the locality, and in four years a large quantity would be ready for collection. There need be scarcely any limit to the size of the space planted up with it, and the work of taking care of a large acreage planted with Indian rubber would seem to be particularly fitted for anyone with natural history or sporting proclivities. There would be some difficulty at first in getting seeds or slips to plant in nurseries, but once they were obtained, all the rest would be easy.

Sago is the product of a palm tree which flourishes to perfection in Borneo. The following remarks by Mr. W. M. Crocker on its cultivation will be of interest; he says that its production in Sarawak "affords a steady industry to some thousands of inhabitants, all living in comparative wealth. It may give some idea of the enormous rate of this product if it be considered that three trees yield more nutritive matter than an acre of wheat, and six trees more than an acre of potatoes."

The main drawback to the investment of capital in sago planting is the length of time that elapses before the trees are ready to cut; but it must be understood that when once they commence yielding, they go on continually without cessation, so that the only expense attending their cultivation, when once they are in bearing, is the upkeep of fencing to keep out pigs. It is also to be added that the expense of planting is very small compared to the returns when once they begin to come in. Mr. Crocker calculated that a plantation of 2,000 acres would give a profit of £15,560 a year. Since this calculation was made the price of sago has declined, but there is no chance of its not yielding a good profit to the grower. It is also to be remembered that the sale value of a newly-planted sago plantation would rise heavily yearly.

Amongst other things, cocoa will, I think, be found to thrive particularly well in British Borneo, judging from the few trees grown in the native gardens on the Segaliud and elsewhere; while coconuts flourish extremely well, are a safe investment, and yield some two years quicker in British Borneo than elsewhere.

I will conclude my remarks upon agriculture by again expressing my extreme desire to see general plantations started on land in the Sandakan district, and my confidence that if rightly managed they would prove a profitable investment to their owners, and lead up to their being the main prop of the country generally in the future.—*Straits Times.*

Tobacco for Ceylon.—The attempts now being made to grow the tobacco plant on a good scale in this country have induced the trade section of the London Chamber of Commerce to offer two prizes of fifty guineas each for the best specimen of tobacco grown in the United Kingdom, and for that produced in India, or in any of the British colonies and possessions. It is stated that these prizes will be awarded as a means of definitely ascertaining how far the above sources of production can add to the supply of tobacco suitable for the English market, and to what extent, if any, these growths can compete in quality and price with those of foreign countries, from which the consumption of the world has hitherto been chiefly drawn. Each specimen is to weigh not less than 400 lb., and must not consist of picked leaves from a large quantity. The specimens not grown in the United Kingdom shall be submitted for competition in London, and in the bonded warehouse of either the Victoria, the London and St. Katherine's, the East and West India Docks, or other bonded warehouse. Specimens of British-grown tobacco will only be admitted under bond at the Haydon Square bonded warehouse. The tobacco grown in the United Kingdom must be sent for inspection on or before the 1st March, 1888, and that of other places on or before the 1st of December of the same year. I shall hope to hear that both European and native tobacco growers in Ceylon will compete for the colonial prize, as there is very little doubt they would stand a good chance of success. In 1851 Jaffna tobacco, sent to the Great Exhibition by some American missionaries in the north took a prize medal; and competent judges pronounced some of the Trincomalee-grown leaf first class, but spoilt by over-pressure in the bales. This and the presence of not more than 15 per cent of moisture in the leaf are essential points.—*London Cor.* Local "Times."

Indian Figs.—A paper by Dr. George King of Calcutta, on "The Genus Ficus, with special reference to the Indo-Chinese species," was read at the Linnean Society on March 17, in which it was shown that insects play a considerable part in the fertilisation of certain forms. Dealing with the structural peculiarities of the flowers in the genus Ficus, he specifies:—1, male; 2, pseudo-hermaphrodite; 3, neuter; and, 4, female fertile flowers. Besides these there occurs a set of flowers originally named by himself "Insect-attacked females," but for which he has adopted Count Solms Laubach's term, "Gall Flowers" (see *Gardeners' Chronicle*, vol. xix., p. 530; vol. xx. p, 22, 1885)—the latter botanist having anticipated him in publication, though King's researches had commenced earlier. As to the question of these gall flowers, Dr. King states that the pupa of an insect can usually be seen through the coats of the ovary. The pupa when perfected, escapes into the cavity of the receptacle by cutting its way through, and fully developed winged insects are often to be found in considerable numbers in the cavity of the Fig. The pupa of the insect must become encysted in the ovary of the gall flower at a very early period, for about the time at which the imago is escaping from the ovary the pollen of the anthers of the male flower is only beginning to shed. Thus Dr. King holds that through the interposition of insects the malformed flowers doubtless become functionally important in the life history of the Fig trees. From the peculiarities in the structure and arrangement of the flowers Dr. King is of opinion that the evolutionary history of the genus Ficus may be traced. On data derived therefrom he arranges the Indo-Malayan species into two great groups, the second of these being again divided into three subsidiary sub-groups as follows:—

FICUS, *Linn.*

Group I. Pseudo-hermahphrodite ...			... Galœomorphe.
Group II. Unisexual.	Sect. I. ...		... Urostigma.
	Sect. II. ...		... Syncœcia.
	Sect III	A.	Sycidium.
			Corwellia.
		B.	Eusyce.
			Neomorphe

—*Gardeners' Chronicle.*

PROSPECTS OF TEA IN BURMAH.

(Communicated.)

Before we give an estimate of the expenditure necessary in opening out and maintaining a tea garden in Burma until it becomes a profitable speculation, we think it necessary to give our readers a clearer insight into the enterprise, by explaining the kind of land best suited to the cultivation of tea.

For this purpose, the land most suitable is high land gently undulating and with a rich dark, sandy loam or a moderately heavy soil. The land chosen should be near a road, navigable river or railway, for despatch of the product of the garden to market, but it is still more important that it should be near a virgin forest for the purpose of keeping up a continuous supply of timber for the manufacture of charcoal and tea chests, and for building requirements. About 600 acres of such forest would be necessary for the proper working of a garden of 150 acres. It is our belief that such land as we have just described can be had in any quantity in Burma.

The question of labour can be easily settled by application to the numerous cooly agencies in India, who could supply the right kind of labour at a very moderate charge per head.

The seed can be procured from Assam and Cachar through the Agents of tea concerns in Calcutta, and we would recommend a high class China with a fair admixture of Hybrid, say 30 per cent. This mixture should be obtainable in Calcutta at R25 per maund, or even less. The implements necessary are axes, dhas and hoes, all these are obtainable in our local bazaar at moderate prices.

It is in the power of Government to assist intending planters in many ways, by furnishing information as to likely sites, opening up nurseries at central places for the supply of seedlings at moderate prices, and more particularly by protective measures with reference to the labour question, as was done in the early days of tea planting in India.

We will now give an estimate of the probable cost of starting a garden of 150 acres, and maintaining it until it becomes a profitable concern, keeping well within our supposed capital of one lakh of rupees.

	Rs.	A.	P
Land 600 acres (on a thirty years lease from Government at R10 per acre ...	6,000	0	0
Seed 100 maunds at R30 or 35 landed on the garden	3,500	0	0
Labor, cost of importing 100 coolies at R30 each	3,000	0	0
Implements	500	0	0
1st year expenditure from October (say 87-88) to October inclusive of Manager's salary and buildings	12,000	0	0
Total...	25,000	0	0

With this expendiure a pushing Manager should be able to open out from 80 to 90 acres; the remaining 60 or 70 acres can be undertaken during the second year, when the cost of maintaining the area under plant (if 90 acres) will be R7,560.

2ND YEAR'S EXPENDITURE.

Maintaining old garden for 12 months ...	7,560	0	0
Seed 50 maunds at R35	1,750	0	0
Cost of planting out and maintaining new garden 50 acres for 12 months ...	6,000	0	0
Cost of importing 50 new Coolies at 30 each	1,500	0	0
Cost of Building Bungalow for Manager and Tea Factory	3,000	0	0
Total..	19,810	0	0
Grand Total...	44,810	0	0

3RD YEAR'S EXPENDITURE.

Maintaining 150 acres at R84 per acre ...	12,600	0	0
Seed 10 maunds R35 ...	350	0	0
	12,950	0	0
Grand Total...	57,760	0	0

4TH YEAR'S EXPENDITURE.

Cost of working 150 acres with manufacturing charges at R120 per acre	18,000	0	0
Deduct price realised by sale of 150 maunds of Tea at R50 per maund ...	7,500	0	0
Total...	10,500	0	0
Grand Total...	68,260	0	0

5TH YEAR'S PROFIT.

Sales of 450 maunds of tea at R60 per maund	27,000	0	0
Cost of working garden Commission, Freight, Brokerage, &c.	20,000	0	0
Net Profit...	R7,000	0	0

—*Rangoon Gazette.*

CINCHONA PROSPECTS.—Messrs. James Cook & Co., in their latest report, do not make much of the probable Java exports of bark in the future—at any rate for a long time yet. The export of 1886 is in fact not likely to be much exceeded in 1887. For last year they give:—

Private exports	1,626,000 lb.
Government account ..	546,000 lb.
	2,172,000 lb.

CEYLON TEA: SPECIAL ANNUAL REPORT.

13, Rood Lane, London, E. C., March 24th 1887.

Dear Sirs,—We beg to submit for your consideration a few facts bearing upon Ceylon tea, together with some suggestions concerning the opening up of ne markets for British Grown tea.

At the first sight, the average price is no doubt disappointing, but it must not be forgotten that the value of Indian tea has fallen to a far greater extent. Indeed, it is almost surprising that the value of Ceylon tea has not been even further depreciated, considering the great influx of tea from India and the additional supply from Ceylon. These imports amounted together in 1886 to 83,460,000 lb., against only 66,863,000 lb. in 1885. No doubt a portion of the fall in price during a few months of the year can be accounted for by the poor quality of the majority of arrivals during that period.

The main reason for the high value at which Ceylon tea has been maintained is due to the manner in which it has been advertised throughout the country, chiefly through the enterprise and perseverance of Ceylon Planters. Through their instrumentality it has been introduced into localities where it had previously been quite unknown. Once introduced, its quality commanded attention, and met with such general appreciation that a steady demand ensued.

THE COLONIAL and INDIAN EXHIBITION which was opened in May last, was destined to become a powerful advertising medium for Ceylon tea, not only from the attractive display of handsome specimens and the instructive lectures which were delivered, but especially from the quantity disposed of as a beverage, as well as sold in the dry condition. An influential Committee was appointed to guarantee the genuineness of the tea, and great care was taken to purchase the mellowest liquoring and most delicate flavoured descriptions. Such success followed this carefully devised scheme that no less than 6,055 lb. of tea were used in the infusion sold as a beverage at the Exhibition, to about 360,000 people. 23,086 lb. in the dry state were also sold in the building; this quantity, comprising a vast number of small packets, exercised an important distributive influence. At the same time the article came prominently and favourably under the notice of the press. Thus the practical outcome of this Exhibition was a more general knowledge of Ceylon tea, combined with a growing appreciation of its qualities by a continually increasing number of the British public. A powerful impetus was thus given to the trade. This was speedily followed up by the establishment of various agencies for the exclusive supply of Ceylon produce,

The growing demand was more than sustained, and so greatly increased that Ceylon tea has since maintained a comparatively high value, with the result that no difficulty has been experienced in dealing with a supply amounting to nearly double that of 1885.

LIVERPOOL EXHIBITION, 1887.—It will be encouraging to planters to learn that at the Jubilee Exhibition to be opened in Liverpool next May, arrangements have all ready been concluded, whereby Ceylon tea will again be specially brought before the public. It may be well to add that there is great probability of this Exhibition being visited by an entirely different section of the public to that frequenting the Colonial and Indian Exhibition of 1886. Hence there is reason to anticipate a continuance of the beneficial results already attained through that Exhibition.

QUALITY.—After the above remarks, it should be hardly necessary to impress upon planters the absolute necessity of maintaining the quality of their produce. No effort should be relaxed, and no opportunity missed, whereby an improvement can be effected in the general quality of the liquor. The greatest care should be exercised to avoid the recurrence of so unfortunate a deterioration in quality, as took place during the earlier months of last year. There is no doubt whatever, that Ceylon is capable of producing tea, the quality of which can only be pronounced as unexceptionable. If the enterprise is to prove a lasting success, it must be the aim of each individual planter that his tea shall attain to the highest standard of excellence.

QUANTITY.—There is good reason to suppose that the exports from Ceylon this year will be about double those of 1886. So large an increase is not unlikely still further to depress values. This probability should induce Planters to neglect no opportunity of economising, where such can be effected without in any way depreciating the quality of the Tea. On the other hand no expense should be grudged, whereby actual improvement can be effected in its liquoring qualities, an object which it is impossible to attain without a more adequate supply of water or steam power than at present exists upon many estates. The one great axiom to be observed should be *quality*, not *quantity*.

NEW MARKETS.—The severe drop in the price of Tea generally, during the past year, forcibly illustrates the importance of opening up New Markets, both by extending the area over which Tea is consumed, and by the further development of the trade in those countries where as yet it has scarcely obtained a sure footing. The education of any popular taste must of necessity be gradual. Its attempt is fraught with danger lest the slow process by which changes in national tastes can be brought about, should be partially or it may be entirely overlooked and forgotten. Thus it sometimes happens that a new article which, judiciously introduced, would have probably met with entire success, has *through lack of adaptability to the habits and tastes of the people*, ended in disappointment and failure. As an instance, it may be mentioned that where strong, pungent descriptions of Indian Tea have been suddenly introduced in those countries accustomed to drink poor China Teas, the experiment has proved unsuccessful and that those Indian Teas which ultimately succeeded have been such kinds as approached the nearest in general characteristics, although superior in quality, to the Teas previously in use amongst the population.

ADAPTABILITY.—In the United States of America a large portion of the Tea consumed is a kind of Oolong. There is no reason why Ceylon should not supply this demand, with an article not only similar in character, but undoubtedly superior in quality—at a rate which should compete favourably with similar descriptions from other countries. This Tea is easy and inexpensive to manufacture, and an effort might be made to adapt a portion of the produce of Ceylon to a market of such magnitude as that of the United States, where over seventy million pounds of Tea are annually consumed. Here, there is also an extensive sale for Green Tea—a fact of which Planters are doubtless well aware.

DISTRIBUTION OF CEYLON TEA.—That Ceylon Planters are alive to the necessity of pushing their produce in New Markets is evident from the following statistics, showing the different places to which Tea has been exported from Ceylon during the past year, viz.:—

United Kingdom.	Australia.	India & Eastwards.	Mauritius.	America.
lb.	lb.	lb.	lb.	lb.
7,580,000	148,154	24,775	8,147	6,621
Hamburg.	Marseilles.	Trieste.	Genoa.	Other Continental Ports.
lb.	lb.	lb.	lb.	lb.
7,137	4,630	620	96	10,256

Their next step should be to study carefully the different tastes of those countries whose markets they wish to supply;—their object being first to *meet* their tastes and then to *improve* them. There is no doubt that much time will be required for the accomplishment of this end,—a circumstance which still further accentuates the importance of immediately discovering new outlets, in order that Ceylon Tea may become thoroughly established in different markets before the output is developed to its full extent.

The quantities taken by the majority of the largest Tea drinking countries show a decided increase; a number of the minor consumers have also imported more Tea. Our principal Colonies show very satisfactory increases, especially Australia and Canada. The figures for the United States are also encouraging. There is reason to believe that Tea consumption in France is likely to increase.

DUTIES.—The rates of duty in some European countries certainly appear prohibitive. In most of our Colonies, only light duties are imposed. In the United States—and practically in Canada,—the article is admitted free, and thus our attention is again drawn to the Markets of North America as extensive fields for future enterprise.

GOW, WILSON & STANTON, Tea Brokers.

SUGGESTIONS REGARDING MANUFACTURE.

We trust it will not be considered out of place in a "Statistical Circular" if we call the attention of our planting friends, in a general way, to a few points of interest in regard to manufacture.

PLUCKING.—The excellence of the tea appears to us almost as dependent on the careful treatment of the plant in the field, as on the subsequent process of manufacture in the tea house. A proper balance must be preserved between the leaves and roots of a plant, as the health of the one depends entirely on the vigour of the other. If the bushes are *overplucked* the leaf action speedily becomes impaired; as a consequence the leaves will be produced in smaller quantities, and the plant will soon assume a stunted and unhealthy appearance (planters will understand what is meant by "crow's-feet") while the quality of the tea, must of necessity be deteriorated. Let the plucking be regular and often, say once a week, and the taking of "immature" and "coarse" leaf guarded against. Leaves should not be stripped off promiscuously, otherwise such shoots will be left without the power of reproduction. It is customary on some estates to pluck half leaves; but we feel sure a natural and more luxuriant growth is obtained by leaving the *full leaf*. We believe that in the process of withering, the "stalk" which is tender and succulent, improves the flavour of the tea.

"Coarse" and "hard" leaf should be left on the bushes, where it is of more value in assisting the functions of the plant. If plucked it does add much to "quantity," but it can and does damage the "*quality*." Indeed, it is self-evident that leaf which toughens instead of turning soft and flaccid in the withering and fermentation, and will not even turn black in manufacture, is not worth the plucking. Again, when there is much "red leaf," the bulk has to be picked over, and during this operation, the tea is of necessity exposed for hours to a damp atmosphere, which cannot but injure it.

WITHERING would appear to be for the purpose of evaporating as much of the fluids as possible without injury to the odorous principle or aroma; or rather to

induce a slight degree of incipient fermentation or *eremeausis* which is a process of slow combustion. In certain conditions of weather it is next to impossible to obtain the required "wither," without which teas of first quality cannot be produced. From our own observation it occurs to us that the "jute hessian tats" have much to answer for. They imbibe and retain moisture, and leaf which in fine weather becomes partially withered by the evening, may be found, if the humidity of the atmosphere has increased, to be quite fresh the next morning, and totally unfit for manufacture. This is a serious difficulty to combat, and we would suggest a trial of something which is less liable to absorb moisture. A free current of air is absolutely necessary, and all leaf lofts should be perfectly ventilated and have an opening along the ridge to allow the partially saturated air to escape.

ROLLING.—This operation requires attention as much as any of the other stages of manufacture, but without efficient steam or water-power it is hopeless to expect justice to be done. Many pence or pounds are lost in consequence of this part of the manipulation not being *thorough*.

SORTING.—A uniform standard should be maintained, and every Tea should be good of its class. *Dust* should be carefully avoided, as it seriously depreciates the value of Broken Pekoes; even small Pekoe Faunings should have the dust removed with a muslin sieve. *Small Broken Pekoes* say under a No. 14 wire sieve *if possessing liquor and quality* are much sought after by the Irish trade, but leaf Bro. Pekoes under a No. 12 are more suitable to the English market.

On estates producing only a small quantity of Tea, we would suggest that, in order to meet the requirements of the trade in respect to size of breaks, the bulk should be sorted into two classes only, viz.: Broken Pekoe (or Broken Orange Pekoe, if very tippy) and a Pekoe Souchong; the former, sorted through a No. 12 wire sieve, and packed in boxes, *under* 28 lb. *gross*, or in half chests; the latter graded through a No. 8 and packed in half chests.

BULKING.—We incline to the belief that some of the deterioration of the tea may be traced to the system of "binning," for it stands to reason that unless the bins are *absolutely air tight* the tea must imbibe a large amount of moisture, to be driven off in the final firing when owing to the "steaming" which naturally takes place, it must lose "point," and to some extent flavour. In many instances we think it would be better to sort and to pack the tea as made, *leaving the bulking to be performed in London.*

GOW, WILSON AND STANTON,
24th March, 1887. Tea Brokers.

COFFEE AND GREEN BUG AND ITS REMEDY.

A planter in charge of good coffee who is naturally very anxious to do it justice and to preserve so valuable a culture for the proprietor, favours us with the following notes. They were written before he had read the recent remarks on the subject in the *Observer*:—

"April 17th.—I am sorry to say that green bug which has been the ruin of so many estates on the Kandy side, is now spreading over Dimbula, Dikoya and Maskeliya. Now that coffee is up to 90/ and rising, now that blossoms have been more like those of old times and that leaf-disease is not so prevalent as it was, this spread of a new pest is serious indeed. It affects the growers of coffee directly and the growers of tea indirectly, as the more coffee land is converted into tea, so much the more is the chance of overproduction increased. The question, therefore, of battling with this new enemy is one of interest, more or less to all, and as from the reports of successful experiments carried on by Mr. Green, it appears *that there is a remedy.* I think no time should be lost in ventilating the question. To my thinking this can be best done by the *Observer* calling on some of the oldest planters to give you their opinions. I am sure much good would come of it. Many planters (and there are experienced V. A.'s among them) look upon the attack as fatal and consider any expense incurred in combatting it, as so much time and money wasted. They tell you of the disastrous effects in Matale and elsewhere and will not admit any arguments suggestive of exhausted soil, overcropping, or climatic influences—'No, it was green bug pure and simple did it.' These opinions have influenced some planters to such an extent that, fearing their credit might suffer, they have kept the fact that their estates were attacked, to themselves. Others again say that tea is doing so well, that they don't care if coffee does disappear—to them the lesson of not having all their eggs in one basket will never be taught.

"I refer to these two classes of fatalists, to show how difficult it will be to carry out any common line of action—and yet, if the remedy is not jointly carried out and heartily supported in each affected district, the cure will be difficult and expensive, if not impossible. I have not yet ascertained the particulars of Mr. Green's treatment, but I believe it was by applying a solution of Phenel by the roots. If the cost were reasonable, I am sure many would try the experiment. Would Government allow the materials to be imported duty free and charge a low rate of railway freight?* These are questions which ought to be raised and without any loss of time too. The pest spreads very rapidly. I know an estate where not three months ago, green bug could hardly be found. It was then only on the backs of a few leaves scattered here and there. It is now not only all over these leaves, but all up the green stalk as well, and the trees are beginning to turn black.

"Some hope that at the higher elevations, where the coffee is still young and vigorous, where the soil is good and where we are free from excess of drought, or rain, the blight may pass away, just as in olden days black bug did. But the suddenness of the attack and the rapidity with which it spreads, makes me begin to feel doubtful and unless some common action is very speedily resolved upon, and it is not too late yet, it very soon will be."

We can only urge all our coffee planters to tell us what they can of this fell enemy—what they are doing to fight it and with what result. Let no false delicacy stand in the way of publicity.

REVIEW OF THE CHINA TEA TRADE FOR 1886.

LONDON, E.C., 23rd March 1887.

The past season has been full of incidents and more or less eventful. Yet the lessons to be learned are difficult to demonstrate and in many cases unpalatable to the scholar. The Hankow crop was reported of unquestionable excellence and he was considered fortunate who secured many parcels of it. It has not, however, borne out this character. The Tea arrived home to a poor market the result of general depression and political complications—pronounced fine by connoisseurs in Mincing Lane it was condemned by the Old Lady in the country and shelved and discarded for Indian and Ceylon Teas, the lower Chinas being considered good enough for mixing purposes. Throughout the last five months of 1886, holders continued to "Bull" the market for first crop teas without even provoking enquiry of any importance, month on month passed away until February when it was thought best to be "getting on" and the Auctions were pretty freely resorted to and prices realized for teas costing in China from 1s 5d to 1s 9d little over the price obtained in July for Shuntams.

To speak of the Teas themselves, no doubt they were fine, but they were thin and weedy showing no mettle, indeed scarcely a tea fit to drink by itself. There was a great want of point no enquiries came for counterparts ex this ship or that, a sign we take it that but little satisfaction was obtained from a purchase at the supposed low prices ruling in July.

To say that the English taste for China Tea is destroyed is not accurate. A Rich Kaisow, Souchong, or Moning of ancient days would still hold its own with either Indian or Ceylon Teas, but this dead level of weak quality (insipid hot water with some flavour) has

* No doubt if the P. A. applied in due form.—ED.

had the effect of sending large quantities of Indian Tea into consumption for mixing purposes.

General depression has forced the retailer to reduce his prices. 1s 6d and 2s are now the every day duty paid prices for tea; a curtailed profit has made the grocer a keen buyer and as some tea had to suffer the weak China became the butt. What does it profit a retail dealer to select teas with no point or character so long as it is ¼d cheaper? it is mixed off and its little character lost in a malty Indian blend, without undervaluing the responsibility of buyers in China the future seems simple enough.

For thin and weak teas such as this season £45 to £80 per ton *i.e.* 4¾d to 8½d per lb. would we think be a full range. But we cannot believe that Cathay is played out as a tea producing country we look with some hope to receiving fine teas again from Hankow and Foochow.

If the China tea is to compete with the Indian and Ceylon, the teas must be strong, and full ripe Pekoe Souchong flavour with a cup that will give a rich cinnamon brown when milk has been added, the tea, taster using a little more of his mother wit, and a little less of his scientific knowledge. Still it must be borne in mind that the quantity of *finest* tea sold in this country is now comparatively small, Kaisows we would suggest should be tested on the basis of Ceylon teas, those ranging from say 9d to 1s 2d; curio leaf teas we except as being a fancy article.

Finest Ningchows. Russians may pay rates far beyond safety for England for these. Ordinary finest chops if well made, free from dust, strong and full flavoured, would we think be a fair risk from 1s 1d at 1s 3d.

Finest Oonfaas. If quality is good and the leaf unmixed and well made 1s 2d at 1s 3d, if only fine teas and no finest come down of this class 10d to 1s

Finest Yung-Low-Tong-Chun sou-kai, Sun-Yongs and Oopacks generally if choice 1s to 1s 1d. Second chops 8d to 10d Nip-ka-Szee, and Ho-How 9d at 11d second chops 7d to 8d, Thuntams 6d to 7d if well made and good quality. Prices for second crops will be ruled by the total supply of the first crop.

These ideas are based on a probable supply from all sources, China, India, Ceylon and Java, of say 230 millions and with a strong useful crop of tea to handle.

(Signed) N. McNAIR & CO.

COCONUT NOTES: SEED NUTS.

(*Communicated.*)

In view of the great variety of habit and bearing power in different coconut trees, it is the business of the planter to use great precaution in the selection of seed-nuts. The usual practice hitherto has been to take nuts for nurseries indiscriminately from the heap, or if any choice was made, it was in favour of the largest nuts. By selecting seed-nuts from early and heavy bearing trees, there is no certainty that the same variety will be reproduced, but there is a better chance of getting good varieties from selected trees that show desirable qualities than by the other system. The tree selected for seed-nuts should be strong, full-leaved, and heavy bearing; nuts of medium size with thin husks and green colour. Very large nuts are not desirable, because the enclosed nut is generally small in proportion to the bulk of the husk, and any advantage gained in size is more than compensated by deficiency in numbers.

It has been recommended in laying down a coconut nursery to place the nuts on their side, so that the contained water may cover the germ. As to the welfare of the future plant, it is of small consequence in what position it is laid, because the first event in germination is the conversion of the water into a light spongy substance that fills the whole cavity, and the upright position has advantages in the subsequent management of the plant, chief of which are, that in planting out, the nut can be put deeper in the soil, and the tender bud may be easier preserved from white ants.

In some parts of the country the natives do not make nurseries, but heap the nuts in a dark corner till they germinate, the advantage said to be gained is that no roots appear outside the husk till they are planted out. The roots of nursery plants have to be shaved off, and the plant has to supply fresh ones before it can get a hold of the soil. In one place I saw the seed-nuts hung on the branches of a thickly-leaved tree: I have not heard what success has attended the experiment.

REMINISCENCES OF A VISIT TO THE PEARL FISHERIES AND THE "BURIED CITIES" AND TANK REGION OF CEYLON.

THE LONGEST DIVE ON RECORD AT THE PEARL BANKS —THE "ARAB" DIVERS—NATIVE AND REGULAR DIVERS CONTRASTED—OYSTER-BEDS AND OYSTERS.

Before resuming my notice of the truly grand Kalawewa (*wewa* in Sinhalese as *kulam* in Tamil always = tank), I must acknowledge a most interesting communication which has reached me from Capt. Donnan. It is to the following effect, the date being the 13th :—

"We are now working on the Cheval, having left the Matarakam* on Saturday last, and if the weather keeps fine, of which there is every appearance at present, we shall do much better in the way of revenue than I expected when I recommended the fishery. I have been ashore only once since you left. You will remember that 'Arab' diver with the nose nipper. Well, I had him alongside this morning and told him to let me see how long he could remain under water and I carefully timed him, one minute and 49 seconds, which is the longest dive on record on these banks or beds. The other 'Arab,' with air-pump and dress, only worked one day with it, when he only sent up 1,500 oysters, and now, without the dress, he is sending up from 2,500 to 3,000 oysters per day; so that the helmet, dress, and air pump are not calculated to succeed at pearl-diving. I found also in 1884, off Chilaw, with four of Mr. Kyle's divers, that the natives sent up more oysters per day, man for man, than they did; a result which very much surprised me at the time, and now it has been confirmed again."

It will be observed that the so-called "Arab" diver, really a Hindu, from the Bombay Presidency, remained under water for a period extending to 109 seconds, or, within 11 seconds of two minutes. What that means, only those know who have watched for the re-appearance of a human being who has remained half the time under water. It really seems "an age" to those who "watch and wait." Not only is 1½ minute the longest dive on record in the annals of the Ceylon banks, but I suspect that if sceptical criticism were brought to bear on the stories which allege subaqueous existence by divers for periods up to six minutes, this latest feat would be found to take rank amongst the most remarkable in the annals of diving where the diver has not been artificially supplied with air. No doubt the organs of the human body are capable of being educated, by continued practice to endurance of abnormal conditions and of adaptation to such conditions: to those of extreme heat for instance, if gradually applied. I could, therefore, understand a man who commenced a diver's life "sound in wind and limb," obtaining gradually the power

* Popularly Modregam

of remaining under water and repressing inspiration and respiration for two minutes, or at the very utmost two and a half. But those who know that the blood is the life, and that it must, as it circulates be ærated, or lungs and heart will cease to act, will be slow to believe in a staying power under water of three minutes, far less of six. If such dives have ever been really made, *the record being accurately kept*, the conclusion must be that in such cases the respiratory organs were in an abnormal condition, or that some means of obtaining fresh air were adopted. It is not obvious how the use of a nose-compressor (made of horn, I believe,) could have aided the man who made the long dive. The other "Arab" alluded to by Capt. Donnan had an imperfec diving dress which, it will be observed, was rather an encumbrance than a help to him as a regular diver, in which capacity he was only thoroughly successful when he abandoned the adventitious aid. Much service to the pearl fisheries of Ceylon was naturally expected from the class of European divers who, by means of external air supplied to them, can remain not minutes but hours under water. But the hopes entertained have not been realized. For the ordinary operations of rapidly collecting and bringing shells to the surface, a regular diving dress is as much of an impediment as was Saul's armour to the shepherd lad who slew the giant with the simple weapons of a pebble from the brook projected by a sling. For exploring the banks and reporting on their condition, more might have reasonably been expected. But a thickly mailed and heavy booted European diver, with 7 to 9 fathoms of water pressing on him, is no light entity to walk over and inevitably crush the colonies of molluscs. Sir Henry Ward, in his graphic account of his visit to one of the series of pearl fisheries in his time, did not fail to notice the heavy and awkward movements of the regular diver under water, as contrasted with the lithe and rapid action of the next to nude native professional. As a matter of fact, Capt. Donnan, by the aid of a few well-trained and experienced native divers, who not only bring up specimens of the shells, but report on the conditions they have observed below, (for the divers keep their eyes open,—very wide open,) is better able to judge of the state and prospects of a bank, than he could be by any aid rendered by men in cumbersome diving dresses. Most useful are such men in exploring wrecks and in carefully and patiently building up submarine structures, such as our grand Colombo breakwater. But there are limits to their functions, and those limits are reached when it is attempted to employ them in connection with pearl banks or pearl fisheries. In calm clear weather, I believe the bottom is distincly visible through seven fathoms of water, (the *average* on the pearl banks,) and with a good glass to aid the eye, so, also, I should think, are most details of coral and algæ, living and dead shells, and even the movements occasionally of such fishes as skates and "old women," destructive enough, in all conscience, but not to be compared I suspect to the deadly operations of the voracious whelks, who only want a small chip on the edge of a shell, or the incautiously prolonged opening of the lips of its prey to make short work of the animal, whose nacre-secreting powers has made it so famous and so valuable. For scientific observation, however (observation which may lead to important economic results), I should think the electric light might be employed with advantage. There is very much in "the life history" of the pearl mussel (*Avicula [Meleagrina] margaritifera* of LINNÆUS), which is obscure or utterly unknown. We know that on banks with the proper conditions of depth of water and other circumstances, but the bottom of which is merely sand, the bivalves will not settle, because the ground presents no solid object to which the creature can anchor itself by its byssus, or beard, an organ which it has the power, often resorted to, of throwing off and renewing. A sandy bottom strewed profusely with coral or other rocky fragments, capable of offering a steady resting-place to the aggregated mollusks, presents the necessary conditions, with, always, about seven fathoms of water over the bank. So essential is this latter condition that if ever the hitherto abortive experiment of breeding pearl oysters artificially is to succeed, it must be secured. Shallow estuaries, the water of which has a warm temperature, such as the edible oyster rejoices in, would, we now know be fatal to "the pearl oyster." But all the conditions of a coral-strewed bottom in seven fathoms of water may be present, as they are in many places between Aripu and Chilaw, and yet the pearl shells will either never settle on them, or never settle long enough or in sufficient numbers to render a fishery of such banks profitable. Even on the two banks on which the oysters do settle and sometimes remain until they more or less attain maturity (the full term of life being seven years, but their fishing age ranging from 2½ to 4 years), the effects of currents by which the masses of spat are driven hither and thither, and the other conditions which lead the spat to settle, and fix themselves and grow for a longer or shorter period,—sometimes the whole millions vanishing as suddenly and mysteriously as they came,—are all wrapped in much obscurity and require patient investigation.

Of one thing my recent visit and observations have convinced me, that amongst the main reasons why, in the midst of all their capriciousness and precarions, the Modregam bank just fished and the Chevalpar now having so successfully dealt with are such favourite resorts of the pearl oysters, is *the large quantity of fresh water*, with all that it contains of vegetable and animal matter suitable as food for the animals, which several large rivers pour into the bay of Silavaturai. The fresh water, of course, floats for a long period over the salt, and Mr. Twynam told me he has dipped perfectly fresh water from the surface many miles from the shore. No doubt, in periods of extreme flood, the rivers may do harm instead of good to the oysters on the banks, by bringing down such enormous quantities of alluvial matter, that the bivalves are smothered in the resulting mud. This effect, when it has occurred has been easily seen and duly recorded, but I cannot at this moment recollect if due prominence has been given to the theory I venture to advance, or support, if it has been advanced, that under ordinary circumstances the rivers which embouch into the bay opposite the Modregam and Cheval Pars, which are only about twelve miles from the shore, must have an important influence for good: probably in modifying the temperature and quality of the sea water with which the fresh gradually amalgamates, but especially in the quantity of vegetable and animal matter, (land plants, leaves, and flowers, fresh water algæ, earth worms, insects of various kinds &c.,) they bring down and which, first their own momentum and then the currents carry over the bank and deposit amongst the oysters. Such is the strong belief forced on me, and I also feel that the Pearl Banks of Silavaturai, the "buried city" of Anuradhapura, and the Great Kalawewa lake, are connected together by a chain of most interesting physical circumstances, to which further reference may

be made. Meantime, let us congratulate Mr. Twynam and Capt. Donnan as well as the Governor and all the inhabitants of the Colony on the gratifying success of the JUBILEE YEAR PEARL FISHERY.

SLAVERY IN BRAZIL.—The Centro Abolicionista of Porto Alegre, Rio Grande do Sul, is proposing to inaugurate a popular subscription for the liberation of all the slaves in that province, which it is thought do not exceed 10,000. —*Rio News.*

MYSORE GOLD MINES.—Last month 674 tons 7 cwt. of ore were crushed by the Mysore Gold Mining Company and gave 906 3-5th oz. of gold. The Nundydroog Company crushed 65 tons of ore in February and March, and obtained 54½ oz. of gold. —*M. Mail*, April 9th.

A NEW INDUSTRY.—Mr. Evenor de Chazal, who is always foremost in advancing Colonial Industry, has just obtained the authority of the General Board to work a factory in St. Georges Street for the preparation of wine (*boisson vineuse*). We have at present no particulars as to the process, but we are told that it is calculated to be the means of producing a step in advance to colonial industry. We sincerely wish Mr. de Chazal every success in his enterprize.

"STROPHANTUS" is apparently the latest important addition to the "Pharmacopœia" and Mr. Neil S. Campbell has been sending the first specimen pods to the island, one of which has been sent to our office. Strophantus is described by competent authority as a great improvement on digitalis, for its influence over the heart—increasing blood tension, producing diuresis, and reducing temperature. The plant, the seeds of which are used is "Strophantus hispidus" which is widely distributed in Equatorial Africa.

THAT COFFEE TRADING COMPANY has at last been organized in Campinas, S. Paulo. The name is to be "Sociedade Anonyma Cooperativa dos Interesses da Lavoura" and the capital is 1,600,000$. It is needless to predict the result. We regret to notice the suicide, on the morning of the 19th, of Mr. S. A. Herforth. Mr. Herforth was a partner in the late firm of Kern, Hayn & Co., which become seriously embarrassed through unfortunate coffee operations some two years ago. Mr. Hayn committed suicide about a year ago, and Mr. Kern was, and possibly still is, confined in an insane asylum. Coffee has a good deal to answer for.—*Rio News.*

CURING COCOA.—The following advice on cocoa fermenting occurs in a report on Jamaica economic plants, probably by Mr. Morris: has it been tried in Ceylon? :—

A very simple means by which the process of fermentation may be set up in small quantities of the 'nibs,' is to put them into an empty kerosine tin or 'pan,' and then place them in the full sun, taking care to cover the opening close with a thick cloth, so that the sun, striking on the outside of the tin, raises the temperature. Two, or at most three, days is sufficient for this purpose; they should then be carefully washed with clean water until all the adhering mucilage has disappeared, then thoroughly dried in the sun. Cocoa dried by this method brings a much larger price than that sent to market without fermentation, and the practice is one by which small cultivators could not fail to be largely benefited were it made known among them by clergymen and others who come into frequent contact with the people."

THE TALLOW TREE OF CHINA.—Vegetable fats and wax have long been known, but it is only recently that the above has attracted the attention of the soap manufacturing fraternity. It is cheaper than animal tallow, and is said to be capable of producing very good soap. The tree which yields it is a native of China, and it is from the kernel of the fruit, says the *Technische Seifensieder*, that the tallow and oil are obtained. A thick layer of tallow envelopes the nut, which also contains a yellowish aromatic oil, used for heating and other purposes. When the fruit is gathered, hot water is poured over it, which is allowed to cool, and the tallow which has congealed on the surface is easily removed, after which it is again carefully melted, and run into moulds, ready for the market. It possesses a peculiar odour, which is not unpleasant, is crystalline, of a greenish colour, and melts at 40°.—*Burgoyne Burbidges.*

A WATER PLANT CATCHING FISH.—The bladders of the curious water weed—Utricularia—still occupy the attention of the curious in the Old World. The fact that these bladders caught living things was first observed in this country by Mrs. Mary Treat, of Vineland, N. J.; but the fact does not seem to have attracted the same wonderment in America as in the Old World, where it is a continuous topic with newspaper writers. The bladders are very small, not much larger than small bird shot, and when the magazines which love to put the sensational into scientific topics talk about the plant being a dangerous enemy to the fish culturist, we have to make all due allowances. Very small fish are caught, and larger ones, as Professor Mosely says, held by the tail till they die; but these unfortunates will be but a small portion of those that would be caught and eaten by the larger fish. Very few of the immense number spawned reach maturity, plentiful though the stock may seem to the fisherman. For what purpose the bladders catch the animalculæ and minute creatures is not known, if, indeed, there is any special purpose of this kind. Professor Mosely says that it has not been found that there is any digestive operation going on, as it is believed there is in some of the carnivorous plants, more properly so called.—*Independent.*

OUR PEARL OYSTER BEDS.—We read:—The forty years' experience of Messrs. Barnett & Foster, Forston Street, London, as manufacturers of submarine appliances of all kinds was exemplified in a display of divers' dresses and equipments, atmospheric engines, compressing-pumps, and safety-lamps. The last-named exhibit was certainly *the* novelty of the display, and carried the palm in point of interest. Foster & Fleuss's new lamp, broadly described, is a modification of Foster's submarine lamp, being, so far as the production of the lights is concerned, an adaptation of the well-known lime-light. The lamp may be said to consist of two parts, the lower portion or bottom comprising the gas reservoir; while the upper portion forms a sort of double hood, nearly one inch apart, which is filled with water to keep the lamp cool for mining purposes, and which screws on to the lower part, so as to form an air-tight joint. Shortly prior to the invention of this lamp Messrs. Barnett & Foster patented a new diving-apparatus, which entirely dispenses with pumps, tubes, and all extraneous arrangements. Together these inventions represent the most noteworthy advance in this direction of modern times; while at the same time they mark an important revolution in the theory and practice of submarine exploration. Provided with these truly invaluable appliances, it is possible for a man to continue to work for several hours at a time without any communication with the external atmosphere, thereby justifying the hope and belief that, with further practice and experience, the new principle may be largely applied in exposing and recovering life after colliery explosions.—*Home Paper.*

[By means of such apparatus we ought to obtain better knowledge than we possess of the laws which rule the life and progress of the pearl shells, so that the regular cultivation may yet be rendered possible.—ED.]

THE INTRODUCTION OF COFFEE CULTURE INTO THE ISLAND OF CEYLON.

To Mr. Advocate de Vos of Galle, we are indebted for the following translation of some notes of P. A. Leupe on the history of coffee culture in Ceylon found among a collection of Dutch MSS. Mr. de Vos found the writing very indistinct, but he has done his best with it. Can the original of this be in the Government Record Office? The letter dated 27th July 1719 was written by the Directors to the Principal Government, that is at Batavia. As it referred to Ceylon, a copy of it must have been forwarded in the usual course to the Ceylon Government:—

In the "Nieuwe Amsterdamsche Courant" Algemene Handelsblad (General trade list) of the 29th January No. 19,704, we read under the East Indian intelligence from Batavia of the 16th December last year in a report of the officer the Heer C. W. P. A. van Spall on coffee culture in Ceylon, amongst others the following:—"That the cultivation of coffee in Ceylon by the native population was commenced in 1690 when that island was under our rule: that that culture was continually encouraged by the servants of the East India Company with more or less earnestness with "the result that the exportation of coffee in 1739 from that island amounted to 100,000 pounds etc." This is in a certain sense—so far as the introduction of coffee culture is concerned—opposed to fact. We are forced to infer that Heer van Spall is unacquainted with a little work entitled "Invoering van Koffy Kultuur op Java" (Introduction of coffee culture into Java) contributed by us to the "Koninklyk Instituut voor de Taal—Land—en Volkenkunde van N. I." (The Royal Institute of the knowledge of language—countries and peoples) and incorporated by the Government into their memoirs where it is said, "that in the year 1719 in Ceylon, the experiment should be tried to make the leaseholders of legally and illegally acquired lands being suited to the cultivation of coffee to reserve (unite) them for that culture."

Thus it was not before 1719 that people thought of trying the experiment of planting coffee in Ceylon. We are in a position to state what brought this about. In the letter sent by the Directors to the Principal Government in that year, 27th July 1719, we read the following:—"The low and marshy lands mentioned by Governor Rumph and Council in their letter have made us think of coffee culture (being a tree) which requires almost no trouble or labour, and the Company will in the present state of affairs, profit much if people will zealously engage in it and if it could be obtained from its own soil and marshes. Therefore, we cannot refrain from taking this opportunity of submitting to your consideration what has occurred to us in respect of this matter, viz., that this tree prefers a shady spot or marshy soil and once planted grows without need for any further trouble, nay ought or can one prune it being in need of no other care than only when the tree becomes big and sometimes through over-bearing some of its branches, which are always thin and long, fall off they must be broken to make room for the new ones which soon shoot out from the stem. The gathering of the berries is also not much trouble; for, to get good, ripe and full coffee-berries, they ought not to be plucked from the tree but one should wait till they fall off and then collect them in a dry place with a small wooden rake with teeth so close to each other as not to allow the berries to pass between them till they are again stored in a dry place under cover without anything further being required. The stones sufficiently grow of themselves if only they are not too dry and hard of kind as we found out from the coffee seeds formerely brought from Mocha, and it is reckoned that each tree produces in the third year at least one and in the tenth year at least 5 lb. of cured coffee. Remembering, therefore, the benefits which will result not only to the owners and renters of lands but also to the Company, we think that it is well worth trying the experiment."

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special Letter.)

PARIS, March 19.

M. Andourd, chemist, draws attention to the loss of nitrogen resulting from the mixture of nitrates and phosphates. In one of the departments of France, a mixture of nitrate of soda and mineral phosphate was carefully prepared and sold to various farmers. The mixture represented six per cent of nitric acid. In a short time the fertilizer rapidly lost its fertility which went on steadily declining. Between the 6th June and 14th July, the percentage of nitrogen declined from 6½ to 3½. Another mixture at the moment of fabrication, registered 2 per cent of nitrogen, lost in fifteen days, something over the moiety. In some of the samples, the alteration of the nitrogen was so rapid that the mass was full of bubble-holes, caused by the elimination of nitrogenized gases. Indeed some of these were gathered in a receiver. Artificial experiment confirmed the escape of nitrogenous gases from the two mixed fertilizers, varying in the space of one month, between 17 and 33 per cent.

In the case of sulphate of ammonia, the loss was from 5 to 15 per cent. What then must be the loss at the factory, where the mixture is prepared in large quantities, and exposed to the sun's rays? because, between a temperature of 77 to 100 degrees F. the disengagement of nitrogen is very active, and once commenced will be kept up even when the temperature falls as low as 54 degrees. Slow or quick, the elimination of the gas is certain when the nitrate and phosphate are intimately mixed. And yet the escape of nitrogenous gases can be only checked by employing the nitrate in a lumpy form, that which is injurious to vegetation. Clearly the mixing of the fertilizers should take place close to the time of using them.

Since nearly quarter of a century, Saxony suffers from a scourge of insects—*nematodes*—which prey on the roots of sugar beet, as the phylloxera does on those of the vine; the damage is relatively as serious Professor Kuehen has tried sulphuret of carbon, but not with much result. He relies on "trap plants," to catch the myriad-enemy. The nematodes are also partial to all cruciferæ plants; on a soil infected with the insect, sow white mustard, rape &c. When the latter have attained a pulling height, pull them; cast them away, as the roots will be a mass of the insects. Repeat this plant-trap two or three times, and the enemy will be extirpated, while the beet which had fallen to seven tons per acre, will increase to seventeen. M. Girard relies on sulphuret or carbon; dose, 10 ounces per square yard, deposited in the soil, the fumes of the chemical killed the insects right off, and the land, purged from the enemy, the yield of beet rose from two to nineteen tons per acre, and the saccharine riches of the roots, from 4 to 12 per cent.

French farmers appear inclined to pay serious attention to tobacco culture. It would seem that seed from Southern Russia suits best their soil and regions. Many authorities maintain, that the Russian equals the best second class Turkish tobacco, while the plant is more hardy.

THE JAPAN CEDAR.

(Cryptomeria Japonica).

The following are extracts from a notice in *Forestry* of the Japan tree from with most of the tea boxes which Ceylon is now receiving from Japan are made:—

Forty-one years ago, or during 1844, the Horticultural Society of London, through their collector, Mr. Robert Fortune, sent seeds of the above interesting tree from Shanghai, the produce of which has now in this country attained, in several instances at least, heights varying from 60 feet to 75 feet—rapid growth, it must be admitted, for a Japanese conifer in Britain. Delighting and thriving most luxuriantly in cool, damp soils, the humid atmosphere of Great Britain is peculiarly well suited for the successful cultivation of this handsome conifer. When seen at its best, the

Japan Cedar is a tall, portly tree, of somewhat conical habit of growth, with a clean, straight stem of fully 1000 feet high, and 4 feet or so in diameter.

The branches spread horizontally, are slightly drooping with up-curved tips, the lateral ones dividing into numerous frondose branchlets, thickly covered with bright, glossy green foliage.

Leaves fully half-an-inch in length, rigid, incurved or awl-shaped, and oppressed to the stem, obscurely quadrangular, and marked rather indistinctly with two glaucous silvery lines beneath. The flowers are monœcious, or both male and female on the same plant. Male catkins of an oval or oblong shape, and produced in great abundance in the axils of the leaves at the extremities of the branchlets. Cones globular, about three-quarters of an inch in diameter, terminal, singly, and usually erect. This distinct and beautiful conifer, although at first branded with a semi-tender character, is found to be perfectly hardy, sound in constitution, of very rapid growth after it has become thoroughly established, and by no means fastidious as to soil or situation, provided the former be naturally sweet and healthy, or artificially made so. Although usually asserted that this tree only thrives, or at least thrives best, on damp soil and in low sheltered situations, a comparison of the trees growing in Penrhyn Park and in other situations over the estate, hardly upholds this theory, for some of our most luxuriant specimens are growing in deep, sandy loam, with the happy medium of neither excess nor want of moisture. Judging from the specimens here, I should say plant the *Cryptomeria* in good dampish, but not stiff loam, where partial shelter is afforded, and all the better if in a shadyish situation—by this I mean a northern or eastern aspect, where direct sunshine is prevented. Better, indeed, than the generality of coniferous trees, the Japan Cedar seems to thrive in the dense, still air of mid-woodland, and is even not fastidious about the juxtaposition of surrounding trees, so as their extending branches do not actually commingle with its own.

Both in Japan and China, into which latter country it is generally supposed to have been introduced, this tree is largely employed for ornamental planting, such as in the formation of avenues for clumps and groves, and as single specimens in the gardens and grounds.

In Japan there is an avenue of fully thirty miles in length closely planted with this tree, while others of shorter lengths are not uncommon.

The timber of *Cryptomeria Japonica* is light but lasting, and largely employed for room-panelling, for furniture generally, and in the making of light packing-cases. It is white, soft, and easily worked, with a pleasant perfume, which makes its adoption for panelling or room furniture particularly desirable. As might be expected, the wood of this tree produced in Britain differs but little from foreign specimens, at least such was our verdict after an impartial examination.

A. D. WEBSTER.

Penrhyn Castle, North Wales.

COAL.—At a recent lecture delivered in Philadelphia by a promisent scientist, the gentleman said it takes a prodigious amount of vegetable matter to form a layer of coal; that the present growth of the world would make, a layer only one-eighth of an inch thick, and that it would take a million years to form a coal-bed 100 feet thick.—*Journal of Forestry.*

AMONG articles exported from India spices figure to the extent of 43,061,335 rupees, an augmentation of nearly 100 per cent during the last five years, notwithstanding the decline in the exports of pepper. The shipments of ginger are growing very rapidly. About 7 millions out of 10¾ millions lb. exported were sent to Europe, where a fine appetite for Indian ginger seems developing. Exports of cardamoms are falling heavily, and no wonder, since Ceylon—which is not, of course, included in the report—has nearly supplanted India as a purveyor of that spice.—*Chemist and Druggist.*

WE see it asserted in a French medical journal that a correspondent has "killed" the phylloxera by planting Datura Stramonium among his vines. We venture to doubt the correctness of the assertion, or at least to suggest that more evidence be forthcoming.—*Indian Agriculturist.*

MOSQUITOES.—It is said that nitre paper burned in a room will drive out mosquitoes. We have not tried this, but a mixture of equal parts of essential oils of eucalyptus and lavender applied freely to the skin will repel their attacks. And we can assert from experience that essential oil of lavender applied to a bite without delay will at once relieve all irritation and prevent swelling.—*Chemist and Druggist.*

TIMBER merchants are anxiously watching the progress of an American invention for drying wood by a quick process in which cold air plays an important part. Instead of wasting time and causing loss of interest on capital in the shape of timber on hand, which needs three to seven years to mature naturally, it is claimed for the new process that it matures wood in three days. A tree felled to-day can be delivered, sawn into shape, and ready for use in the building and furniture trades next week.—*Journal of Forestry.*

TEA PLANTS AND THEIR LEAVES.—The Editor of the *Forestry* replying to a correspondent, who stated "the Tea plants live though denuded of their leaves," wrote:—That "tea plants will live without leaves" for a time is true (so also will plants generally), but that they will do so for long or indefinitely is an error borne out by everyday experience. Responsive action between the leaves and the roots must be sustained, else there can be no living and thriving for any length of time in any plant. The herbaceous condition of the shoots that spring from the roots of recently felled trees enable them to fulfil the functions of leaves for a time, till leaves are put forth, and prove that nature is not without resource when by accident or design disturbance of the balance of functional action takes place.

A SHORT time ago it was given out that paper rails had been made and successfully tested. Now, the same material has been utilised for making pipes, and a certain quantity of such pipes have been exhibited in Vienna. The process is as follows:—Strips of paper, the width of which corresponds with the length of one pipe section, are drawn through melted asphalt and wound upon a mandril. When the pipe thus made has cooled the mandril is withdrawn, and the inside is covered with a kind of enamel the nature of which comprises the main secret of the invention, and is, therefore, not made known. The outside is painted with asphalt varnish, and dusted over with sand. It is stated that such a pipe will resist some 2000 lb. internal pressure, though the thickness of the stuff is only about ½ inch. *Indian Agriculturist.*

EUCALYPTS IN ITALY.—We learn from a German authority that the plantations of eucalypts made in malarious districts in Italy have so far proved a failure. The trees do not grow; either the soil or the climate, or both, are unfavourable. This is somewhat wonderful in a tree that in this less favoured climate makes astonishing progress in summer; only, however, in the milder districts, and not always in even them, to be spared by our severe winters. It is not only wonderful, but disappointing that a tree which a few years ago was trumpeted so loudly as a specific against malarial fever, should fail in the largest experiment ever tried with it. We are afraid it is no fit subject to plant in marshes, for even if it succeeded in growing well, the growth would be of such a spongy nature that winter's frost even in many parts of sunny Italy would be fatal to it. We find the same authority recommending *Laurus glandulosus*, various American and Indian *Acers*, *Salix Babylonica*, and several poplars as substitutes for the eucalypts, and claiming for them several febrifugal properties to those claimed for the eucalypts. We are not aware that this claim for the latter has ever been advanced on reliable grounds, and this grand Italian experiment having failed, we are not likely soon to have the point satisfactorily settled.—*Journal of Forestry.*

CHINA TEAS.

We have been favoured with a copy of a London Circular prepared by a Broking Firm for its constituents concerned in China teas and, as everything connected with the subject is of interest to the Ceylon planting and mercantile public just now, we append the greater part as follows :—

As usual at this time of year we have the pleasure of giving you our ideas as to the position and prospects for the coming Tea season, and our views as to probable safe limits, which we commend to your attention. The political outlook is not reassuring, and affairs at home certainly do not show much advance from the late continued depression in trade. The state of Ireland, too, is most critical, and there is no certainty as to the continuance in office of the present Unionist Government. The position you have to face is this—the taste of the public is fast leaving China Tea. In the coming season 100 millions from other countries, costing the grower no more than an all-round price of 7½d to 9½d, according to the locality, will be knocked down as it arrives at the best price it will fetch. To compete, therefore, you must send us a better article (strength the great desideratum), at a low cost, and even to support present currencies much less of it. For the coming season we estimate this supply at—

India	... ...	82,000,000 lb.
Ceylon	... ...	18,000,000 „
Java	... ...	5,000,000 „

Leaving 115,000,000 lb. to be provided by China to make up our probable delivery, including Exports, of 220,000,000 lb. Our delivery is not increasing by "leaps and bounds," but since 1884 has remained stationary, we, therefore, do not require 128,000,000 lb. from China, as estimated by some brokers. We give you the usual table of deliveries which speaks for itself.

Deliveries excluding shipments to the Continent and elsewhere.

	Indian.	Ceylon. lb.	Java. lb.	Chinas. lb.
1886	68,420,000	6,245,000	3,677,000	98,249,000
1885	65,677,000	3,218,000	3 536,000	105,710,000
1884	63,038,000	1,179,000	3,709,000	107,395,000
1883	59,096,000	incl. in Indian	2,893,000	111,291,000
1882	50,497,000	„ „	1,787,000	115,990,000

The Home consumption of Chinas falls off 7½ millions, and that of Indian, Ceylon and Java increases nearly 6 millions. The Chinas showing a reduction of 17¾ millions in five years.

For the first two months of the year the comparison is even more marked:

	Indian, Ceylon and Java...			
	10,741,600	12,643,144	12,236,052	15,778,098
Chinas	...18,609,600	18,283,299	17,301,221	15,176,993

Our stock of Congou on the 1st July will be rather larger than last year, and with the experience then gathered, we see no great chance of improvement from our present scale of values for common Teas. In regard to fine Teas, both black and red, Indians and Ceylons have taken their place for Home trade, and there is now hardly a quotation over 1s 3d. For months hardly a sale of fine Tea took place, except at auction, and results to holders are simply disastrous.

NORTHERN TEAS.—The crop of last season was undoubtedly a fine one, but was generally so thin as to be very unsuitable for the Home trade. Even with the scarcity of fine Indians, prices for choice Chinas could not be kept up to anything like old levels, and fell away from 4d to 8d per lb. This drop in fine and finest acted on the grades below, and brought them down too. Keemuns have suffered most in the general depression, and finest first chops have been sold under 1s per lb.

We give below a range of prices, which with a crop of average quality, we consider it safe to buy at, including the usual buying and selling commissions :—Finest 1st Pack. Ningchows and Keemuns (a few exceptionally choice parcels up to 1s 6d.) 1s 3d to 1s 4d per lb.

1st Pack Ningchows and Keemuns, if not quite up to finest 1s 1d to 1s 2d per lb.

Finest 1st Pack Taow Yuens, Oonfaas, Cheong-Sow-Kais, and Suun Yangs, also finest 2nd Pack Ningchows and Keemuns 1s 0d to 1s 1d per lb.

(Should the Kiukiang crop be very inferior, a few of the choicest Taow Yuens might be bought up to 1s 2d per lb.)

1st Pack Taow Yuens, if not up to finest, the best of the 1st Pack Tong Shans, and fine 2nd Pack Ningchows and Keemuns 0s 11d to 1s 0d per lb.

Good first Pack Oonfaas, Cheong-Sow-Kais, Suun Yangs, a few of the choicest Yung-Low-Toongs and Kut Oans, and the inferior 2nd Pack, Keemuns and Ningchows 0s 9d to 0s 11d. per lb.

For last crops of grades below the above 10 per cent. under last year's selling prices on arrival are the safest limit.

Second Crops.—The best Ningchows might be bought up to 10d and Keemuns up to 9½d., while 7d. is the highest that should be paid for Hankow district Teas. These limits, however, are only safe if the first crop prove a small one.

Red Leafs.—We have had a steady market all through the season for these, but with anything like the same quantity next season a smart fall in values must be expected. Paklum, the finest Tea of the year was sold ex first steamer at 1s 3½d., and there is no reason to think that this will not again be the top price. Soomooas, Qui Fars and Cheong Loks, "Une Heong" was the solitary sale over 1s 6d but we should be sorry to place the value of this exceptional parcel over 1s 4d., and the rest of the crop in proportion. Pan Yongs, one of the finest Teas of the season was sold on arrival at 1s 6d., but at this price the Trade would take no more, and the next sale for a crack chop quite as good was 1s 4d. 1s 3d has been the top price for the last five months for retail quantities of the choicest chops shipped. If the Colonies can afford to pay 1s 8d for a similar quality, naturally they must take the pick of the crop but 1s 3d. s quite enough to pay for anything to this market

Saryunes: One or two chops that always stand out may fetch 1s. Ordinary finest first chops are not worth over 9d, in fact at the lowest point of the market this season they sold down to 7¾d. Paklings. The market was regularly opened at 1s 0½d for crack chops and this price may be again obtained if the supply of boxes is not overdone. Souchongs: To make Teas with any quality at all the Sinchune district can evidently not produce 57,000 chests. Probably with a 20,000 chests less crop, and a return to their old standard of excellence, they would again come into favour. As a guide we give the following limits :—

Soomoos.	Crack Chops of the Cheang-Mow class	1s 3d to 1s 4d.
	Crack Chops of the Cheang Kee class	1s 1d to 1s 2d.
	The inferior class of first Chops	0s 10d to 1s.
Paklums.	Choicest with true Flowery pekoe water	1s 3d.

Pan Yongs. Finest 1s 1d to 1s 3d 2nd class 9d to 10d 3rd class 7d to 8d.

Paklings. Finest 1s to 1s 1d 2nd class 8½d to 9½d 3r d8d.

Saryunes. Finest 8d to 9½d 2nd class 7d to 7½d 3rd 6d to 6½d.

Yunghows. Finest 8d to 8½d 2nd 7d 3rd class 6d to 6½d.

Suey Kuts. Finest 8d to 9½d 2nd class 7d to 7½d 3rd class 6d to 6½d.

The value of second and third crops will depend, to some extent, on their quality; but more on the size of the first crop.

Souchongs. Choicest 1s 8d. Finest 1s 4d. Fine 1s 1d.

We have been told that at these prices "we should not have 5 lacs of Congou," with which statement we do not in any way agree; but, at any rate, our proportion of 5 lacs would be much more in unison with our requirements than 7¼! In the old days the crack Soomoos were bought at Tls. 17 and 18. Why not again? Filth such as we have received at the

end of this season, with a black infusion may be knocked off the Export altogether. Our present quotations of 4½d to 5d should settle the question, as it must be under the cost of production.

NETHERLANDS INDIA: JAVA.

We are always pleased to see, and to listen attentively to, anything that Mr. J. P. Van den Berg writes on Java. He has lately compiled two exhaustive letters on the financial and commercial condition of Netherlands India. If any one desires to make himself acquainted with the present condition of Holland's colonies in the East, he cannot do better than turn, when he has an opportunity of so doing, to any work by the President of the Java Bank. The tolerably heavy pamphlet which Mr. Van den Berg has written for H. B. M.'s Consul at Batavia, in reply to queries from the British Indian Government, is marked only for private circulation. We trust that it may be formally published, as the facts are martialled in proper array, and one can tell at a glance the economic position of the countries. Broadly speaking, it deals first with the financial situation; secondly, with the commercial condition; and, thirdly, in a second letter we have some remarks on the question of currency. We will take them in the order Mr. Van den Berg places them before us, only regretting that space will not permit us to do so at a length that the importance of the subject demands.

One very import point to be noted in connection with the finances is the extreme instability of the revenue of Netherlands India, the fluctuations being really of a violent nature. This is of course in large part due to the fact that the colony is dependent on the prices it realises for produce sent to Europe for sale. It has always occurred to us, and the system has been more than once animadverted upon in these columns, that the custom of including the Budget of the colonies in that of the mother country is exceedingly inconvenient, and approximately accurate figures cannot be determined on. It must be apparent that the figures which, at the time we write, have, say, just been despatched for next year (1888), can only be roughly put down. By all means let the Colonial Minister retain the power of vetoing the colonial proposals, should he have sufficient cause to do so; much in the same way as is adopted in the case of British Crown Colonies. This is a detail; but the suggestion is, we think, worthy of serious consideration. We wish that the question of the deficits were as easily reckoned with. From 1876 to 1884 the Netherlands India have been spending on an average eight millions of guilders more than their revenue. The Acheen war is the primary cause of the disturbance in the desired equilibrium. Before it commenced "the normal military and naval expenditure may be taken in round numbers as having averaged f. 30,000,000 per annum. During the period of 1873-1884 the yearly average increased to about f.50,000, thus showing a difference of f. 20,000,000 a year, or f. 240,000,000 in the course of the last twelve years, which amount may be taken as the usual actual cost of the Acheen war, apart from the expenses for civil purposes in the newly-annexed territory, which appear under other heads of the Budget." Railways the Batavia Harbour Works, and the measures for the suppression of the cattle disease also made heavy inroads in the revenue, amounting in all to some 335,000,000 guilders. In the connection of Public Works Mr. Van den Berg contends that the money should have been procured on loan, as circumstances required, and not have been charged against current revenue. To meet all these heavy calls the Government had to resort to new taxes, and readjust others, so that they yielded their maximum. So much were the imposts increased that once or twice trouble has been on the verge of being the result. And yet the deficits were not overtaken; despite the fact that the system of taxation included many items which are generally of a purely municipal character. This may, perhaps, be owing, however, to the fact that the country is destitute of any special provincial or municipal funds.

Of the commercial condition Mr. Van den Berg, though he points out the disasters which have to be met, conveys a more hopeful impression than most writings on Netherlands India have assumed since 1884. That matters are bad in sugar, however, he thus points out:—"On the whole the actual position of the Java sugar industry which, as stated in my former letter, is a matter of vital importance to the welfare of the island, may be called rather critical. Many estates have run largely into debt, and unless a material improvement of prices sets in, it may be taken for granted that the year 1887 will bring ruin on more than one estate which till now has been able to keep up the struggle, on the issue of which the future of the colony so largely depends." Sugar is, of course, the most vital interest of Java, and thus of the whole colony. It is a matter discussed by every one who has any interest directly or indirectly in the colony, and the system of bounties and the production of beetroot are more keenly studied than in this country, deputations and Chambers of Commerce memorials notwithstanding. Van den Besch's system created in 1831, and which has in the past very largely conduced to the prosperity of the colony, is now shown to be of no further practical utility. This system, as far as sugar is concerned, will be terminated in 1889, and only coffee will then remain, which in turn will, we presume, be likewise turned over to free labour and private enterprise, what is to be done for the future then? The Acheen war seems farther off a conclusion than it was at the commencement of the present decade. We wish that Mr. Van den Berg had proceeded and answered this question, as from his long experience he would be well qualified to do.

We can only mention the long dissertation on the question of currency which Mr. Van den Berg so ably argues out. As a banker and a person who has devoted considerable attention to the questions of bimetalism, the appreciation of gold, &c., his opinions carry considerable weight. He concludes that the disadvantages, by raising so largely the prices of imports, would more than counterbalance the increased rates obtained for produce, whilst it would be unfair to Government officers dependent for their incomes on silver, and to capitalists in Holland who have invested in estates in Java, to upset the present equilibrium. He therefore argues against any change in the present currency regulations.—*L. & C. Express.*

THE BREAK IN QUININE.

(New York Drug Reporter, March 16.*)*

The cause of the depression in the quinine market is one of the mysteries that defy investigation. No one appears to have any decided opinion as to the reason why prices should have taken such a remarkable tumble during the past week or two, but the impression prevails that it is due to one of two causes; namely, that either the small holders became frightened when the market fell off a cent or two at the beginning of the downward movement and have been unloading ever since; or that the market is being depressed by some large operator or operators with a purpose. In support of the first mentioned reason it is stated that when prices were so low a few weeks ago and everybody was talking of much higher prices as the inevitable outcome of the position of bark at that, time, many small speculators including clerks and even truckmen connected with the large houses, and not a few similarly situated in other branches of trade took a flyer in quinine. Without capital to hold out for any length of time they were forced to sell as soon as the market developed any signs of weakness, and their anxiety to get out precipated the decline. Those who hold to this version believe that nearly all of the weak holders have unloaded, and that in a few days a decided change for the better will occur. There seems to be less tangible grounds for the impression that large operators are bearing the market, the only cause for such a belief being apparently the favorable opinion of the future that such operators are believed to entertain, because of such remarks as they may have let drop in confidential moments.

Probably both of these have been factors in bringing about the depression, but possibly the present situation

of the bark market is at the bottom of all the trouble. At nearly all the public sales of bark in London for several months past the representatives of American manufacturers have been conspicuous buyers, bidding up prices until the foreign manufacturers had to stand aside and let them make the bulk of the purchases. During all this time reports have been freely circulated on this side to the effect that a very large decline in the production of bark would greatly reduce the supply for consumption this year and must inevitably result in much higher prices for the alkaloid. As these reports were fully substantiated, apparently, by the very convincing array of facts and figures accompanying them, they had a very decided effect upon the market for a time and when prices for quinine did begin to advance early in the year it was believed by many to be the direct result of the causes indicated by these reports. Now, however, it would appear that the bark situation is not so encouraging as the people on this side had been led to believe, if the result of the last fortnightly sale is a criterion. From late mail advices we learn that at this sale the German manufacturers, who heretofore had been virtually kept out of the market by the spirited bidding of the Americans, were the principal buyers, and that they got all they wanted at their own prices. This would indicate either that the makers on this side were satisfied to let the price of bark drop for a time, or that they had discovered new facts which induced them to change their views regarding the supply. In referring to the last bark sale a London contemporary says: —"That the affair has been badly managed on the other side there is no doubt, for it was little short of madness to attempt to bull the market without first of all ascertaining the prospects of East India barks. As it stands the shipments are fully up to last year, and the market upset; besides which all the advances in prices have been not only lost, but the unit lowered without doing the slightest good, beyond putting a few thousands into the Ceylon planters' pockets."

CEYLON UPCOUNTRY PLANTING REPORT.

WEATHER CHANGES AND PLANTERS' FEELINGS—THE LITTLE MONSOON AND TEA FLUSH—THE 'SHADOW' OF BUG—CACAO.

24th April, 1887.

A change in the weather has a marked effect on a planter's feelings; as well as in his ideas of the value of estate property. After some weeks of roasting weather, when all growth has been checked; the ground baked into the hardness of the kiln-dried brick: the mind wearied out with an unprofitable wrestle to know the future, and the solution of the questions what will the place do? and what is its worth? then comes the rain, and with it what a change.

The soil which had looked as unfruitful as the public highway, becomes a rich loam dropping with fatness; the bursting buds of promise whose growth may almost be seen, fail to expand themselves with anything like the rapidity which marks the opening of the vision of the cultivator; and where before there was but the potential grave of a buried treasure or at best the scene of long and unrewarded labour, there is now the site of a successful venture—an apocalypse of a glorious resurrection of buried coin.

It is well we have these bright days. "Look here," said a man to me the other day, "I would not sell my place now for four times what it cost me." I suppose he will stick to that—till he changes his mind.

Certainly this little monsoon has altered the face of things. Tea has almost run away with itself; cacao looks fit for anything; and the green of the foliage of the cinchona trees deepens its shade daily. As to coffee, it has allured us with blossoms so abundant that as "Tip Thompson" used to say "you could not put another spike on, even with a pair of pincers"; and there is such a promise of harvest that we all are ready to declare that even in its best days, better was not to be seen. Bright-eyed hope is wide-awake, we all look forward to fortunes, and the value of estate properties has risen all round. Pretty good results these to point to from a change in weather.

Of course there are shadows, and the worst is the bug. What an infliction that means, can sometimes be calculated by a man's diminished rotundity—a loss of flesh, as well as rupees. In whatever form the insect makes itself felt, none is agreeable. It is the "Kismet" of the planter which "sits and waits;" and is as seemingly hopeless to struggle against as any other form of fate before which the mind of the Eastern collapses. It is not until a man has had a real tussle with the green bug that he knows its power and the despair it inspires. I have seen it attack fields of coffee which were fit almost for a place in Paradise, and in a few months there was little to be seen but a howling, blackened waste, and to cure it I have never known anything do any good. When I read, therefore, of the efforts which are being put forth, by those unfortunates who are but making their first acquaintance with this pest of pests, of kerosine, mana grass, lime, sulphur, manure *et hoc genus omne*, it is like the re-acting of your past, a revival of blasted hopes—a wasting of good coin. We have reached that startling crisis which never comes very kindly home to our people—that of having *wholly* to "lippen to Providence," as to whether this insignificant visitor will swallow up what little good coffee is left, or disappear as mysteriously as it has come. Of course, there is the disposition with the price of coffee rapidly approaching 100s a cwt. and our trees bearing an extra fine crop to be more than usually staggered at this new influx of bug and perhaps to express a puzzled surprise as to what Providence is thinking about!

It is a comfort to know that the increase of cocoa stocks in London, which has had the effect of lowering its price so much, is not likely to go on, and that the prospects are favourable for a turn in the tide in regard to selling rates. This result is ours through the misfortune of the Demerera men having a bad cacao crop. Cacao is looking as if it would do its best to supply what is wanting.

PEPPERCORN.

COCONUT NOTES: COPRA DRYING.

(*Communicated.*)

COCHIN *v.* CEYLON OIL—WESTERN PROVINCE COPRA *v.* NORTH-WESTERN—WHAT THE VILLAGERS DO?—DIFFERENT KINDS OF COPRA—A PRACTICABLE COPRA DRYING-HOUSE FOR THE SOUTH-WEST OF CEYLON.

By last report Cochin coconut oil was selling at £37, while Ceylon could only obtain £26. At no former time has the one been so high and the other so low-priced, the difference being equal to 45·44 per cent. It has been suggested locally, that there may be a difference in the chemical constitution of the two commodities, but Mr. Field ascribes the inferiority of our product entirely, to colour and smell in his report to our Commissioner. If the inferiority should turn out to be due to a chemical defect there would be little hope of finding a remedy, but if the colour and smell are the faults—the only ones—the remedy is on the surface. Ceylon coconut

oil may be made as bright and colourless, and when newly drawn almost as scentless as filtered water. The colour and most probably the disagreeable smell are entirely due to bad treatment. Many of the villagers gather unripe nuts and pay very little attention to the drying of the copra; they thus produce a dirty half-rotten copra that sells very low. The Western Province estate proprietors almost to a man sell their nuts to traders, who smoke the copra when half-dry. The planters of the North-Western Province enjoy dry weather during the greater part of the year which enables them to dry their copra with very little trouble and being a long way from the market, it goes on drying in the boats even if only partially dry when dispatched. This is the cleanest, the driest, and consequently the highest-priced copra, and if manufactured separately, would probably yield an oil equal to Cochin, but it suits the oil-maker's book to mix all the various qualities of copra and make one uniform quality of oil and the inferiority of our produce in the European markets is the result.

When the villagers are not induced to take greater care in the preparation of their copra by the relatively low price they obtain, there is little hope of reaching them in any other way, but the class that own estates of 10 acres and upwards are, as a rule, more intelligent and energetic, and generally sufficiently awake to their own interests. Estate proprietors say, however, that they make more of their crops by selling them to traders than by preparing the copra, and disposing of it on their own account. This to a simple mind seems an incredible statement, for the trader will certainly not continue to carry on a business that yields him no profit, while exposing him to the risk of loss in the fluctuations of the market; nor can the trader prepare the copra and send it to market at a cheaper rate than the estate proprietor. The statement is true, nevertheless, and two causes operate to make it so. The experienced trader knows to a nicety the amount of drying that will pass muster, while the planter anxious to produce a good quality, continnues the drying far beyond the trader's point and in consequence takes from 5 to 100 more nuts to the candy than the trader. This would be all right were a close and skilful discrimination exercised by the buyers, but what nicety can be expected from those who do not take clean and dry as their standard, but fix the price by the mode of bringing the article to market. Thus we find the prices stated in the market reports as boat copra R38·50, cart copra R32·50. The way to test the value of copra would be to weigh a sample carefully, and then subject it to 250 degrees of heat for two hours, then weigh it again and note how much it has lost. Thus if the price of the day be R40 for perfectly dry and clean copra, say the sample has lost 8 per cent in the process of desiccation reducing the value by R3·20 and it is discoloured by smoke for which deduct R1·50 more, making R4·70; the value will, therefore, be R35·30 and so on for still worse lots. The drier copra is, it yields the more oil in proportion to its weight; the cleaner it is, it yields the better quality; an inferior quality may suit the trader and the oil manufacturer, but it is on the producer of the raw material that the loss of the difference in price of Cochin and Ceylon oil ultimately falls and with him lies the remedy, if a remedy is ever to be applied. All that the planter can do in the first place is to dry his own copra with due care, and thus do away with the trader. If he then finds that he cannot obtain the true value from the oil-makers, the second thing is to make his own oil, and third if he cannot get the true value in the local market, export it on his own account.

It is possible that soil and climate may affect to some extent the quality of coconut oil. The best sample at the Colindies was from British Guiana, and is described as not only pure white, but unusually solid. But Mr. Field has not mentioned solidity as a test of quality, and we have the remedy for colour in our own hands as it consists of care in preparing the copra; whereas qualities depending on soil or climate are beyond our reach, as we cannot materially modify one or the other.

As the climate of south-west Ceylon is not to be depended on for nine months of the year, and the other three are not altogether safe, as rain falling on copra exposed to dry in the sun is seriously injurious, as the heaviest gatherings of nuts come in the wettest season, and as they cannot be kept in husk for much over three months without serious deterioration, I would recommend every proprietor to provide his estate with the means of drying his copra independently of the weather. I have seen a perfectly successful experiment in this direction with the material of an old rusted iron tank cut up and substituted for the "warratchy" shelf in the common smoking shed, the seams being plastered over with tempered clay: newly broken coconuts were then put on and piled up to the roof, the usual fire of dry husks was kept up night and day for forty-eight hours, when the copra was taken out perfectly clean and dry. All that is essentially required is between the fire and the copra, a substance that freely conducts heat, while turning aside every particle of smoke. As a drying house should be a permanent institution on every estate of ten acres or upwards, the temporary makeshift above described would be as little appropriate as a patent desiccator. 1,000 broken coconuts in the shell, 250 cubic feet, thrown loosely together, $3 \times 10 \times 8$ feet, will give very nearly that space; therefore, a house 10 feet in length 8 feet in width, will hold 1,000 three feet deep; and working 300 days it will dry 150,000 nuts, say 120 candies of copra in the year. Cabook walls 9 feet high and a tiled roof at 4 feet high, a sheet-iron floor resting on iron bars one inch square, and at 5 feet another floor of wooden spars one inch apart gridiron fashion for the charge to rest on: such a structure would not cost R100 and besides saving some labour, would render the planter independent of weather.

TEA-PLANTING IN CEYLON.

The Tea-Planter's Manual. By T. C. Owen. pp 162, with Coloured Lithographed Plates of an Iron and a Wood and Stone Tea Factory drawn to scale. (Colombo, Ceylon: A. M. and J. Ferguson, 1886.)

Eight years ago, on account of the depression in the coffee industry of Ceylon, the prospects of the colony were of a sufficiently gloomy character. A great improvement has, however, been effected by the partial substitution of tea and cinchona for coffee, and by the general attention given to cacao, cardamoms, and other subsidiary subjects. Ceylon has also been fortunate in possessing a practical scientific institution in the Botanical Gardens of the colony; and its local press is enterprising and well-informed.

It is well to mention here that the excellent growth made by tea plants at the Peradeniya and Hakgala Gardens fully justified the advocacy of tea-planting in Ceylon by the late Dr. Thwaites in his Annual Reports, while it is also due to the Colonial Office to state that through Lord Blachford it warmly supported the introduction of Assam tea plants into Ceylon in 1867. In 1877 Ceylon tea in commercial samples was submitted, through the Royal Gardens, Kew, to the Indian Committee of the Society of Arts, and the Report of this Committee clearly foreshadowed

the high place which Ceylon tea has since taken in the London market.

The present manual is one of a series issued by the *Ceylon Observer* press, and is intended to be a complete hand-book to all the multifarious duties of a successful tea-planter. Colonel Money's "Essay," and the "Tea-Planter's Vade Mecum," both publications having special reference to the circumstances of Indian gardens, have hitherto been the only books on the subject.

As stated in the preface, Mr. Owen's manual "is more a compilation of the opinions of others and the results they have arrived at than an original work." The very valuable notes of one of the earliest and most successful of Ceylon tea planters, Mr. Armstrong, of Rookwood, form an important portion of the book. The compiler wisely avoids an extended disquisition on the original home of the tea plant and on the question whether the "Assam tea tree" and the "China bush" are specifically distinct. In the latest works on the subject they are both included under *Camellia theifera*, Griff. There is no doubt that the Assam tea tree—for in a wild state it often reaches 40 to 50 feet in height—is indigenous to the mountainous district lying between South-Western China and the River Brahmaputra. It is probable also, although not clearly proved, that the China tea plant—of a somewhat shrubby habit—is derived from the same stock; although, as we now know, it was greatly altered by persistent cultivation for several centuries in a soil and climate different from those of its original home. The China tea plant has been found wild in no part of China. Under cultivation in Ceylon the Assam variety is suited to the plains, a hybrid form is sought for mid-elevations, while the China variety is useful only for the highest elevations up to 6000 and 7000 feet. Mr. Owen recommends that for all new plantations the best "jat" of Assam or hybrid plants should be obtained, as "no amount of care or skill will make up for a bad class of plant put into the garden at the outset." To a beginner in Ceylon, or to a planter, in any other country, unacquainted with the particular methods pursued on Ceylon estates, the book would prove at first somewhat perplexing. Too much knowledge is assumed on the part of the reader as regards the important questions involved in the selection of land, while as regards "the details of cultivation the particular "fads" and "fancies" of individual planters are too largely dwelt upon. It would have been more to the purpose to present a clear and simple statement of the first principles upon which the growth and culture of the tea plant, as a plant, should be based, in order to produce the best results. As regards the details of the manufacture of tea, quoting authorities is no doubt the best course, for the process of manufacture consists of a series of purely empirical operations, and a statement of principles alone would not meet the case. After discussing selection of land (Chap. I.), varieties of the tea plant (Chap. II.), seed and nurseries (Chap. III.), lining, holing, and planting (Chap. IV.), field cultivation (Chap. V.), topping and pruning (Chap. VI.), plucking (Chap. VII.), and manufacture (Chp. VIII). ,the writer devotes the remainder of the book to buildings end machinery (with plans), and to statistical returns connected with yield and cost of production.

The rapid progress made by the tea industry in Ceylon is exemplified by the fact that, while in 1878 only 282 pounds of tea were exported, during the past year 1886 the exports reached over 7,000,000 pounds. The probable exports in 1887 are placed at 12,000,000 pounds, while in 1888 they are expected to reach 30,000,000 pounds. So far, the price of Ceylon tea has maintained a slight advantage over Indian teas—the average price during 1885 being 1s. 3½d per pound for Ceylon tea, as against 1s 1½d for Indian teas. The combined effect of large shipments of Indian and Ceylon teas will no doubt lead in time to a displacement of much that now comes from China. And while the general character of tea obtainable in European markets will improve, there obviously must come a fall in prices for which both Indian and Ceylon tea planters must be fully prepared. At the Colonial and Indian Exhibition, thanks to the energy of Mr. J. L. Shand, Ceylon tea was admirably brought before the English public. Tea from Natal, Fiji, and a small sample from Jamaica were also shown; but the tea from fiji possessed such special qualities that we shall probably hear more of this promising article.

To return to the subject of this notice, the "Tea-Planter's Mannal" is a useful summary of the knowledge gained respecting tea-planting in Ceylon, and it embodies much valuable information for the use of practical planters. What fault there is to be found is not with the book itself, but with the system of cultivation it inculcates—a system which unfortunately appears to be adopted in the treatment of most tropical economic plants by European planters. These plants are treated too purely as so many "rupee making" machines. Too little attention is given to the characteristics and habits of the plants as living subjects, and too much to the details of an unsympathetic and essentially artificial system, already proved in Ceylon to be unsuited to the coffee plant, but into which there is now a strange tendency to force the tea plant. As there are diversities of soils and climates, so there are also diversities of industrial plants exactly suited to them. Where all such considerations are ignored, there is danger both to the plants and the planter; and this danger ought in the present case to be avoided. D. M. —*Nature.*

N.B. FOR CEYLON TEA PLANTERS.—Says the *Produce Markets' Review*:—

The rapid increase in the production of Ceylon tea, and the augmented quantities brought forward at the public sales, will necessitate the importance of avoiding small breaks as much as possible, and Importers will study their interests by giving this subject their attention. If the Ceylon season's out-turn reaches the estimate of from 14,000,000 lb. to 15,000,000 lb., it is evident that, with the anticipated larger imports of Indian tea, the trade will have little time to devote to exceedingly small lots. Of the 1,621 packages of Ceylon offered this week, no fewer than 76 breaks consisted of ten chests and under; and, when it is considered that the same expense and time are necessary to sample and value these trifling lots as is required for parcels of four or five times the size, it will be obvious to Importers that they will consult their interests best by combining lots as much as may be practicable. Very small lots in times of pressure stand little chance of being properly tasted, whereas if five or six were clubbed together the trade would give them a due share of attention.

THE KALUTARA TEA DISTRICT is described as the scene of great activity at present—not only among the planters in overtaking flush, and manufacturing tea, but in the erection of new factories and other indispensable buildings—the number employed (artisans and other Sinhalese, apart from coolies) is very considerable, and the money spent must benefit thousands all along the Galle road. The best carpenters are from Ambalangoda. A very narrow escape from lightning was experienced by the much-liked Chairman of the District P. A., Mr. Morison, whose bungalow on Culloden—on the top of a high rock,—was struck in his absence and some damage done in a place where he usually sits when at home. The electric discharge ran from the factory chimney, down the three wires supporting it, and killed the three trees to which they were tied. No wonder though lightning conductors have since been fitted up for bungalow and factory. Some coolies in the factory were paralysed so completely that life seemed to have departed from them: but by the use of mustard plasters over their bodies and whiskey given internally, after a time pulsation was restored, and in a few days they were about their work as usual.

PERAK SUGAR CULTIVATION COMPANY, LIMITED.

THE annual general meeting of the shareholders of this company was held at their offices No. 3, Nanking Road, Shanghai, on the 24th March.

REPORT.—The directors have now to submit to the shareholders their report of the working of the company during 1886; the first year of practical results from the Gula Estate.

The principal evnts which have happened since the last annual general meeting, held on 10th May, 1886 were made known to the shareholders at a special meeting held on 8th October, and also by circulars issued by the directors about that date. As the shareholders are aware, the chief work of the directors in Shanghai has been to give effect to the sanction to a debenture issue, as authorised by the shoreholders, while at Gula the manager has been using his utmost endeavours to carry on his work efficiently despite the absence of many necessaries required for the proper equipment of the estate.

The directors are happy to be able to report that the endeavours in both quarters have met with fair success. They have succeeded in issuing debentures to an extent of about Tls. 30,000 and hope to be able to procure the remainder of the Tls. 60,000 authorised as it becomes necessary for the extension of cultivation. The success which the manager has been able to achieve is now given in the following report:—

Canes have been cut from an area of 450 orlongs, say 600 acres, producing piculs 12,040 of sugar and realising (gross) $61,340 (including estimated value of "Sugar in stock" on 31st December). The averages given by these figures are:—

Production per orlong.....piculs 26·75
Average price per picul.....$5·09

In comparing these figures with the estimates given in the circular of 21st September, it will be noticed that the area of production is 12½ orlongs less: these 12½ orlongs though technically "in cultivation," *i. e.*, cleared, drained, &c., have not so far been planted with canes. The actual weight of sugar produced per orlong is, on the other hand, slightly better than the estimate. As to price, the average of the first six months was not maintained in the latter portion of the year; this was primarily the result of a fall in the Penang market, but was also in considerable measure due to the straitened circumstances of the estate, which prevented a full supply of labour being maintained and proper cultivation of the canes during their earlier stages—the result being sugar of a lower quality. This trouble, however, has ceased and the sugar now being made is fully equal to the earlier standards. It should be mentioned that owing to the absence of any appliances for dealing with the molasses upwards of $7,000 has been lost to the estate during 1886.

The average of piculs 26·75 of sugar per orlong from the estate in its first year is highly satisfactory and confirms all the opinions given as to the excellence of Gula soil for sugar cultivation.

The failure to get money when first asked for in May last year, and the consequent inability to procure the labour required to cope with the cultivation, has not only adversely affected the results of 1886, but has interfered to some extent with the prospects of 1887, it having been impossible to carry on the work of replanting the fields as they were cut; consequently though the area of cultivation has been increased to 510 orlongs (=680 acres) the area planted for the coming crop is not greater than in 1886. It is satisfactory to be able to report that the condition of the young canes is excellent, the "earwig" trouble has, as the manager predicted, disappeared, and it may resonably be expected that the estimate of piculs 28 per orlong, given in the circular of 21st September for the second year's crop, may be considerably exceeded.

With reference to the necessities for the equipment of the estate as set out in paragraph IV., of the 21st September circular, it seems possible that the expense of a "Still," which as the shareholders know is desired to work off the molasses, may be saved; negotiations are in progress which it is hoped may result in a market being found for the molasses, and if these succeed there will be so much more money to devote to the all important object of extending the cultivation up to the capacity of the mill. The other necessities are being provided for.

ACCOUNTS.—The year's working shows a profit of Tls., 1,961·41, which amount is carried forward; and amount of Tls. 2,500 is transferred from working account to "Estate Cost" for 47½ orlongs added to cultivation and for sundry expenses which have been met out of income, but which ought to have been provided out of "Capital." Amongst the liabilities, that "Due to agencies" is nearly covered by "Sugar in stock;" the other outstandings have since been cleared off. The "Debenture loan" which appears as Tls. 24,560 has since been raised to Tls., 30,300.

The Chairman said: Gentlemen, with your permission we will take the report and accounts as having been read. Since the date of the last report the news from the estate is extremely satisfactory. The returns of last year, both as to quantity and quality of sugar, were exceptionally good for the first year of a cane estate. The damage done by insects to the estate which is a common incident in first years on cane estates has disappeared, as was predicted by the manager at the close of the first year. There was unfortunately a delay of about 5 months last year in raising the necessary amount of additional capital required to complete the estate and to carry out extensions. This has thrown us back and the returns on our crop last year will come in during the latter half of this year. The danger which at one time existed that we might lose possession of the estate for want of sufficient capital has been averted, and there is now no danger of the company losing possession and control of the property. All the work on the estate is now going on very satisfactorily and there is no cause for anxiety on any ground. Of the Tls. 60,000 debentures which the shareholders authorized should be added to the capital, the Directors have already issued Tls. 30,000 and as further applications are now coming in the Directors will no doubt issue debentures to the full amount, so that everything that is necessary will be done for the estate. It is a common Shanghai saying that "it is an ill wind that blows nowhere" and it is therefore perhaps necessary that I should mention to the shareholders, in fact they are entitled to have the information, that in the event of war breaking out on the continent, it must, of necessity, greatly reduce the supply of bounty-fed beetroot sugar, and any stoppage of that would be an immediate and immense advantage to us, alike improving our position and prospects. I do not think there is anything more to which I need allude, but I shall be happy to answer any questions you may wish to ask before putting any formal resolutions.—*Straits Times.*

FOOD FOR THE GODS.

The grateful mortal who first named the plant from which we obtain a certain very delicious and very wholesome berry *theobroma* must have had a keen insight into the possibilities which lay undeveloped within the rough exterior of the pods of the *cacao* plant. Crude as must then have been the means of preparing the rich, nutritious berry, there must have been unmistakable evidence of its value, even in that condition or so ambitious a name would surely never have occurred to the mind of its discoverer. "Food for the gods," was his verdict upon the fruit of the cocoa plant—fit rival to the claims of the famed ambrosia, a boon indeed to men.

Nor, of a truth, now that civilisation has brought its skill to bear upon the preparation of this cocoa, does its pretentious name seem unwarranted by facts. Under the separate styles of "cocoa" and "chocolate" various preparations of the nuts of the cacao plant are now made with such delicacy and skill that, whether regarded as necessity or a luxury, *theobroma* plays a most important part in modern domestic economy. Whether it is in the form of the cheering, comforting

cup of cocoa, the fragrant, steaming chocolate, the sustaining, wholesome bars and "drops" of the same toothsome dainty, or in the delicate and delicious confections into which chocolate, cream, cocoa-nut, vanille, and other pleasant things enter, *Theobroma*, "food of the gods," is constantly before us. The weary workman fortifies himself for his long trudge homeward through the snow, when the short winter day has closed in, with a cup of cheering cocoa; the butterfly of fashion sips its cocoa from tiny Sèvres cups in my lady's boudoir; the hard-worked governess, toiling from house to house for a poor pittance, supports exhausted nature by furtively munching chocolate as she goes, knowing well its exceptional powers; and her pupils are not, we may be sure, innocent of the delights of the more luxurious forms of the sweetmeat. It is not always that the luxury of the rich is equally the wholesome and attainable indulgence of other and less fortunate classes; but in cocoa and chocolate we have not only a delicacy fit to be dubbed *theobroma*, but at the same time a nutritious food and beverage for all sorts and condition of men.

That this is so is of course due in no small degree to the skill and enterprise brought to bear in the manufacture and manipulation of the material. The mechanical requisites in the making of cocoa and chocolate are now brought to a rare degree of perfection, and in addition to this the "putting up" of chocolate by a first-rate firm evidences so much taste and refinement that the very appearance of the boxes stimulates the appetite and acts as a fitting herald of the dainties to be found within.

It would be difficult to find a more complete example of the nicety, scrupulous cleanliness of manipulation and surroundings, and for that matter of the extreme delicacy and toothsomeness of the manufactured article, than may be found in the extensive manufactory which stands hard by the Avon, in the good old city of Bristol, from which emanate the productions known all over the world, and bearing the time-honoured name of Fry. It is not too much to say that Fry's cocoa is a household word all the world over. And it is no matter for surprise that such should be the case. Those who have been priviledged, like ourselves, to go over the well-ordered works, and inspect the various processes of manipulation, and admire the all-pervading air of extreme method with which the processes in question are carried out, can readily understand the firm hold which Messrs. Fry's productions have obtained upon the public. Here we see for ourselves that the materials used are of the best, the apparatus of the most perfect, the *employés* of a class which speaks volumes for themselves, and the great firm whose interests they serve, order, cleanliness, method, reign supreme, and the outcome is not merely excellence but economy. Messrs. Fry can compete with the world both as regards the quality and cost of their productions—hence the secret of their success. The public are too critical and too well informed nowadays to be satisfied with crude, imperfect, or extravagantly dear conditions in the commodities which enter into their everyday life, and they know by experience that they may safely accept the name of Fry as a guarantee of excellence. The Manufactory is an extensive range of buildings. It has grown with the growth of a firm which has been in existence more than a hundred and fifty years. The original premises gradually absorbed the houses right and left for a considerable distance. At the back of these some years later was built a factory of four floors, what then doubtless was looked upon as a great extension.

Later on another building of seven floors was added, double the size of the former works, and later on the extension of the trade again compelled the erection of yet another building of seven floors. Upon entering the buildings one is at once struck with the sight of corridors lined with oblong blocks of cocoa and chocolate, as one ascends to the eighth floor, where the roasting-room is reached. Here the raw material is first utilised. In revolving cylinders the beans, from which all palpably imperfect specimens have been picked, are carefully roasted, a process upon which very much depends. The nuts are shot into hoppers, and crushed and winnowed in order to remove the thin adhesive shell, the crushing reducing the nut itself to the form of the familiar cocoa-nibs. Both shell and nibs are articles of commerce, the former being used in Ireland and in some parts of the Continent for the manufacture of a cheap drink. The clean nuts are then ground. The mills being warm, the fatty part of the cocoa-nut, or cocoa butter, is partially freed, and the hard dry nut is thus reduced by grinding to an oleaginous paste, which is further ground to a finer paste of a creamlike consistency. For storing purposes this paste is poured into cold moulds, from which it emerges in solid blocks of pure cocoa. To make the famous "Cocoa Extract" this liquid passes through some further important stages. Well-filled canvas bags are placed in metal cylinders with punctured holes, hydraulic pressure is applied to the extent of 1,200 lb. to the square inch, and out comes the cocoa butter, when warm as liquid as salad oil. Collected in oblong tins, it cools to the consistency and appearance of clarified beeswax. Solid blocks of it adorn the multitudinous floors and passages; some of it is used on the premises, some sold for surgical purposes. It possesses the rare quality of never becoming rancid. When taken out, the dry mass is broken, ground many times, and sifted with fine sieves, constituting "Cocoa Extract."

Not content with bringing the "Extract" before the market, Messrs. Fry, determined to solve once and for all the problem how to secure extreme solubility and absolute adaptability to all digestions, have, after some research, produced what they term "Pure Concentrated Soluble Cocoa." The already finely ground powder is ground again and again, and passed through sieves with 2000 holes to the inch, securing perfect fineness. By a new scientific process the finest flavour of carefully blended cocoas is developed, and the result is the excellent preparation we all know.

The fancy confectionery department is more complicated. The "creams" may be taken as typical of more classes than one. The chocolate used for covering these "morsels of delight" is reduced to a thin and workable paste. To prepare the "cream," pure boiled sugar is poured into an open pan and allowed to cool. It is then efficiently stirred, till it assumes the opaque creamy consistency so much desired. By means of an adaptation from the printing-press, hundreds of tiny moulds are "dabbed" out on trays of powdered starch, and into these moulds the sugar, with any flavouring or colouring required, is rapidly poured by dexterous assistants. Thence the tiny globes are taken to the covering rooms, where scores of girls with trays of thin prepared chocolate perform their part. Here again, it is only necessary to change the mould and the particular flavouring to produce vastly different forms of sweetmeat. There are sugar boiling rooms, moulding rooms, and covering-rooms apparently without number, to detail which would encroach too much upon our space. In short, it only remains to add that the skill and enterprise of the firm has not gone without its due reward. Two members of the family enjoy the honourable distinction of being Members of Parliaments, and the firm of J. S. Fry and Sons is honourably known in every quarter of the globe.—*British Mercantile Gazette.*

FOREST TREES are now felled in America with dynamite. A cartridge of the explosive substance is placed in a channel board directly under the tree to be operated upon, and when exploded the tree is simply forced up bodily and falls intact on its side. In most instances it is found that the tree is not fractured by the force of the explosion; a large proportion of valuable wood at the base of the trunk can be utilized which is now lost. For clearing forest properties this method is admirably adapted, as it brings up the root of the tree at the one operation, and dispenses with the tedious and costly process of grubbing the roots of the felled timber.—*Journal of Forestry.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, March 31st, 1887.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS
BEES' WAX, White	Slightly softish to good hard bright	£6 a £7 5s
Yellow	Do. drossy & dark ditto	£4 10s a £6
CINCHONA BARK—Crown	Renewed	1s a 2s 6d
	Medium to fine Quill	1s 4d a 2s
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s
	Medium to good Quill	6d a 2s
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s 1d
and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine	1s 6d a 2s 2d
	Brownish	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 6d
Loug Ceylon	Middling to good	8d a 1s 4d
CINNAMON 1sts	Ord. to fine pale quill	7½d a 1s 5d
2nds	,, ,, ,, ,,	7d a 1s 2d
3rds	,, ,, ,, ,,	6½d a 11d
4ths	Woody and hard	6d a 9½d
Chips	Fair to fine plant	2½d a 7d
COCOA, Ceylon	Bold to good bold	66s a 82s
	Medium	60s a 65s
	Triage to ordinary	40s a 55s
COFFEE Ceylon Plantation	Bold to fine bold colory	92s a 105s
	Middling to fine mid.	82s a 91s
	Low mid. and Low grown	76s a 84s
	Smalls	77s 6d a 80s
Native	Good ordinary	68s a 75s
Liberian	Small to bold	63s a 71s
East Indian	Bold to fine bold	90s a 110s
	Medium to fine	82s a 90s
	Small	77s a 82s
Native	Good to fine ordinary	68s a 75s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£5 a £17
FIBRE, Brush	Ord. to fine long straight	£10 a £35
Stuffing	Coarse to fine	£8 a £17
COIR YARN, Ceylon	Ordinary to superior	£12 a £30
Cochin	Ordinary to fine	£11 a £32
Do	Roping fair to good	£13 a £15
COLOMBO ROOT, sifted	Middling wormy to fine	10s a 28s
CROTON SEEDS, sifted	Fair to fine fresh	10s a 20s
GINGER, Cochin, Cut	Good to fine bold	75s a 5£ 10s
,,	Small and medium	37s a 58s 6d
Rough	Fair to fine bold	32s a 58s
	Small	20s a 28s
GUM ARABIC, Madras	Dark to fine pale	25s a 102s 6d
NUX VOMICA	Fair to fine bold fresh	7s a 11s
	Small ordinary and fair	3s a 6s
MYRABOLANES	Good to fine picked	6s a 8s 6d
	Common to middling	5s a 6s 3d
	Fair Coast	5s 6d a 5s 9d
Pickings	Burnt and defective	3s 3d a 4s 6d
OIL, CINNAMON	Good to fine heavy	1s a 3s
CITRONELLE	Bright & good flavour	¾d a ⅞d
LEMON GRASS	,, ,, ,,	1⅛d a 1⅜d
ORCHELLA WEED	Mid. to fine, not woody	40s a 55s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7⅞d a 7¾d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White	,, ,, ,,	10d a 2s 6d
PLUMBAGO Lump	Fair to fine bright bold	9s a 14s 6d
	Middling to good small	7s a 10s
Chips	Slight foul to fine bright	3s 9d a 10s
dust	Ordinary to fine bright	3s a 9s
RED WOOD	Fair and fine bold	£4 10s a £4 17s 6d
SAPAN WOOD	Middling coated to good	£6 a £7
SANDAL WOOD, logs	Fair to good flavor	£20 a £44
Do. chips	Inferior to fine	£5 10s a £22
SENNA, Tinnevelli	Good to fine bold green	5d a 1s
	Fair middling medium	5d a 7d
	Common dark and small	2¾d a 4½d
TURMERIC, Madras	Finger fair to fine bold	9s 6d a 10s
Do.	Mixed middling [bright	8s 6d a 9s
Do.	Bulbs whole	7s 6d a 8s 6d
Cochin	Do split	6s 3d a 7s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 29s
2nds	Foxy & reddish 5 a 8 ,,	16s a 23s
3rds	Lean & dry to middling under 6 inches	10s a 16s
4th	Low, foxy, inferior and [pickings	4s a 8s

FROM BOMBAY AND ZANZIBAR.	QUALITY.	QUOTATIONS
ALOES, Socotrine and Hepatic	Good and fine dry	£6 10s a £8 10s
	Common and good	£4 a £7 10s
CHILLIES, Zanzibar	Good to fine bright	32s a 33s
	Ordinary and middling	25s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTAITONS.
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright	10½d a 11d
	Common dull to fair	8¾d a 10½d
,, Stems	,, fresh	2½d a 2¾d
COCULUS INDICUS	Fair	9s
GALLS, Bussorah & Blue & Turkey per cwt.	Fair to fine dark blue	57s a 62s
	Good white and green	46s a 53s
GUM AMMONIACUM per cwt.	Blocky to fine clean	15s a 34s
ANIMI, washed, per cwt.	Picked fine pale in sorts,	£13 10/ a £14 10/
	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto	£4 10s a £7
	amber and dark bold	£7 10s
scraped	Medium & bold sorts	£5 a £8
ARABIC, E.I. & Aden	Sorts	90s a 120s
per cwt. Ghatti	Fair to fine pale	38s a 80s
Amrad cha	Good and fine pale	90s a £7
	Reddish clean	34s a 68s
ASSAFŒTIDA, per cwt.	Clean fair to fine	35s a 40s
	Slightly stony and foul	25s a 30s
KINO, per cwt.	Fair to fine bright	40s a 44s
MYRRH, picked ,,	Fair to fine pale	£6 a £7 10s
Aden sorts	Middling to good	70s a 100s
OLIBANUM, drop per cwt. ,,	Fair to fine white	45s a 55s
pickings	Reddish to middling	32s a 44s
siftings	Middling to good pale	13s a 18s
INDIARUBBER Mozambique, red hard	Slightly foul to fine	11s a 13s 6d
per lb. Ball & sausage, white softish		2s 5d a 2s 6½d
unripe root		2s a 2s 3d
liver		10d a 1s 2½d
		1s 8d a 2s

FROM CALCUTTA AND CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
CASTOR OIL, 1sts per oz.	Nearly water white	3½d a 4¼d
2nds ,,	Fair and good pale	2¾d a 3d
3rds ,,	Brown and brownish	2¼d a 2¾d
INDIARUBBER Assam, per lb.	Good to fine	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon	Fair to good clean	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 6d
	Fair to good black	1s 11d a 2s 2d
SAFFLOWER	Good to fine pinky	£4 10s a £5 10s
	Middling to fair	£3 5s a £4 2s 6d
	Inferior and pickings	£1 a £1 10s
TAMARINDS	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior	3s a 6s

FROM CAPE OF GOOD HOPE.	QUALITY.	QUOTATIONS.
ALOES, Cape, per cwt.	Fair dry to fine bright	24s a 28s
,,	Common & middling soft	8s a 22s
Natal	Fair to fine	25s a 30s
ARROWROOT Natal per lb	Middling to fine	3d a 3½d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.	QUALITY.	QUOTATIONS.
CAMPHOR, China, per cwt.	Good, pure, & dry white	62s a 65s
Japan	,, ,, pink	
GAMBIER, Cubes, cwt.	Ordinary to fine free	32s 6d a 33s
	Pressed	29s a 30s
Block [per lb.	Good	22s a 22s 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra	Barky to fair [sar	6d a 2s 3d
Reboiled	Common to fine clean	1d a 1s 4d
White Borneo	Good to fine clean	11d a 1s 3d
	Inferior and barky	1d a 8d
NUTMEGS, large, per lb.	61's a 80's, garbled	2s 8d a 3s 9d
Medium	83's a 95's	2s 5d a 2s 7d
Small	100's a 160's	1s 5d a 2s 5d
MACE, per lb.	Pale reddish to pale	2s 3d a 3s
	Ordinary to red	1s 10d a 2s 1d
	Chips	1s 5d a 1s 6d
RHUBARB, Sun dried, per lb.	Good to fine sound	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried	Good to fine	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, per cwt.	Fair to fine	11s a 14s 9d
medium	,, ,, ,,	11s 6d a 13s
small	,, ,, ,,	10s a 11s 6d
Flour [per lb.	Good pinky to white	8s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine	2½d a 2⅞d
Singapore	,, ,,	2½d a 2¾d
Flour	,, ,,	15s a 18s 6d
Pearl	Bullets, per cwt.	26s a 27s
	Medium ,,	21s a 22s
	Seed ,,	21s 6d a 21s 6d

LETTERS FROM JAMAICA.—No XV.

WEATHER, CROPS AND LABOUR—JAMAICA BOTANICAL DEPARTMENT: A CORRECTION—JAMAICA "GLEANER" ON LOCAL TAXATION—MORE JAMAICA PROVERBS.

[This is the missing letter to which we referred a short time ago, but its contents are still of interest. —ED.]

Blue Mountain District, Jamaica,
17th December, 1886.

DEAR SIR,—I am pleased to be able to chronicle an improvement in the weather. The rains continued very steadily until about the 10th November. We have since had some very fine days, but even now it is still unsettled and occasionally showery. The coffee in the upper fields is beginning to recover from the effects of the two terrible storms of 27th June and 19th August, and needs "handling"; but the crop will be very short indeed except on coffee at a low elevation, which was sheltered and escaped the violence of the storms. It is, therefore, a good season for the settlers, as not only have they got a much better crop than has been the case for some years, but the quality also is good, for the ample supply of rain with which we have been favoured has been beneficial, and as, moreover, prices are 10s. to 12s. per cwt. better than they were last year, our Creole friends have every reason to rejoice, for "every dog has his day," and "Buchia" must sometimes come off second best. I have yet to learn what beyond a decrease in European stocks has caused the rise in the medium qualities of coffee. It will be a good thing for all coffee planters if it be true that the Brazils will henceforth commence to yield annually lessening crops, because of some disease in the trees and the now gradual emancipation of slaves, which will eventually enhance the price of labour. It is time that John Bull, who paid millions to emancipate the slaves in his own dominions, should put some check on slave-grown products, and cease to allow sugar and coffee &c., from slave-owning countries to come to England on a par with his own colonies, where all are free, and already overweighted with competing with bounty-fed sugar and adulterated coffees, by the imposition of a protective duty, thus guarding the interests of his own colonies and dependencies, without which he would find it very hard to find employment for his superabundant offspring; for, (as an old lady in Ceylon, a Mrs. Malaprop in her small way, once observed to a near relative of mine, alluding to a gentleman much esteemed and respected,) "John" is a very "populous" man.

Mr. Hart, of the Jamaica Botanical Department, has asked me to make a correction. He writes that in my letter No. 13, I stated that he had been appointed "*Pro-tem*" Superintendent of the Cinchona Plantation, which I think most people will have understood to mean that he had been appointed acting head of the department. But he writes as follows, believing my statement would bear unfavourably upon him unless corrected:—"I have held the appointment of Superintendent of the Cinchona Establishment ever since 1881, and was appointed acting head of the whole department in July last, which was probably what you meant to convey. To friends in a similar position in other parts of the world the statement will be misleading, and they will think I have been assuming a false position for the last five years, unless your mis-statement is contradicted." Trusting the above will satisfy our friend's *amour propre*, who has been very deservedly promoted to the charge of the Botanical Gardens, Trinidad, on which piece of good fortune he is sincerely congratulated by all his Jamaica friends, who wish him every success in his new position.

The local *Gleaner* newspaper,—under the influence of its new American editor, who, with evident Irish proclivities, like the famous St. Kevin, of Vale-of-Glendaloch renown, was very anxious to have "a taste of land" the property of King O'Toole, whose gander he had revivified—has started a theory that Government should levy a sufficiently heavy tax on all large land-holders to compel them to cultivate all they do not actually use, and if they will not pay the said tax to compel them to give back all land except they are willing to pay tax on, so that Government may hand it over to the native settlers to be cultivated. In this district such lands are either "ruinate" and exhausted, or too steep and rocky, or too high and exposed for cultivation, so that even were the planters to be forced to give up these lands, it is not likely they (the settlers) would avail themselves of them, though they might in the pen and sugar-cane parishes. The plan proposed is that Government should sell and make over these and other lands to all applying settlers in lots of 50 acres, and make them a loan of £50 on each tenure to enable them to cultivate it, the money, I conclude, being lent on interest, and to be repayable in yearly instalments. In answer to the *Gleaner's* plea, that most of the people are poor, and cannot get work, or grounds of their own, I would reply that Government have thousands of acres which they cannot sell for even 2s or 3s an acre, that there are numbers of old and abandoned properties, whence land can either be purchased or rented at reasonable prices, if the natives would but work, and avail of them. If the *Gleaner* scheme were successfully carried out, it would drive all sugar and coffee planters, pen-keepers and large fruit growers out of the island, simply because they would be unable to obtain labour, unless it were imported at a cost that would not pay them to keep up their properties, and make from them a reasonable income. But would such a scheme be likely to succeed? Now I do not wish to be understood to class all Creoles, that is African descendants alike, there are exceptions to every rule, and there are doubtless good and true men and women amongst them, honest, even hard-working, who lead virtuous lives, but it would be expecting the leopard to change his spots, that Quashie would rouse himself from his natural inertness and love of ease to work 50 acres of land, and to repay Government the interest and principal, (they deem their present taxes sufficiently onerous.) I believe the majority would soon run through the money, building houses and in other congenial ways; at most cultivating a few acres as they do at present, just enough to give them food and clothing, only working on the estates sufficiently to enable them to indulge in a few luxuries. In the end Government would probably have to take back most of the land, and what would they do with it? Would it be worth the borrowed capital they had lent upon it? If, as in some few cases, there is not labour to be had for all from the estates all over the island, the people can and do rent land, they could cultivate more coffee, more fruit, more coconuts, more cocoa and many minor products, for all which they would find a ready sale at the various shipping ports. If labour were ample but could find no employment, how is it that the sugar and coffee planters were obliged to submit to a heavy export tax in order to enable Government to procure cooly labour, at a very large cost to the colony and themselves? No; Jamaicans are not so eager for work though they know the planter

would prefer them to coolies, for they *can* work hard and well when they like, and when they get job and piece-work, though for "Master" and day wages their energies are far less active. Jamaicans have been attracted to Colon, in the hope of making money, their large numbers have died, and of those who have returned many are lastingly shattered in health—many of those who died have left wives and families to fight the battle of life unaided by the natural bread-winner. If the Jamaica revenue is deficient and the land must "pay the piper," then as suggested in my reply to the *Gleaner's* article "Tax the Land," let a sufficient but moderate additional impost be put upon all cultivated land, and let all landholders, large and small, white, brown or black pay the same rate per acre. "Ruinate," reserve, and uncultivable lands already pay a sufficient tax, but to force holders of large areas, obtained in "old times" when Government was only too glad to encourage the settlement of capitalists: to have their properties studded over with Negro settlers, because they cannot afford to, or will not pay an unjust tax, would be odious. Fancy having native grounds all over one's estate, with free right of way? Petty larceny is rife enough already without opening such another encouragement. Another argument I read in the *Gleaner* was a complaint that no sooner did a man make money than he was taxed; that there was consequently no encouragement to the people to better themselves and that the right thing was to tax the land, was the only proper way to raise revenue. How absurd? as if it were not right that those who can afford it should pay the taxes, not the poor. Says the *Gleaner* writer, if a man makes money and buys a horse and carriage he is immediately made to pay tax thereon, and rightly so, for he should contribute to the upkeep of the roads which he uses and without which his carrage and horses would be of no use; this is but one example made use of for taxing land, and making it pay for anything else.

In my next letter I hope to be able to tell your readers something about the "North-side" as I am going on a short visit to St. Mary's; it is a parish of sugar and banana estates and "Pens," large numbers of coconuts are also grown. I may also see "Castleton," the Botanical Garden of Jamaica. I will close with a few more Jamaica proverbs:—

Behind dog, it is dog, before dog it is "mister" dog.
Big blanket make man sleep late.
Cotton tree nebber so big, but little axe cut him.
Finger nebber say "look here," him say "lookdere."

—Yours faithfully, W. S.

MR. VON DONOP'S LATEST REPORT ON PLANTING, &c., IN BORNEO.

Sapagaya River.—I visited this river to ascertain in what condition the property owned by Mr. Major was in. I regret to report it is fast returning to jungle though I noticed coffee, and fruit trees, &c., all battling against the grass and small jungle growing up against them. The buildings which are all temporary are rapidly decaying.

The property of the China Sabah Company on the Suanlamba river is, I regret to say, in a similar state to that of Mr. Major's the plants I saw of Liberian coffee, cocoa, &c., were looking fairly healthy but unless immediate steps are taken they will soon be choked and die. The policemen are in charge of the property and live in the bungalow. The Condenser is in good order—I gave instructions, however, to have it carefully oofed over. The tobacco press is also in good order. There is a small Bajow village on this river the inhabitants of which are cutting timber for Mr. Koh Heen's firm. I consider both the China Sabah Company's property and Mr. Major's would be very suitable for Chinese to cultivate. A large acreage is already cleared of the forest but immediate steps should be taken to clear away the grass and small jungle. The land having been cleared for some time back should render the locality healthy.

I visited Messrs. E. E. Abrahamson & Co.'s Timber works on the Domondong river which I found a scene of busy activity. There are at present 120 men cutting and hauling out timber. Of these 90 are Chinese and the rest Malays. The Bajows work independently and seem to take to the business.

I had no time to visit the Blacking river but I learn a Chinese firm employ about 200 men, Malays, Bajows and Sulus in cutting and removing timber.

Mr. Henry Walker made a complete survey of the Labuk river as far as Limantic. I called at the Governmeut station Balmoral which is at the mouth of the Labuk. It is in charge of a native with two policemen. I regret I am unable to report favourably of it. No progress has been made since my last visit when I was accompained by Your Excellency. There are only 3 houses (including one belonging to Government) on an average only 3 boats call at the station each way per month. No fees, dutice, &c., are collected. There is no appearance of Bajows who I at one time hoped might be induced to settle there, for the reason they are what they have been very properly termed Sea-gipsies and lead a roving life. In the meantime the station costs the Government annually about $400. The Government building is in fair order. I do not consider the native in charge a suitable man for the post. He can neither read nor write and appears to have no influence or tact with the natives and gives me little or no information of the affairs of his district. Should the Government decide to continue this station (which I cannot recommend them to do) I would suggest a suitable substitute be put in his place. Around the houses I noticed sugar cane growing and a few other products. Pigs, however, appear to do considerable damage. Proceeding from Balmoral (the native name of which is Piluran) we arrived at Galagan two hours journey. I visited Galagan a few months ago and I am glad to say this settlement formed by people of Bulungan has progressed most favourably and will I am sure progress still more. There are about 65 houses most of large dimensions, the occupants of which, putting them down at 10 per house, would make a population of 650 people. There are several new arrivals from Bulungan who reside in houses of their own.

The inhabitants give one the idea of being a very industrious lot. On their first arrival they busied themselves with clearing the jungle building their houses around which fruit trees are thickly planted. At the present time besides what might be termed an orchard, large tracks of land are being planted with paddy which before long will I think be an article of export. I noticed sugar cane being crushed in the usual native fashion. To the Chief, Dato Mumucno Nagara I handed 2,000 sago plants which were eagerly seized upon and with your approval I wish to indent for a further supply from Province Dent. I had a long evening "bichara" with the Dato and settled many matters upon which he wished to obtain information and *vice versa*. The people of Bulungan are not the same rovers as the other inhabitants of the river; They set-

tle down in a certain locality and remain there though they may have their paddy fields at a distance. I would recommend in the event of the station of Balmoral being given up the two policemen be transferred to Galagan. From Galagan we proceeded up the river as far as Limantic, Mr. Henry Walker being anxious to survey the river as far as he could in the launch. Limantic is only a small village consisting of two houses. Returning from here we proceeded down the river to Kolapis a small Bajow village on a river of that name. There are only two houses. I was in hopes at one time that this race might have settled at Balmoral but the term sea-gipsies is a very applicable term for them as they are always roving about the sea and have not as a rule any settled abode. From Galagan to Balmoral two hours. From Galagan we proceeded to the village of Tetabuan situated in the Labuk Bay. I made this visit especially for the purpose of gaining information concerning the pearl beds that exist here—and which with your approval it is intended to farm out to Panglima Butu the Bajow chief in that district and who with his men have been in the habit of collecting them no collecting has yet been begun but I am informed the collection will shortly commence. I enquired from the chief the reason he did not migrate to a better position where he could have a plantation, he informed me in reply that he was afraid to leave as if he did somebody might come and claim the pearl beds. The Panglima arranged to be at Sandakan in a week's time to sign an Agreement concerning the custody of the Pearl beds. These people have nothing to do with the pearl beds at the Maroap river which will be farmed out to others. While at Tetabuan I received information of the wreck of a "Prahu" with a cargo of rattans from Sisip. Out of the 8 people on board two were drowned. In reply the Panglima informed me the reason he had not sent me information to Sandakan on the subject was that there was a heavy sea on at the time. From Tetabuan I paid a visit to Lincabo a small Sulu village and from there proceeded back to Sandakan.—*North Borneo Herald.*

COCONUT REFUSE is thus alluded to in an article in *Forestry* on the Resuscitation of Choice Trees by top-dressing:—Failing loam, the next best top-dresser is, on the whole, coco-fibre refuse. It is less feeding, and perhaps almost more conservative alike of heat and moisture, also free from offensive odour, decomposes very slowly, and finally forms a fine mould of which the roots of all trees seem specially fond. [This is rather a different verdict to that delivered by Mr. Symons.—Ed.]

FLOODS IN DEMERARA.—Disastrous floods of an unprecedented kind have been experienced on the east coast of this Colony, by which the poor inhabitants of the district are suffering severe losses and indescribable privations. The following description of the scenes is taken from the *Argosy* :—Many villages with their provision and pasture ground annexes are (or were, for we are glad to be able to say the rains are abating) from two to four feet under water, the villagers' huts looking like bathing machines in a placid sea, water up to the doorstep, frequently above it, no road to be seen, not a blade of grass for cow or mule, or a dry foot of ground for the smaller stock. The people were helpless and no help could be extended to them in the way of relieving their lands of the deluge; they had simply to sit and suffer, to awake in the morning with nothing to do, their farms all lost to sight, crops ruined, and all attempts at cultivation impossible.—*Colonies and India.*

THE NORTH BORNEO Land and Saw Mills Company (Limited), referred to in our last issue, has been registered. The first subscribers are:—Major-General Sir A. Anson, St. Leonards; Mr. E. Lucas, Kensington-square; Mr. F. K. Barclay, Crucifixlane, Bermondsey; Mr. T. L. Jeyes, C. E., 9, Victoria-chambers: Mr. J. R. Boulter, engineer, Blackfriars-road, and Mr. J. S. H. Drake, solicitor, 50, Old Broad-street. The first three named are to be directors of the company, in conjunction with Messrs. Walmisley Stanley and W. J. Tanner. The board of directors is to number not less than five nor more than nine, the qualification being £300 in shares or stock of the company. The director's remuneration is to be £600 per annum each.—*L. & C. Express.*

CEYLON TEA IN AMERICA.—Of the venture of Messrs. Pineo & MacCombie Murray we have received some particulars:—"Office of the Ceylon Pure Tea and Coffee Company, Philadelphia, 10th March 1887. I send you by this mail our Circular through which we endeavour to make known our brand of Ceylon tea. The label is also enclosed, and I hope it will meet your approval. We have done what we can to advertise our pamphlets, of which 20,000 will be distributed shortly, and more when these are given away. We have been at great expense in this line and can only hope that our endeavours will meet with success. The tea is not liked generally *at first*, but by talking over the matter with people we may accustom them to the new flavour, and get the thin end of the wedge in. Our business is conducted methodically, and we hope to reach every respectable family in Philadelphia through canvassers. I am afraid the Ceylon Syndicate may be likened to a wheel without a nave. If they had a little capital they could boom some of the large cities in this country with every chance of success, but I fear there is a want of a spirit of unanimity among planters which will always stand in the way of any great enterprise in this line. You will perceive by our prices that we sell teas from 50 cents to $1·10 the ruling prices of teas sold. The profits are not so large as they would appear, as 30 per cent commission must be given to canvassers or retailers in any way. The $1·10 is a fancy tea sent us from London of which the sales are limited. Then we have 10 cents per lb. to pay for delivery and packing expenses in tin foil inside boxes,—reduce our profits to a minimum. I may mention that even by allowing a retailer 30 per cent. commission on sales, we are unable as yet to do much through the trade, as *retailers* make more profit out of Japans than we can make at these prices as importers. Teas bought by retailers at 20 cents to 30 cents sell at 50 or 60 cents, and sometimes they will consider it proper to sell the same tea to one who can pay for it at 75 cents. There is no rule in the retailer's business. Although they have only one tea, they sell it for all kinds of tea and charge according to the general appearance of the customer. Sad, but true! These practices are very much against the introduction of our teas, especially as we have to *make* demand, before any one will handle them. We are prepared for uphill work, and it is well that we are so. We are both very thankful to you for remarks you have from time to time made in your columns with reference to us. We are much encouraged thereby, and we can *assure* you that every encouragement given us by you and others in Ceylon is greatly appreciated by us." The pamphlet and circulars prepared by Messrs. Pineo and Murray are very neat and attractive and show a good deal of enterprise on their part. We wish them all success.

PHARMACY IN CEYLON.

The style of business out here is much the same as a country business at home; we are "Chemists, Druggists, and General Dealers," though in some Stores the Chemist's Department forms only a small part of the business. We do not get very remunerative prices—Eno's Salts, 2 rupees; Clarke's Blood Mixture, 2 rupees; Cockle's pills, 2*s.* 9*d.* size, 2 rupees, 6-oz ordinary mixtures, 1 rupee; 8-oz, 1½ rupee. The rupee being so low in value—under 1*s.* 6*d.* sterling—the prices are much the same as one has been accustomed to in England. Our expenses in importing home goods are very heavy; we have a 6-per-cent *ad valorem* duty on goods coming into the colony, which, in addition to agents' buying commission, shipping, landing, and railway charges, and other incidentals, together with 33⅓ per cent premium, which we have to pay in exchanging rupees into sterling, causes an advance on many goods of 50 to 60 per cent. over London invoice prices. We are in the land of "spicy breezes"; we do not wish to detract from the island, but cannot help thinking there has been a mistake somewhere; certainly we get breezes—incidental to a hot climate, we suppose—the spice in them being rather conspicuous by its absence.

Our beautiful scenery and foliage is always admired by passengers taking a trip into the interior. Indian visitors, who have been accustomed to the hot and parched plains, say the visit to Ceylon is a glorious change for them, and admire very much the luxriant growth of vegetation for which our island is so famed. Our climate is like a perpetual summer; the year is marked, not by four seasons as at home, but by the two monsoons, the one from the North-east, which comes in about October, lasting till the following April, when the South-west comes and stays till the next October. The burst of the monsoons is accompanied by plenty of stormy weather, when we get thunder and lightning, and rain in torrents. We have several botanical gardens in Ceylon; those at Peradeniya are especially good. I will send you a little paper on what I see there at a future date. I met Dr. Bonavia, Brigade-Surgeon of the Indian Medical Department, a little while ago. He has been carrying on a research into the properties of the orange family, and told me of the excellent results he has observed from the use of "Decoction of Lemon." As it may interest some of your readers, I give the recipe for the preparation of the medicine in full, copied from a letter by Dr. Bonavia to the *Ceylon Observer*.—"To make decoction of lemon, take one Malta lemon, or three sour limes, cut into thin slices, rind, pulp, and all, add three breakfast-cupfuls of water, and boil in an enamelled saucepan until the liquid is reduced to one cupful, then leave it exposed all night to the air; next morning strain through muslin, and drink the liquid early on an empty stomach." Dr. Bonavia adds: "In quotidian fever simply, decoction of lemon given only once a day acts like cinchona febrifuge. In enlarged spleen of recent occurrence (within few months) the decoction has a wonderful effect. In loss of appetite and weakness after illness, decoction of lemon may be prescribed with marked benefit." The wholesale houses at home seem very anxious to do business with their colonial customers direct. We get hosts of price-lists by every mail, and occasionally a traveller from the old country drops in. "Siegel's Syrup" people have been sending their almanacs through the post to almost every person in Ceylon, and within a few days after the arrival of these almanacs all the Stores had run out of stock. By the time new stocks arrive it may possibly happen that the interest of the patent-medicine-taking public will be taken up with something else.

I notice you are altering the publication of THE CHEMIST AND DRUGGIST to once a fortnight, and no extra charge to subscribers—another instance of the liberal spirit you have always shown to us; a years' numbers and the Diary, all post-free for ten shillings—marvellously cheap. May you continue to go on and prosper!—CINNAMON.—*Chemist and Druggist.*

DOMESTIC REMEDIES OF THE ARABIAN DESERT.

Dr. E. Gordon Hull, in the *British Medical Journal*, gives some particulars of observations on the diseases and remedies current among the Bedawin of Arabia Petræa and the Arabah Valley, made during the autumn and winter of 1883-84, while he was acting as Honorary Medical Officer to an expedition sent out by the Palestine Exploration Fund. He remarks that chronic bronchitis and chronic articular rheumatism are almost universal. He measured twenty-six men and nearly all their shoulder-joints creaked and groaned as they raised them. This will account for the curious inability of the Arabs to move about, or do any work in the morning before they are "thawed" and rendered supple either by fire or by sun. Nevertheless, the Arabs appear to be a very healthy people.

The remedies they are in the habit of using are not many in number, and are usually derived from those plants which are most widely distributed. As a diuretic, that is, for pains in the back and gravel, they use the retem, or broom (*Spartium monospermum*), making a decoction of the top shoots in hot water, and drinking it; they say it is also purgative. This shrub, which provides them with fuel, and their camels with a scanty nourishment, is almost universal; we saw it in flower on the way to Petra, and the inflorescence, which is purple and white, gives out an exceedingly sweet perfume. It has a very bitter taste.

Several species of wild melon, of the family *Bryoniæ*, allied to the elaterium (which also grows in these parts), are in common use as purgatives; the native method of using them is ingenious. A fruit is split into halves, the seeds scooped out, and the two cavities filled with milk; after allowing it to stand for some time, the liquid, which has absorbed some of the active principle of the plant, is drunk off. A milder remedy is camel's milk, which appears under some circumstances to be purgative to the Arabs.

The order *Compositæ* furnishes several medicinal herbs of which the Arabs make use. The *Santolina fragrantissima*, a graceful plant of a sage-green colour, bitter taste, and strong fragrant odour, furnishes them in the form of an infusion, with a carminative, good for colic and all painful affections of the abdomen. In the bazaars of Cairo the fragrant dried heads are sold for the same purposes as camomile. I was told that there are no snakes in the districts where the plant grows, and the natives believe that the odour of the plant is sufficient to drive reptiles from a house, and it is used for this purpose in Cairo and other towns.

Another plant of the same order is an artemisa, or worm-wood, with a very strong aromatic odour and bittter taste. The fellaheen use it to put in their bedding to drive away vermin. This use of the plant appears to be very universally known, witness the old English rhyme:—

> When wormwood bath seed, get a handful or twain,
> To save against March, to make flea to refrain:
> Where chamber is swept, and wormwood is strewn,
> No flea, for his life, dare bide, or be known!

From the seeds of some of the kinds of artemisia be which grow in these parts, santonine appears to obtained. In the wilderness of Judæa, near to Beersheba, we found a pretty little calendula, or marigold, very common. It became extremely abundant along the Mediterranean seaboard, and is used by the natives as a sort of tea for flatulence and pain in the abdomen. Knowing how largely a liniment derived from this plant was advertised by homœopaths, I tried to find out if they used it as an external application, but they did not know of its virtues as such. One of the commonest desert plants is the zygophyllum, so called from the leaves being composed of short succulent jointed segments; these, bruised in water, form a mucilaginous liquid of which the Arabs are very fond as an application for sore eyes. It has an exceedingly nauseous taste, but this fact only appears to commend it to the notice of the camel, who devours i greedily. A curious tropical plant, which we foun

in the Ghor, at the south end of the Dead Sea, is the osher (*Callotropis gigantea*), a large tree-like asclepiad, containing simply enormous quantities of milky acrid juice. Its properties are stated by Endlicher to be powerfully purgative and emetic; but the natives use it to give to women whose milk is scanty, probably in accordance with the doctrine of signatories. Here, also, grows the castor-oil plant, but its virtues are unknown to the natives. A very striking plant, which, perhaps, I should have mentioned before, and which often hangs in graceful dark-green festoons from the granite walls of the gorges of Arabia Petræa, is the caper plant (*Capparis spinosa*). The natives are very fond of the fruit, which has a warm aromatic taste, and they stroke the region of the epigastrium appreciatively after eating one or two. The cortex of the root is said to be aperient and diuretic. Another fairly-common plant is a hyoscyamus, called by the natives "sekharan," with fleshy leaves and purple flowers. The dried leaves are used by the natives to smoke, and produce a kind of intoxication or delirium; and an infusion of the fresh leaves possesses strong narcotic properties. It is nearly allied to the mandragora, which becomes common on the limestone downs in the South of Judæa. The Arabs are extraordinarily susceptible to narcotics. Our tobacco they could not smoke at all; a few whiffs make them giddy, and give them a headache; even a "Richmond Gem" cigarette is too much fo them. Only two mineral substances appear to be regarded by the Bedawin as medicinal. One of them, sulphur, I have already mentioned; the other is a kind of common red coral, found on the shores of the Red Sea and Mediterranean, and sold in the bazaar at Gaza. As far as I could gather, they only use this as a charm.—*Chemist and Druggist.*

EUCALYPTI: BOTANICAL DISTINCTIONS OF THE OIL-PRODUCING SPECIES.

The popular nomenclature of the eucalypts is as confused and thoroughly bad as it could be. In the first place the generic name of gum-tree is rather poor, as true gum is by no means an abundant or characteristic product of the eucalypt; but the faults of the generic name could easily be forgiven it, if a a happy and discriminating series of specific names had been attached to it. Probably no great *genus* has ever had its species so irritatingly mixed up by careless popular naming. It must be allowed that the specific separation of the eucalypts has proved a task of extreme difficulty to botanists with the largest share of classificatory talent, and the amateur will find it a matter of some little trouble to acquire moderate facility in distinguishing many of even the commoner eucalypts without good specimens of flowers and fruit. Broad general characters, by which to distinguish the more nearly related species, are hard to lay hold of, as will be recognised when it is considered under what diverse forms the individuals of a single species can present themselves according to the locality of their growth. Thus trees which on the ranges appear as forest giants shooting up straight, with colossal smooth white trunks are found in barren reaches near the sea as scrubby stunted specimens, with wrinkled dark bark. An idea of the utter confusion of the popular nomenclature, may be gathered from the facts that there are no less than six distinct species in Australia called the blue-gum, the most important being the *E. globulus*, sometimes distinguished as the Tasmanian blue-gum. There are three peppermint trees, namely, *E. amygdalina*, *L. odorata*, and *E. piperita*; there are three red-gums, three mountain ashes, one of which is the *amygdalina*, which has already figured as a peppermint tree; there are nine white-gums, *amygdalina* again figuring in the list; there are eight ironbarks, and finally there are fourteen boxes, very inadequately attempted to be distinguished. The stringy-bark of South Australia and Tasmania is the *E. obliqua*, which in Victoria is mostly known as messmate, while the tree called stringy-bark in Victoria is the *E. macrorrhyza*. Under these circumstances the student of the eucalypts will find it discreet not to take his lessons from the bushman or elector, but to go and consult the *Eucalyptographia*, and learn to ignore the popular trivial names as completely as he can.

The distinguishing characteristic from which the *genus* got its name of eucalyptus, meaning "well-covered" is the deciduous operculum or calyx-lid, which is supposed to represent the united petals. It varies in shape from hemispherical to elongated conical; it is always simple, sometimes thin, but oftener thick: sometimes fleshy, but mostly woody; the veins run through it lengthwise, and are approximately parallel; the line of separation of operculum from calyx tube is nearly always distinct in the bud. Often in the young bud a thin membrane is found covering the operculum. The stamens are numerous and arranged in series; the shape of the antlers was first employed by Bentham as a diagnostic character for the systematic classification of the eucalypts, and with this Mueller has joined the mode of opening the anthers. The woody fruit consists of the bell-shaped calyx tube enclosing the capsule; the seeds are mostly infertile. The flowers as a rule are arranged in umbels, although in a few exceptional cases they occur singly and sessile.

E. Amygdalina has an unfortunate specific name as there is nothing the least almond-like about it. This species is remarkable as containing perhaps the tallest trees in the world and also trees with a larger secretion of oil than any other known tree produces. The tree varies considerably in external appearance, from the giant "white-gum" form to the stunted rough-barked form known in Victoria and Tasmania as a "peppermint" and in New South Wales as a "messmate." Its leaves are thin and equally green on both sides, the veins do not spread out much, and the oil dots are abundant and clearly visible. The flowers are small and grouped in solitary umbels, the operculum is almost hemisperical and almost half as large as the calyx tube, the anthers are kidney-shaped and open by confluent slits; the fruits are small and truncate globular, with depressed border and valves enclosed. This tree ranges along the south-east coast of Australia and Tasmania; it is always interspersed with other trees, and its timber is not much valued.

E. oleosa.—This species will be taken as representative of the four species that are mixed together in the mallee scrub; it is a dwarf, ranging from 12 to 18 feet in height, its leaves are of an equally bright green on both sides, the flowers occur in solitary umbels with slender stalks and short stalklets. The operculum is semiovate, passing into a pointed cone, and is a little longer than the calyx tube. The anthers are roundish, opening by longitudinal slits, the fruits are truncate ovate with compressed border, while the valves are half inserted and prolonged into decided points. The oil globules are plainly visible in the young leaves, but tend to get concealed in the older ones. This is a desert species found in the large tracts of mallee country in the regions round the mouth of the Murray and inland along it and its tributaries.

E. Globulus has its leaves long, thick, and equally green on both sides with the circumferential vein well in from the edge, and the oil dots concealed. The flowers are large, for the most part solitary, and almost sessile. The operculum is crown-shaped, and like the calyx-tube is covered with the same blueish white waxy bloom as gives the large ovate leaves of the seedlings and young trees of this species so characteristic an apperance; the anthers are distinctly longer than broad, and open by parallel slits. The fruit is large and hemispherical, whence the specific name. The trees occur mostly dispersed, but sometimes gregarious in the humid regions of the south and east of Victoria, and in Tasmania. This is the eucalypt that has become famous by reason of its unequalled rapidity of growth, its fine timber and its malaria destroying reputation.

E. leucoxylon has its leaves equally dull green on the two sides, the flowers are mostly arranged in solitary umbels of three flowers each, the operculum is semi-ovate and pointed, the outer rows of stamens are sterile, the anthers are roundish and open by pores at the summit, the stigma is broadly dilated, and the fruit semi-ovate in shape, has a compressed border, and

enclosed valves. This species has a wide range from the south of Queensland to Spencer's Gulf. Like the *amygdalina* it presents two very different external appearances, one of which is known as a white gum on account of the smooth pale stem left by the deciduous bark, the other as Victorian ironbark on account of the fissured hardness of the retained bark. This bark is pretty rich in kino.

E. macrorrhyza:—The leaves are long and equally green on both sides, with the oil dots hidden, the operculum is as long as the tube, and is concavely attenuated to a sharp point, the anthers are kidney shaped, opening by slits, the stigma is not broader than the apex of the style, the fruit is hemispherical below with a convex border, and the valves much inserted. The species is very widely spread in Victoria and New South Wales, being the commonest of the stringy barks in Victoria. The trees are gregarious, and there is a great demand for their timber on account of the readiness with which it splits for the manufacture of rails and shingles. They often occur mixed with E. Obliqua.

E. obliqua has its leaves equally green on the two sides, and shining with the oil dots concealed. The specific name was given to indicate the marked inequality of the leaves at the base, but this is a feature in the leaves of many eucalypts. The calyx is rough, and its tube is longer than the hemispherical operculum, the fruits are truncate ovate with the border compressed and the valves enclosed. The trees occur gregariously in large forests to be met with between St. Vincent's Gulf and Gippsland, but not spreading far into New South Wales, they furnish most of the ordinary sawn hardwood. The two last species although their yield of oil is not high, offer considerable advantages to the distiller by reason of their gregarious habit and their vogue as hardwood timber trees, which makes the gathering of their leaves cheap.

E. rostrata:—The leaves are of the same colour on both sides and of a lanceolate shape, the veins are crowded, and the oil, dots though visible are scanty; the flowers occur in solitary umbels of from 4 to 14 flowers, the operculum is longer than the semiglobular tube, from its hemispherical base it rises into a beak-like prolongation, from which the specific name was taken; the anthers are ovate with longitudinal slits, the fruit is roundish with a protruding convex rim, and three, four or five highly exerted triangular valves. This species is found chiefly along the river margins of south-east Australia.

E. odorata has equally dull leaves with the veins spread out at an acute angle. The operculum varies in shape from broad conical to bossed hemispherical, and is shorter than the calyx tube; the antlers are small and roundish, with pore-like slits, the fruit is bell shaped, with valves enclosed. The species is almost entirely confined to South Australia in the neighbourhood of Spencer's and St. Vincent's Gulfs. It is probable that in Victoria the E. Melliodora has sometimes been confounded with E. odorata, to which it is closely allied, and to which it is very similar, the most salient point of distinction between the two is that the fruit of E. melliodora is decidedly contracted at the summit, while that of E. odorata preserves the pure bell-shape.—*Chemist and Druggist of Australasia.*

THE SUGAR CANE AND THE SUGAR INDUSTRY AT MAURITIUS.

(Translated for the "Tropical Agriculturist" from the 1st number of the "Revue Agricole.")

MAURITIUS, Jan. 1887.

The sugar cane (*Saccharum officinarum*) is a gramineous plant, which appears indigenous to India and Indo-China, whence it has extended from time immemorial to the Oceanic Islands.

Towards the middle of the 13th century the traders who carried on commerce with India brought home with them this plant, and introduced it into Arabia, whence it was extended to many points in the basin of the Mediterranean, notably to Egypt, Spain, Sicily and up to the South of France,

The sugar yielding reed was soon transported into Madeira, thence in 1420 to the Canaries, and in 1506 the Spaniard P. d'Arrança introduced it into St. Domingo, where it multiplied rapidly. Gonzalis de Meloza established the first sugar factories there. In 1643 the English began to cultivate cane at Barbadoes, and the French at St. Christopher's in 1644, and at Guadeloupe in 1648.

For a long time the process of extracting the juice of the cane remained in a rudimentary state. The mills moved by bullocks or mules, were composed of three vertical cylinders. Two men, placed one on each side passed the canes, first between the cylinders the widest apart, and then through those which were closer together. As it was necessary to hold the canes in the hand to keep them horizontal in going through the vertical cylinders, it frequently happened that the men thus employed were from carelessness, or when overpowered by sleep, subject to having their fingers caught between the cylinders, the rotary movement of which was very rapid, and the whole arm and sometimes a portion of the body were crushed before there was time to stop the mill.

Stedman, in his voyage to Guyane, relates that in the sugar factories of that colony there was a well sharpened axe kept near the cylinders, for the purpose of cutting off an arm, in case of such an accident.

The use of horizontal cylinders and of water wheels and wind-mills, were so many steps in advance, which were successively realized, to be superseded at the present time by steam power.

The process for extracting sugar from the juice of the cane followed the same steps. At first the manufacturers were content to carry on the evaporation by means of single boilers. Afterwards these were arranged in rows (batteries). Towards 1840, Howard constructed for refining purposes the first apparatus for boiling in vacao, and in 1840 Mons. Rillieux conceived the idea of employing the steam developed by the boiling juice to evaporate another portion of the juice, and constructed the first apparatus for producing the two effects (appareil à double effet), which Mons. Tischbein introduced into Europe in 1880, and which Mons. Robert, a Seelowitz, modified so as to produce a triple effect.

During three centuries, the system of "purging" (égouttage) for the purpose of separating the molasses from the crystals of sugar contained in the concentrated juice, set in a mass by cooling, remained the same. The boiling mass was placed in forms, barrels or cases, the bottoms of which were pierced with holes, through which the molasses escaped. To expel, more or less completely, the molasses adhering to the granulations, cane juice concentrated to 32 degrees Baumé (this was what used to be called clearing le clairçage) or a thick layer of wet clay was poured over the surface of the sugar, the water from which percolated through the sugar, clearing the crystals of molasses. The latter was called claying (le tenage).

In 1849 Mons. Sèrigue invented the plan of applying centrifugal force to drive out the molasses held in suspension by the boiled mass of sugar, and constructed the first turbine.

The processes adopted for purifying the cane juice remained equally stationary for three centuries, and until towards 1848 the sugar maker confined himself to adding a little lime to the juice, though the proportion of this agent, was in no degree based on scientific principles. In 1849 Mons. Melsens suggested the use of bisulphate of lime which was soon abandoned—as the proper way of using sulphurous acid for depriving cane juice of colour was then insufficiently known. Then came carbonatation discovered by Mons. Rousseau, the application of which to the manipulation of cane juice gave but questionable results.

In 1867 the lamented Dr. E. Icery made the first important and practical use of sulphurous acid, which he employed in the form of monosulfite of lime, at the same time he taught the rational employment of sunflower paper (papier au tournesol) to test the cane juice in regulating the quantity of lime to be used for the purpose of separating the mucilage from the cane juice. At last in 1880, Messrs. C

Bernard and L. Ehrmann first used phosphoric acid with the aid of which they obtained sugar that rivalled in whiteness, the best refined sugar.

II.—If from this general exposition of the origin and developement of the colonial sugar enterprize we pass on to what was its past history in our colony, we shall see that it was not till towards 1735 during the time of Labeurdonnais that sugar cane commenced to be of commercial importance and that it was only in 1836 with the introduction of Indian labourers in Mauritius that the sugar industry began to develope itself to such an extent as to become in a few years the one great enterprize which attained its apogœum in 1863, the year in which the crop reached the figure of 316 millions of pounds.

The principal varieties of cane cultivated at Mauritius have been

1st. The white cane of Otaïti;
2nd. the bambu cane or Batavia cane;
3rd. the Gingham—or ribboned cane;
4th. Belouguet cane, or the violet cane of Java;
5th. creole cane, small with very close joints;
6th. Mozambique cane, dark in colour, and leaves tinged with deep brown.

Of these different kinds, the white cane was most generally cultivated, and until 1848 it formed at least nine-tenths of the plantations. At this time a peculiar disease, called the white disease, broke out on the white cane, so that very soon after the planters were obliged to abandon the cultivation of this variety, which previously had been considered the most advantageous. As there was then a prejudice unfavourale to coloured cane, efforts were made to obtain new species of white cane from Java, and two kinds were received from that country, the Penang and the Diard, which for many years were in great esteem, but before long they were given up in favour of the Bélouguet previously despised, but which soon became recognized as the most productive of all the kinds introduced up to that time.

Previous to this period, that is to say until towards 1855 the cultivation of cane was confined to the sea coast of the island. In these low grounds, sufficiently watered, the cane generally flourished with exceptional vigour, in a rich deep soil, and, without manure, gave numerous successive crops. In virgin soil from 15 to 20 crops, and on second planting from 8 to 10 crops. Two or three years of change of cultivation for peas or "embrevattes" (called in Ceylon the Angola pea) were afterwards sufficient to renovate the soil. So soon as the cultivaters went further from the coast, the conditions became very much changed. The soil which was neither so deep nor so rich, yielded, without manure, but very inferior returns to those from the coast lands. The planted canes gave but two or three crops and the manufacture presented great difficulties, consequent on the frequent rains, which hindered the drying of the sugar.

Two new introductions, that of the turbine and that of guano of Peru came to change this state of things. Whilst on one hand, the employment of the turbine obviated the necessity of drying in the sun, and facilitated the manipulation in rainy districts; the Peruvian manure tripled the returns obtained in moist and elevated regions. The consequence was that the forests which in 1855 still clothed a large portion of the centre of the island were gradually felled to make room for cane plantations.

The result of this agricultural revolution was the displacement of the sugar industry. The island in general was desiccated by the destruction of the forests, the coast lands ceased to be sufficiently watered to afford remunerative crops, and a great number of estates in this portion of the island were successively abandoned. The aggregate produce of the country, however, increased, as we have already said up to 1863, the period of its apogœum. After that commenced the era of trials. The Bélougnet cane after having produced so well, became effected in its turn, as well as the kinds called Penang and Diard, it became necessary to fall back on the Bambu and Gingham kinds which were notoriously inferior, and which, after a few years, were in their turn attacked by the same mysterious disease, which under forms varying with the kinds attacked, caused such disastrous loss to our agriculture. To provide against this eventuality, which had been foreseen, means for introducing fresh canes had been organized on a methodical system, and over two hundred new species or varieties were successively introduced, which rendered it possible to form fresh plantations.

It is worthy of remark that among all the new kinds of cane, a very few species were found fit to be compared as regarded production to the old kinds previously introduced and none were superior. At the same time that our different kinds of cane were successively attacked by disease, the planters of Mauritius found themselves called upon to struggle against new difficulties of another order.

The deposits of guano on the Chincha Islands became exhausted, and Peru only exported guano of inferior quality—which gave rise to the formation of establishments for making chemical manure, much more costly and greatly inferior to the old guano of Peru.

It has been said that misfortunes never come single. The truth of this aphorism has verified itself, as far as our sugar industry is concerned. To the diseases of the cane, and the increase in the cost of manure has succeeded a crisis in the market which has for several years struck at the sugar industry in all producing countries; a crisis to which it is impossible to assign a limit, and of which it is equally impossible to foresee the ultimate consequences.

After having viewed the origin, the developement and the present state of our sugar industry, it remains for us to inquire as to what are its present necessities, and the way towards which it is desirable to direct it, so that it may be placed in a position to sustain the struggle for existence, which is at the present moment imposed on all sugar producing countries.

C. B.

(To be Continued.)

TROPICAL FRUITS IN THE KEW MUSEUM.

In connection with the subject of tropical fruits recently brought before the Royal Colonial Institute by Mr. Morris, and referred to in the *Gardeners' Chronicle* for February 26 last, it may be useful to those interested in the matter to know that most of the fruits under review, as well as others not mentioned, but which might prove of equal value, are to be found in the Kew Museum. The collection of tropical fruits preserved in fluid has always been a distinct feature of the Economic Museum at Kew. Those sent home by Henshall and Rattan from the Malay Archipelago some thirty years since were not only remarkably good specimens, but, up to a certain point, were very complete. The addition of fresh specimens, acquired from various collectors and botanic gardens, as well as from the several Exhibitions—notably the Health Exhibition and the recent Colonial and Indian Exhibition—has made the Kew collection unique in this respect. It may, perhaps, be remembered that at the Health Exhibition, Siam made a great display of native fruits, extremely well preserved in a solution of salt and water, the whole of which collection was made over by the Siamese Commission at the close of the Exhibition to the Kew Museum. This collection placed many of the fruits of the East in an entirely new light; some notes on them and others in the Kew Museum may therefore not be without interest at the present time.

The Siam collection included some very fine specimens of the commoner or better-known tropical fruits, such as the Mango, Mangosteen, the Anonas, &c.; but it is to those that are less known that we wish to draw especial attention, and for this purpose it will no doubt be more generally useful to the readers of the *Gardeners' Chronicle* if we refer to the individual fruits under their several natural orders,

BIXINEÆ.—*Flacourtia inermis*, Roxb.—The name of Mad Apple is applied to this fruit in the Siamese collection, while in India it is known as Country Plum. The tree is a native of the Moluccas, but seems to be much cultivated. The fruit is about the size of a Cherry, of a red colour, and has a smooth skin, and is described by Roxburgh as being "too sour to be eaten raw, but makes very good tarts." Under the name of Luvi-luvi, or Lobi-lobi, the fruits of F. cataphracta, Wild., are used in Java for making into preserve: they are globular, with a smooth purple skin, and are about the size of a common Plum. *Aberia caffra*. Harv. and Lond.—The Kei Apple is perhaps better known than the last. It is the fruit of a shrub, native of the Cape of Good Hope and Natal. When ripe the fruits are of a golden-yellow colour, about the size of a small Apple. They make an excellent preserve, but are said to be so exceedingly acid when fresh that "the Dutch settlers prepare them for their tables as a pickle without vinegar."

MALVACEÆ. *Durio zibethinus*, L. (the Durian).—This wellknown fruit is included here only on account of the possibility of the edible pulpy portion being brought to this country preserved in syrup, like Pines. A specimen in the Museum from the Siam collection suggests this possibility, though it is probable that the flavour of the Durian, as described by travellers, would not recommend it to European palates.

GERANIACEÆ.—*Averrhoa bilimbi*, L. (the Blimbing).—This, and the Carambola—A. carambola, L.—are useful Indian fruits, valued on account of their acid taste for making pickles as well as for preserves.

RUTACEÆ.—*Triphasia trifoliata*, DC.—A spiny shrub, native of Southern China, but now naturalised in India and the West Indies. The fruits are about the size of a large black Currant, with a reddish skin: In an unripe state they are said to have a stickly tenacious pulp, and a turpentine flavour, but when fully ripe they have an agreeable sweet taste, and are preserved in syrup. They occasionally come to this country in this form under the name of Lime berries. A closely allied plant is the Wampee (Clausena Wampi, Blanco, better known perhaps as Cookia punctata), a small globular body, esteemed in China and the Indian Archipelago.

MELIACEÆ.—*Lansium domesticum*, Jack. (Lansa, Langsat, or Dooku.)—A tree of India and the Malay islands, the fruit of which is about the size of a pigeon's egg. The skin is of a yellow colour, and the pulp of flesh white. When fully ripe it is of a pleasant, sweetish, acid taste, and is highly esteemed by the people in the Malay islands, either in the fresh state, or cooked in various ways, or made into a preserve. Duku jam was shown in the collection from the Straits Settlements at the Colonial Exhibition, and its flavour was certainly very agreeable.

OLACINEÆ.—*Ximenia americana*, L. (the Amatunduluku of Natal).—It is a shrub or small tree, and is found widely spread over tropical regions. The fruits are fleshy, somewhat ovoid, about an inch long, and when fresh, of a sweetish colour; they have a sweetish, acid taste, and are generally eaten in the countries where the plant is grown. A form of this species has been described under the name of X. elliptica found in the Pacific islands, where it is eaten in large quantities by the natives, and is said to be extremely acid, and to possess an Almond-like smell. It is of a globular form, and not elliptical.

SAPINDACEÆ.—This order contains the well-known Litchi and Longan, and the less known Rambutan and Pootassan. I mention the first only to draw attention to the forms in which these fruits might be introduced. In this country we know the Litchi (Nephelium Litchi, Camb.) only in its dried state, that is, when the outer warted shells have become woody and the inner pulp, or aril, which envelopes the seed, has somewhat shrivelled and become black. In this state the pulp has simply a sweet taste, but in the fresh state the pulp is whitish, or slightly tinged with pink, and has a refreshing acid taste. A sample of these fruits, with the woody coat removed, showing the inner pulp preserved in fluid, from Siam, is shown in the Kew Museum, and they suggest the possibility that this pulpy portion might be preserved, in tins in a similar manner to Pine-apples, and sent to this country. The fruits of the Rambutan, or Rambustin (Nephelium lappaceum, L.), might also be treated in a similar way. The pulp makes an excellent jam, samples of which were exhibited in the Straits Settlements collection. The pulp of the Pootassan (Nephelium mutabile) is similar to the last.

Otophora fruticosa, Bl. (the Phamarieng of the Siamese), produces a two or three-lobed fruit about the size of a Cherry, of a bright shining black when ripe, and containing a large proportion of pulp of a pleasant sweetish, slightly astringent taste.

ANACARDIACEÆ.—Besides the Mango and Cashew nuts, and the several species of Spondias which furnish fruits of varied quality, two species of Bouea yield large, pulpy edible fruits; these are B. macrophylla Griff., and B. burmanica, Griff., both of which are known in Siam by the name of Maprang.

ROSACEÆ.—*Chrysobalanus Icaco*, L.—This is the Icaco, or Coco Plum of the West Indies and South America, The fruits are about the size and appearance of an ordinary Plum, but vary in colour from white to yellow, red or purple. The pulp is described as having a sweet but somewhat austere taste, and is used either raw or for making a conserve.

MYRTACEÆ.—In this large order many fruits suggest themselves as being likely to prove valuable either in the state under which they are at present known, or under an improved condition from the effects of cultivation. The Guava (Psidium guayava, Radd.), and the Rose Apple (Eugenia Jambos, L.), are amongst the best known fruits of the order; these latter however, are but little esteemed in their fresh state by Europeans, in consequence of their generally insipid taste, but candied with sugar they are very agreeable, and have a distinct Rose flavour. Rose Apples preserved in this manner were sent from Jamaica to the Philadelphia Exhibition, and were awarded a Silver Medal. The tree is commonly cultivated in gardens in India, and the fruit is eaten either raw or made into a preserve. Another species of Eugenia, namely, E. Jambolana, Lam., is much valued in India for the sake of the fruits, which are mostly about the size of a pigeon's egg, but vary under cultivation, and are eaten by all classes of the people. The tree is an evergreen, common throughout India, both wild and cultivated, and it is also found in Ceylon, the Malay Archipelago, and Australia.

Ugni (Myrtus ugni), a Chilian shrub, has long been valued in its native country for the sake of its fruits, which are of brownish-red colour when ripe, and about the size of a large black Currant; it has a soft juicy pulp, with a sweetish, somewhat aromatic flavour. It is described as being cultivated in gardens and used as dessert in Valparaiso, and the expressed Juice of the fruit mixed with water is said to form a very refreshing drink, having an odour of Rosemary. The plant has been recommended for cultivation as a fruit-bearing shrub in the warmer parts of England. A fruit very similar to the Ugni is produced by Myrtus salutaris, H. B. Samples are shown in the Kew Museum from Venezuela. On the banks of the Orinoco they are said to grow as large as Sloes.

PASSIFLOREÆ.—Several of the fleshy fruits of this order are utilised in tropical countries for making preserves, as, for instance, Passiflora quadrangularis, L., and P. maliformis, L., and Carica Papaya. Jams made from the first named species were shown in the Colonial Exhibition from Dominica, and from the second from Natal; both, however, lacked any distinct flavour to recommend them, and this was generally the case with the Papaw, which was shown from several of the colonies preserved in various ways. The most curious, however, if not the best in point of quality, were those shown in the Straits Settlements collection where the fruits were cut into various ornamental forms and preserved in syrup. Under the name of "scented Lemon" (a label probably misplaced) was shown some attractive looking substance of a bright green colour, also in syrup, which upon examination I found to be the flowers

of the Papaw. They were crisp to the taste, but had no flavour besides that of the syrup. Papaw jam and candied Papaw were amongst the other preparations of this well known and apparently useful fruit.

CORNACEÆ—*Nyssa capitata*, Walt. The fruits, which are about an inch long and ovoid, of a green colour and very agreeable flavour, are known in North America as Ogeechee Limes, and are often preserved in syrup and used as Limes.

SAPOTACEÆ.—This order contains several genera which furnish valuable edible fruits, such as the Chrysophyllum, Cainito or Star Apple, Lucuma mammosa, Griseb., or Mammei Sapote, and the Achras Sapota, L., or Sapodilla or Naseberry. Of this frut, Dr. Watt says that it is not much appreciated in India, but it is surreptitiously sold in the streets as Mangosteen. The fruits of Mimusops Kauki, L., are perhaps less known. They are about the size of a small Plum, and are known in Siam as Lamut. Those of M. Elengi are also edible.

EBENACEÆ.—Besides the Persimmon (Diospyros virginiana, L.), which is edible when fully ripe or bletted, the fruit of the Chinese Date Plum (D. Kaki) is important in China. The fruits are about the size of a large Apple, of an orange-red colour, and contain a quantity of edible pulp. The Chinese and Japanese use them both in the fresh and dried states and also preserved in syrup.

APOCYNACEÆ.—In this order, containing as it does many plants with elastic milky juices, yielding rubber, and many of them poisonous, one would scarcely expect to find many edible fruits; several of them, however, are valuable on this account, the following of which may be mentioned:—

Hancornia speciosa, Gomez (the Mangaba or Mangabeira, of Pernambuco).—A small tree, the milky juice of which furnishes the Pernambuco rubber. The fruits are yellow when ripe, marked with red streaks or spots, about the size of an Orlean's Plum; when perfectly ripe or somewhat bletted they are said to be very delicious and are a favourite fruit in Brazil. They have occasionally found their way to this country, and I have seen them sold on costermonger's barrows in the streets of London but very rarely.

The *Amatungulu* of Natal (Carissa [Arduina] grandiflora) is the fruit of a large spiny shrub which makes an excellent preserve, and is much used in Natal for that purpose; the fruits are pulpy and very similar to a Plum in appearance, about 2 inches long and 1½ inch broad. Another species of Carissa, namely, C. Carandas, L., known as the Karenja or Karaunda fruit in India, is cultivated in many parts of India for the sake of its fruits, which are used in an unripe state for picking, and when fully ripe for tarts and jelly.

MYRISTICEÆ.—This order is included only for the purpose of drawing attention to the use to which the outer fleshy part of the Nutmeg fruit is put in the East. Cut into various fantastic shapes, as representations of birds, flowers, &c, sometimes with the Nutmeg still enclosed, they are preserved in syrup, and form a very attractive preserve. It has a distinct Nutmeg flavour, and, like preserved Ginger, would be a useful adjunct at dessert.

EUPHORBIACEÆ.—*Phyllanthus emblica*, L.—Known as the Emblic Myrobalum. A tree of the dry forests of India and Burma. The fruit is about the size of a small Damson. The natives eat it raw, preserved, or made into a sweetmeat, while it is used by Europeans for tarts and jellies. It is stated that a "half-ripe fruit, if chewed, has the effect of making water taste sweet." The Otaheite Gooseberry (Phyllanthus distichus, Muell., Arg., better known perhaps as Cicca disticha, L.) is another valuable fruit, used in Java for pickling. Antidesma Bunius, Spr., a native of Java and the neighbouring islands, furnishes small fleshy, berry-like fruits, of a bright red colour, ripening into black; they have a subacid taste, and are used chiefly for preserving. Two or three species of Baccaurea (Pierardia) yield edible fruits; those most valued are B. edulis, Muell., Arg., a Malayan species, known as the Rambeh, the fruits of which are about the size of a large Cherry, yellowish in colour when ripe, and containing a sweet delicate flavoured pulp. In Sumatra it is called Choopah, and in Siam, Mafai; B. racemosa, Muell., Arg., is also a Cherry-like acid fruit of Java, as is also B. sapida, known in India as the Luteo.

The foregoing enumeration of fruits is not by any means an exhaustive one. I have brought those forward which are the least generally known, but of which the Museum contains good specimens.—JOHN R. JACKSON, Curator, Museum, Royal Gardens, Kew. —*Gardeners' Chronicle.*

THE OLIVE IN SOUTH AUSTRALIA.

BY SIR SAMUEL DAVENPORT.

"So similar is the climate of the settled portion of South Australia to that of countries in Europe and Asia where the olive thrives, that some Colonists were early induced to procure stocks from France, Portugal, and Spain, and these were planted in and about Adelaide. Their healthy growth and abundant fruitfulness after a few years proved the soundness of these opinions.

"It was under the stimulus to inquire into new productions given by the announcement of the London International Exhibition, 1851, that the first attempt was made to extract the oil from the olive. Then the late Mr. William Giles, manager of the South Australian Company, who, in 1844, received from Marseilles 51 plants, comprising five choice varieties of olives, and planted them, and could now gather their berries, employed Mr. George Francis to express the oil, and, at the London Exhibition of 1851, this produce gained 'Honorable mention,' on the ground of 'its clearness, color, and flavor.'

"Since that event a gradual advance in the cultivation of the olive has been made by some individual believers in its special adaptation for South Australia, and now the Conservator of Forests favors its distribution in public reserves.

"Meanwhile the high prizes uniformly acquired at International and Inter-Colonial Exhibitions in different quarters of the globe, even in an old and eminent olive country like France, have confirmed the highest views held of the olive and its oil as a local production. In a little brochure on "Olive Culture," published in 1877, at the printing office of the *South Australian Advertiser* newspaper, is the assertion that 'No oil that has ever been sent into the market surpasses in quality, lucidity and creamy delicateness of moist, delicious flavor the oil that is now produced on the Adelaide plains.'

"There being many varieties of cultivated olives whose merits for quantity or quality of oil differ, or whose rank is held in degrees of estimation relatively to national tastes. South Australia has now become rich in the possession of olive stocks of reputation secured to or from Malaga, Gibraltar and Lisbon: from Cannes 'Nice and South of France, via Marseilles; and from Florence and Bari via Brindisi. Some skilled French pruners of the olive have also been introduced, whose labors, and the instruction they must impart to others, cannot but prove of great advantage to the future cultivation and production of the olive.

"Had South Australia been colonized by Greeks, Italians, or French olive growers, it most probably would, long ere this, have produced large quantities of oil and preserved olives for the various markets of the Old World. Nevertheless, in many gardens, and in some special plantations of the tree in and about Adelaide, the silvery hue of the under surface of the foliage, as inverted by the winds calls strikingly to mind the scenery of wellknown localities of its cultivation, as of Cannes or Mentone on the Mediterranean, or of the Upper Tagus.

"The calcareous nature of the soil around Adelaide, and the warm and dry climate, assist in bringing the fruit of the olive, as to the vine to remarkable perfection: whilst, for the benefit of the laborers as well as of the farmers, the olive harvest conveniently follows on the vintage, as the vintage follows on the harvest times of wheat and other grains."—*Colonial Druggist.*

TEA COMPANIES LIMITED FOR CEYLON.

There is a feeling prevalent we find among a number of practical men in Ceylon, who may be said to be disinterested in the matter, that the tea enterprise in the island cannot be put on a satisfactory footing as regards manufacture at least, until large central factories fully equipped with all the best machinery and latest improvements, become the rule in place of being the exception. It is of no use as a permanent arrangement we are told, for every owner of 100, 150 or even 200 acres of tea to busy himself in altering his old coffee store into a tea factory or to spend money in running up some ramshackle concern where even if machinery adequately driven, were available, it is almost impossible to do justice to the tea leaf. There is again the very real difficulty of individual proprietors not being able to command a sufficiency of power to drive the required machinery. And it is now well-known that this is the greatest obstacle of all to the proper utilisation of rollers, dryers, &c., even when these are obtained of the best description. Tea far more than coffee requires plenty of motive power in the store or factory. Now, as the public servant who has drawn our attention to the matter, pointed out: in every planting district where tea has become the supreme object of attention, there are certain estates which naturally fall into groups and for which it should not be at all difficult to find a central suitable spot for the erection of such a Factory as would take in all their tea and where full justice could be done to it in manufacture. It is impossible to find waterpower enough on each estate; but with few exceptions where three, four or even six properties are grouped under one management, it ought not to be difficult to arrange for adequate waterpower, or if not available for an adequate supply of fuel to keep the inevitable steam engine as well as the driers fully supplied. There is undoubtedly a very great deal worthy of attention in this argument, whether regard be had to practical or economic conditions. No one can visit such factories as those of Carolina and Mariawatte without feeling that they must afford great advantages in the regular, equable and economical reparation of large quantities of tea. It may be said that while Carolina or K. A. W. factory commands over a thousand acres of tea, the case of Mariawatte with comparatively limited acreage, rather tells against our argument. But such is not really the case, for apart from the extension of the property in new and large clearings, the exceptionally heavy bearing of the tea there, puts the Factory on a par with the average that would be required in most districts for perhaps double the acreage.

In the item of machinery and store accommodation, the grouping of three to six tea gardens or plantations into one for factory purposes, ought to effect a very large economy. In that of store superintendence and labour, too, we should think, the comparison would be greatly in favour of grouping. But how is this desirable arrangement to be effected? It is not possible for individual ownership and separate management to be maintained with a Central Factory on joint account for manufacture. There must be one equal ownership and one management for the whole group, or else inevitably there would be collapse and failure. The only feasible scheme would seem to be the formation of Limited Companies to deal with such groups of estates as clearly afford the elements requisite to success in the utilization of a Central Factory. In the leading districts in India, the Tea Enterprise seems chiefly carried on through the agency of Limited Companies, and we fancy capital would be available for shares in "tea" in Ceylon with its high name, quite as readily as for Assam. In such cases too as where tea is coming into bearing, giving business at once, there ought to be no difficulty in interesting London capitalists. The proprietors of the estates to be grouped (their mortgagees or both) would no doubt be expected to take the major portion of the shares; and, perhaps, the mention of "mortgagees" suggests the chief difficulty in the way of making any arrangement for amalgamation of estates in the manner described. But there must be cases where such difficulty can be overcome, and if our remarks only serve to turn the attention of tea estate owners, who are puzzling their brains how to get up suitable factories and provide machinery, to the advantage of grouping and co-operation, benefit may result not only to individuals but to the general community.

ESTIMATED INDIAN TEA CROP FOR 1887.

The Indian Tea Association has favored us (W. Moran & Co.) with a copy of their circular giving the estimate for 1887-8, as follows:—

"The Committee has now the pleasure to hand you the following estimate of the crop of 1887, taken from figures which they have been able to collect and from other sources:—

	Estimated outturn of Crop of 1887 lb.
Assam	35,903,520
Cachar and Sylhet ...	27,631,100
Darjeeling, Terai, and Dooars ...	14,703,300
Chittagong and Chota Nagpore ...	1,544,000
Dehra Dun, Kumaon and Kangra ...	3,750,000
Private and Native Gardens (estimated)	1,500,000
Total ..	85,031,920

"The exports to Australia, America, and other places (principally Bombay and Madras) during the past season, have amounted to 2,725,000 lb., and if this quantity, together with the requirements of the Government and the local consumption of Northern India calculated at 1,500,000 lb. be deducted from the estimate, there will remain 80¾ million lb. for shipment to Great Britain during the season of 1887."

PACKET TEA FOR NATIVES.

The Indian *Planters' Gazette* has an interesting letter on "Packet Tea for Natives," and directs attention to the Kaiser-i-Hind Hydraulic Tea Press, the property of a London Company, having their head quarters at 188, Strand. These presses turn out tea in cakes weighing ¼lb each cake being divided into eight sections of equal weight, the cake being somewhat similar in form to a double cake of chcolate as made up by confectioners. The proprietors of the patent are disposed to sell the sole agency for using these presses in India. Compressed tea is no novelty, but the promoters claim that their plan offers special facilities for getting Indian tea into consumption in India. Tea thus treated is said to lose none of its qualities, there is no damping and tampering with the leaf, and each packet bears the impress of the Company. At 8 annas per lb. retail, the purchaser would be entitled of two sections of the packet for one pice, which would give 10 to 12 cups of good tea as natives drink it. The reduced bulk would, other conditions being favourable, probably induce the Commissariat to give the process a fair trial, but the field to work would undoubtedly be the native market in India, and if a brand such as the one under notice could once be popularized through the native fairs and melas, every bunniah's and modee's shop throughout the country would be selling tea, and tea, moreover, that even the bunniah would find it difficult, to adulterate. That the natives of all classes have a taste and liking for tea is well known; but, as a rule, it is not obtainable in such quantities and at such prices as to induce

them to purchase. We know of one garden where the proprietor has had his broken tea made up in ounce packets, each packet labelled in two or three vernaculars with the price, "two pice," distinctly marked on them. These packets have been sold largely along the line of railway, and in the larger towns, and the sale is steadily increasing. This is doubtless one of several instances of similar enterprise, but as yet the consumption does not affect the gross outturn. That it will eventually do so, if the trade is properly fostered and encouraged we fully believe.

TOBACCO IN NETHERLANDS INDIA.

(Translated for the *Straits Times*.)

Count de Gelvos d'Elsloo has started a venture under the style of the Borneo Tobacco Company, of which he will be manager. The company which is domiciled at Batavia, intends to carry on the cultivation of land in British North Borneo for tobacco growing, besides taking in hand the purchasing and curing of tobacco and its sale in Netherlands India and elsewhere. The articles of Association provide for the existence of the company during thirty consecutive years. The company has acquired rights in four thousand acres of waste land near the Ranau River in British North Borneo. The company's capital, has been fixed at two hundred and forty thousand guilders in two hundred and forty shares. The management of the company will be conducted by one director and two commissaries. In Borneo, the affairs of the company will be looked after by a manager under instructions from the director.

TOBACCO PLANTING IN DELI.

(Translated for the *Straits Times*.)

The *Deli Courant* takes up the subject of the vast power for mischief exercised by tindals on estates in Deli, which the Chinese official commissioners recently on a tour of inspection reported upon as one drawback to cooly life there. The evil is inseparable from the difficulties of getting on there with labourers, whose language hardly any planters are masters of. But it has been intensified by the employers leaving the hands of the tindals free to deal with the coolies without exerting themselves to keep them in check. At present, the assistants, from ignorance of the Chinese language, have to rely on the tindals for interpretation. The only remedy for this spreading evil seems to be to raise the salary of assistants who set to work studying the Chinese language, and who endeavour as soon as possible, however defectively, to make themselves understood by the coolies. It is expected that, on estates where many newly arrived immigrants are engaged, the presence of European employees so qualified will bring on satisfactory results. It is well known that the Chinese tindals are most successful in impressing upon these new comers a high idea of their power, and of the need for their interference.

Even European assistants abuse their power over the coolies of whom they have charge. Early, last month, the authorities in Deli had no other alternative than to deal sternly with the manager of the Ludwigsburg estate, charged with ill-treating coolies. An arrest like this will be sure to deepen the unfavourable impression of cooly life in Deli entertained in some quarters, though bringing him to book shows that the authorities not only have the power, but also the will to protect the coolies. Many planters do not seem to realise this. The arrests of several managers on similar charges within the last few months have failed as deterrent examples. They cannot understand that the Government will not allow coolies to be ill-treated. Under such circumstances, those who will not hear must be made to feel the consequences of flagrant wrong-doing.

The tobacco grown in North Borneo turns out to be nowise inferior to the Deli article, as is evidenced by the high prices it commands. From all accounts, the climate and soil of North Borneo are admirably adapted to that branch of cultivation. Reports of the granting of land concessions and the floating of companies to operate there, are in the air. Tobacco growing has indeed come into prominence in that quarter. Under the Netherlands Indian Government, as soon as a planter begins to make money out of his venture, the fiscal screw is at once put on. Taxes, rates, and cesses are piled on him. Their crushing weight stands in the way of sound development, and stunts the growth of planting enterprise. Not only in North Borneo but also in Siak, competition is springing up. But, owing to the latter country being under the Netherlands' flag, the danger is not so great. The Government will not fail quickly to lay taxes on the planters, when they have just started on the hard task of bringing primeval waste land under cultivation. For all that it is competition, however shackled. Its inevitable effect will be to bring on increase of production. These two factors when they once come into play, bid fair to put an end to the monopoly hitherto enjoyed by Deli planters, which in addition to the excellent quality of the tobacco turned out, has had a material effect in keeping up the extraordinarily high prices realised by that article. In Deli, eyes are beginning to be opened to the necessity for turning the land there to account for other kinds of cultivation than that of tobacco. It is only by resolutely working on these lines, that Deli will continue to be a money-making settlement, an exception, by-the-bye, in Netherlands India.

PLANTING &c., IN MANILA.

TOBACCO, DYEWOOD, COFFEE, INDIGO, PEARL-SHELLS.

(Translated for the *Straits Times*.)

All through last year, the depression of trade had prevailed far and wide in the Philippines. The value of hemp exported has fallen off by nearly half a million of dollars. The decrease in this respect, partly arises from inferior quality of the fibre brought to market owing to bad curing. The supplies available either fetch low prices or are rejected, the producers suffering in either case. Sugar shows a still more marked falling off, it being one-tenth compared with the export figures in 1885.

Dyewood exports have not escaped from being affected by the prevailing depression. Neither have those in cigars undergone any change for the better. Several houses see the importance of turning out a serviceable product, so as to keep up the whilom high reputation of the Philippine article. But others setting present gain above future loss, counteract their efforts by bringing out low priced cigars, no matter how indifferent the quality may prove to be. The inferior articles are exported on their account, thereby doing wide spread harm to the reputation of a product which had distanced all competitors up to the time of the abolition of the tobacco monopoly in the Philippines.

The abolition of the Government tobacco monopoly in the Philippines, has taken effect unfavourably not only on cigars, but also on leaf tobacco exported. Four years have passed away since that measure came into force. However beneficial the reform may prove to be in after years, tobacco as raw material or as cigars, still falls short of the mark reached in monopoly times, both in yield and quality. Growers have never realised the fact that free trade in tobacco did not mean liberty for them to cultivate that article badly and cure it worse, but afforded them an opportunity for turning out a product superior enough to bring higher prices than the Treasury paid them in the days of the monopoly. In those times, the Government had an interest in the outturn proving of marketable quality. Nowadays, with no influence for good to keep them on the right path, the cultivators, naturally heedless and neglectful, grow a crop anyhow without a thought of the care and finish required to render the article acceptable. Their only object is to bring it to market as soon as possible, no matter how inferior the quality. Sometimes the crop is sold before it is cut, neglect in the case being grosser. The crop, under such circumstances, fails to bring the prices expected when it reaches Manila. Cultivators become discouraged. In place of trying to mend matters, they grow reckless. A few growers and dealers are

more conscientious, but their efforts are of no avail to keep up the reputation of Philippine tobacco. The soil and climate of the islands are as suitable as ever for the cultivation of the leaf. The only way to improve matters is to bring home to growers, the need of improving the quality of their produce, by cutting the crop in due season and curing it in a businesslike manner. In no other way can the abolition of the tobacco monopoly be expected to result satisfactorily. In 1886 the leaf tobacco exported reached 120,793 quintals against 136,144 in 1885. Under present circumstances, with greed and indifference in the ascendant among the planting community, the experiment of free labour in tobacco growing in the Phillppines set about with such a great flourish of trumpets amid highly strained expectations, bids fair to become a failure. A deplorable result truly.—*Comercio.*

Coffee on the other hand is recovering, the returns showing an export of 117,392 piculs against 83,337 in 1885. Yet its cultivation does not seem to spread, though the local environment admits of a higher outturn. The efforts made to mend matters have failed from lack of push and go. A few years back, the Government directed the provincial authorities to order the natives to plant coffee far and wide. The authorities turned to with a will. Coffee plants were set out in thousands. Glowing anticipations were built on the prospects of their yielding plentifully. Other matters engrossed the attention of Government. Interest in the work so well begun flagged. The newly laid out coffee plantations soon went to wreck and ruin. Nothing has been done to repair the neglect. Further comment is superfluous.

Indigo is another export article which shows a heavy falling off. In the olden time, Philippine indigo enjoyed high repute, until a consignment of inferior quality brought on mistrust in markets abroad. Since then, no amount of good faith and careful preparation can restore the reputation once lost. In bygone times, the trade in this article was of much importance to the Philippines. Last year the exports totalled 1,284 quintals against 5662 in 1,870.

Pearl Shell figures low indeed in the export list, owing to the article being now forwarded from Sooloo to Singapore and other ports direct. The exportation of hides shows almost stationary figures with a downward tendency. Why it should be so is inexplicable, considering that cattle raising ought to succeed better in the Philippines with their fertile soil, liberal laws, and a population open to improving ideas. Districts of note formerly prosperous in the plamy days of the hide trade, have now become impoverished.

CEYLON: NATIVE AGRICULTURAL REPORT ON THE WESTERN PROVINCE.

THE WEATHER—COCONUTS AND THEIR CULTIVATION—FEVER AND QUININE—FARMING.

Hapitigam Korale, 30th April.

The drought broke up early in the month and we have had frequent but not very heavy rain almost daily for the last fortnight and everything is again looking fresh and flourishing. The drought has done some harm to weak coconut trees that were bearing beyond their strength on heavy loams and thin gravels, but less than might have been expected from the long spell of dry weather.

Since my last, several questions have been raised about the proper soil and treatment of COCONUTS. One of your correspondents gives his vote for great depth and width of holes, while others object to the system in toto. So far as I am concerned, I only limit my holes in size by the cost of digging them; I make them as deep and as wide as I can get them made for four cents, and I fill them up with loose earth to within one foot of the surface by breaking down the sides. In no case should the crown of the root be more than one foot below the general surface. In sandy land depth is of no importance but in loams and gravels the deeper the better, always provided the holes are filled up to the regulation one foot. A deep sandy loam is the most amenable to cultivation, and gives the best return for manure; though the strong loams have more of natural fertility, they do not so readily respond to cultivation and till the trees attain to a wood age, say fifteen to twenty years, they suffer from drought. Cabook lands are not guilty of the general condemnation given them by one of your correspondents. They range in quality from utter barrenness to a considerable degree of fertility, and the better kinds are more responsive to cultivation than the heavy loams.

With exception of the dwarf Maldive, I have never, under the most favourable condition, seen a coconut tree flower before the fifth year. Some one challenges old planters to state whether they have ever seen a coconut field with 75 per cent of the trees bearing in the tenth year. I must answer that I never have simply from the fact that I have never seen a coconut field treated fairly during the first ten years of its existence. I do firmly believe that under liberal and skilful cultivation every coconut tree will be in full bearing *before* its tenth year.

I approve of annual ploughing or digging, merely because it cannot in general be done oftener. To keep the soil pulverized to the depth of eight or nine inches is the first of the two things that the coconut requires to give a satisfactory result. As to disturbing the roots it is a matter of no consequence; no coconut tree ever suffered from a deficiency of roots to take up any plant food in the soil; I want no main roots within nine inches of the surface, as the deeper laying mains send up abundance of feeders into the upper soil.

I know no economic plant that will grow and bear fruit on soil so poor and under such utter neglect as the coconut, nor do I know any that so immediately and so amply responds to even minute quantities of manure. Say a ton of bone dust, costs laid down on an estate R75, that properly applied to 370 trees already bearing more or less, they will within three years yield at least 12,000 nuts additional to their former crops, worth at the lowest price R300. Allowing R45 for additional labour the cost will be R120, leaving a profit on the investment of R180. Lime is a very good application to heavy soils if put on in sufficient quantity, unfortunately it will not pay at the local price of the article.

I have never seen or till recently heard of pearls in coconuts. The testimony is too weak so far to convince a person of a sceptical turn of mind. I would hardly believe it if I saw it.

This is awful season for fever in this neighbourhood; there is hardly a house for miles round free from it and in some cases whole families are suffering. My own household is laid up as I write, except myself, and I have no patent protection. We are consuming quinine at a rate that would be ruinous if we had to pay the price of English dispensing druggists.

I am trying to combine some farming with coconut cultivation. I am still in doubt if it will pay directly, but if not, the coconuts will get the benefit of the work and manure. Local prices are not encouraging. Our climate cannot be depended on for any of the more valuable minor products and however successful we may be in growing such things as cassawa, sweet potatoes, pumkins, pineapples and so forth, they are not worth taking any trouble with, unless so far as they can be consumed on the place. Cattle and poultry thrive on cassawa, especially milkcows, who give a double supply under this feeding. I know no plant that yields so large a bulk of substantial food for man or beast with so little labour as cassawa, but its very productiveness renders it an unprofitable crop in larger quantity than required for home consumption.

THE ANTIGUA average rainfall for 1886 at 41 stations is 47 89 inches. This, we believe, has been considered an exceptionally wet year for Antigua. Compare Roseau Valley 208·19; Roseau 94·31!—*Dominica Dial.*

Correspondence.

To the Editor of the "Ceylon Observer."

CINCHONA IN MADULSIMA: INTERESTING ANALYSES.

DEAR MR. EDITOR,—Below, you will find result of analyses of cinchona bark: Renewed and thatched and unthatched. The bark was taken from off trees growing together in lines, shaved at same time. I had heard so many conflicting opinions passed on the matter of thatching the trees after shaving, that I sent Home samples and had them analyzed, the result of which may be of interest to some of your readers. Calisaya marked No. 1 was analyzed by Messrs. Symons & Cochran, and certified at ·32.—Yours faithfully,

C. ESDAILE.

No. 1 Calisaya	0·63	A.
	0·20	Cinchonidine
	0·69	Cinchonine
No. 2 Succirubra Renewed, *thatched*	3·06	A.
	4·02	Cinchonidine
	1·77	Cinchonine
No. 3 Succirubra Renewed, *unthatched*	3·36	A.
	4·20	Cinchonidine
	2·98	Cinchonine

[The results here given are extraordinary. Even the English analysis of calisaya, leaves the yellow bark very poor, in comparison with the red barks which are both good, the uncovered, contrary to previous experience being the better of the two. —ED.]

CINCHONA BARK HARVESTING AND ANALYSES.

Maskeliya, 23rd April 1887.

DEAR SIR,—The public are much beholden to Mr. Esdaile for his interesting communication in your journal regarding cinchona shaving; but the information would be more complete if he will kindly say if the trees experimented upon were all of the same age and all stood under the same conditions in respect to light and shade; that is, if the stems of the trees operated upon were all under the same conditions of exposure to rain and sunshine. Mr. Esdaile would confer an additional favour if he will say if the unthatched trees suffered more from the barking process than those which were thatched! And again, did the thatched trees renew any more quickly than the unthatched? E. F. T.

PEPPER AND CUBEBS.

Upcountry, 23rd April 1887.

DEAR SIR,—I noticed a short time ago that you had collected in the columns of the *Observer* a considerable amount of information on the subject of Rubber Cultivation. You would, I think, confer a boon on owners of land at a low and medium elevation if you would do the same for *Pepper*. This product has one great advantage over rubber, that we know it *has* been successfully cultivated in Ceylon. All the same, comparatively little seems to be known about it now. I put out a good many plants two years ago under various conditions as regards shade and soil, but their growth is not very encouraging and this in land which I should have imagined was admirably suited to them and is doing well in other products. I think it likely enough that I may have got hold of an unsuitable variety as I have heard that some kinds do best in damp and others in dry soil, while some succeed best in shade and others in the open. Then of course one would wish to grow the most valuable sorts only. Any information about "Cubebs" would also be of value. When so many products are suffering from low prices, I cannot help thinking that something might be made of pepper were more information available. PLANTER.

[We thank our correspondent for his suggestion. Everything that we can find about "Pepper," "Cubebs" or any other likely new product for the Ceylon or tropical planter, we put into the *Tropical Agriculturist*, and there is a mine of valuable practical information in successive volumes if "Planter" and others will only kindly consult the index to each. We shall be much obliged if anyone can send us extracts from contemporary literature in the East or West bearing of any likely product which has been left out of *T. A.* —We may collate "All about Pepper and Cubebs" a little later on; but certainly for the present, the *T. A.*—and every first-class estate should have a set of the volumes—should meet the requirements of "Planter" and others similarly situated.—ED.

COFFEE AND "GREEN BUG."

Mausagalla, Badulla, April 29th, 1887.

DEAR SIR,—Can you give me imformation on the following questions?:—

1—When was green bug first noticed in Ceylon?

2—Are there any cases, where the coffee having undergone a severe attack of green bug, it has eventually come round, and is now cropping?

3—Has any large acreage of coffee being *killed* by it?

I do not seek for a remedy, as it is, in my judgment, practically impossible over a large area to apply one, but for information. I would solicit answers upon the above points. Many coffee estates in the island were converted into tea gardens, *before* the arrival of this blight owing to failure of crops from leaf-disease; capitalists declining further advances against coffee cultivation, and the price down to 60 shillings; but, given a good coffee estate this 29th April 1887, free from leaf-disease, coffee rising to 100s, but green bug taking the place of *H. V.*, what course is recommended?—Yours faithfully, GEO. KENT DEAKER.

[Mr. Deaker will find on referring to *Observer* of the 14th ultimo, answers to most of his questions:—(1), "Origin of the Pest:—First attracting attention in Matale in 1882, it had reached Pussellawa in 1884, Ramboda in 1885, and Badulla 1886"; (2), we say "yes, we believe, estates in Haputale that were badly attacked are now free"; (3) yes, in the Kandy district decidedly. There is, no doubt, much reason for experiments in fighting green bug.—ED.]

PHENYLE AND GREENBUG.—There is quite a run by coffee proprietors on "phenyle" to be used as a remedy for greenbug—so much so that, it is said, local stocks are exhausted! Kerosine, Carbolic, and Lime are however well worth trying.

MOUSAKELLIE ESTATE, KELLEBOKKE VALLEY.—This once famous coffee plantation and now favorite and very promising tea estate has lately changed hands we hear. The purchase has been effected by Mr. Gow on behalf of a London syndicate, his offer of close on R80 000 telegraphed out, being accepted by the representatives of the late A. H. Fryer. We do not know that we have seen more promising tea in Ceylon than on a part of Mousakellie, during a visit to the district a short time ago. The property covers 600 acres altogether.

ARTIFICIAL RUBIES.—At the Academy of Science's meeting held on March 14th M. Fremy read a memoir on the researches which he has made with M. Verneuil to artificially produce ruby. An Alumina crucible was used, so as to avoid the presence of silica, which has the effect of imparting a lamellar structure to the product. Under such conditions, with alumina separated from calcium fluoride by a perforated platinum septum, they have obtained perfect crystals of alumina, which, being coloured with traces of chromic acid, were an exact counterpart of the natural stone.—*Chemist & Druggists.*

CANNAVERELLA CINCHONA BARK.—We learn that the parcel of bark sold the other day was taken from a portion of the 100 acres on this estate, but most of the fields have not yet had an ounce of bark taken from them. The bark sold was from the older trees, from the seed of which the clearings were planted. A sample of the bark just sold, taken from the bulk of the parcel, was sent to London for analysis and showed 5·56 sulphate of quinine as compared with the Colombo analysis of 5·04 sulphate of quinine. The trees were *not* thatched. These particulars are interesting. We certainly would recommend Mr. Macfarlane not to leave the trees in his several fields much longer without shaving, so as to get the full benefit of renewed bark.

TEA MACHINERY.—We have had a visit from Mr. John Greig of the well-known Edinburgh firm of Tea Machinists. Mr. Greig was a long time a planter in Western India, and afterwards in tea in Assam. He visited Ceylon in 1868 and made the journey from Gampola to Haputale to visit poor Pitratmalie Wylie; but within the tea era he has not seen Ceylon and consequently perhaps, his various machines have not attracted the notice here to which they are entitled. Mr. Greig is especially confident about the success of his combined Withering, Drying and Sifting machine (his "X L All") with the latest improvements. He is now on his way to Assam to erect a large machine of this kind; and there is one also to be put up in Travancore in supercession of a Sirocco. Mr. Greig has superseded the iron flue pipes by a special kind of fireclay pipe which is expected to prove practically everlasting. Mr. Greig intends to spend some time in Ceylon on his return, and we suppose will then see that a proper series of trials is given to one of the latest improved of his machines, the working of which can be contrasted with that of "Gow's Witherer" in Carolina Factory.

THE CEYLON TEA PLANTATIONS COMPANY, LIMITED.—The possessors of Mariawatte, Dunedin, Sembawatte and Dewalakande estates, have held their first annual general meeting in London. The result of the first year's working shows a profit of 20 per cent on the paid up capital of £75,000, but the Directors have decided to declare only a dividend on twelve months' expenditure and ten months'crops, or on the crops *actually* sold to 31st December of last year. This is equal to 12½ per cent, and they carry forward to this year the value of 117,000 lb. of tea unsold or about R76,000. The crop from the estates was 501,700 lb. and 69,660 lb. bought leaf tea, making a total outturn of 571,360 lb. The average yield was 500 lb. per acre over young and old fields. The tea was produced at 30 cents per lb. which rate includes cost of cultivation of clearings not in bearing. The average price obtained was 65 cents per lb.—*Cor.* [Could the local manager or Mr. Rutherford kindly tell us *pro bono publico* what was the London report and prices for the tea manufactured in Gow's "Witherer" at the trial duly reported by Mr. Jameson some months ago? —ED.]

DISTRICTS AND ESTATES IN CEYLON which for coffee proved failures through the prevalence of wind, have in several cases been found to suit tea admirably. Of such is the Lagalla district in Matale east. We hear the most favourable reports on tea in this quarter. Mr. Armstrong has lately been giving a report on a well-known property there as almost "perfection for tea," and we learn that equally good are the prospects—based on some experience of growth along with professional reports —on the Kalupahane Valley, Western Haputale.

THE CULTUREE OF TOBACCO IN NORTH BORNEO seems to be advancing and we suppose all attempts at restriction in a settlement where the great difficulty is to attract settlers, must be regarded as out of the question. But experience in Virginia and to come nearer home, in Java have proved that a more ruinous cultivation cannot curse a country or exhaust a soil. We have only read of Virginia, but we have seen the extensive wastes in Java and our feeling is that tobacco culture is the least advantageous to a country which can be engaged in.

"THE TEA INDUSTRY IN CEYLON—illustrated in a series of etchings by Ernest F. Vandort."—We have seen a series of etchings prepared under the above title by the son of the well known Colombo Artist, which show that the skill and genius of Mr. J. L. K. Vandort have descended to Mr. Ernest Vandort. The series include well-finished sketches of coolies engaged in the various estate operations :—Pruning, Picking flush, Weighing, Withering, Rolling with machinery, Drying, Bulking, Carrying boxes away, all etched round a central coloured piece showing the bungalow and tea field. The whole is to be framed and sent to the Kandy Agri-Horticultural Exhibition, where we have no doubt, it will attract attention both for its own sake and on account of the youthful artist whose work it is. We do not see why this young Ceylonese gentleman should not aim at getting on the staff of an Illustrated journal either in England or the Australian Colonies.

THE DEVELOPMENT OF ASSAM.—Under the auspices of the East India Association, a meeting of officers and gentlemen interested in the commercial development of the British Empire in the East was held at the Westminster Town Hall on Monday, April 4th, under the presidency of Col. G. B. Malleson, C.S.I., for the purpose of considering various suggestions for the commercial development of Assam, offered in an elaborate address by Mr. Oswin Weynton. Attention was specially directed to those unutilised products bountifully furnished in the uncultivated portions of the tea estates, and Mr. Weynton urged that were Assam brought into communication with the over-populated districts of Bengal, the North-West Provinces, and Madras, a stream of emigration would set in therefrom that would supply the required labour for the full development of the province's resources, to the benefit equally of natives, Europeans, and Government revenue. Meantime, the Assam settler must remember that he is in precisely the position of the Australian colonists forty years ago. The latter did not wait for that influx of labour they knew would be inevitable, but prepared for it in anticipation by utilising their runs to the utmost, and though fruits, corn, and sheep increased on their hands to an unprofitable extent for years, when immigration did set in everything was prepared for it. Assam, either hill or plain, has an equally prosperous future before it if its capabilities are developed with the same energy, though now it is to most people an utter *terra incognita*, whose past and varied indigenous wealth is as yet appreciated by few.

PLANTING IN JOHORE.

[This prospectus and Company proved abortive after publication.—ED.]

THE JOHORE COMPANY, LIMITED.

CAPITAL.—Ordinary Shares (of £10 each),

£600,000. Total Capital £850,096.

PROSPECTUS.

This Company has been formed for the purpose of acquiring the valuable Concessions obtained in November, 1884, and May 1886, from the Sultan of Johore, by W. McGregor Smith and Dalton Sayle, in the name of Mr. William Keswick, of Hong Kong, and of No. 3, Lombard Street, in the City of London, Merchant, as their Trustee.

These Concessions comprise (with the special privileges hereinafter more particularly described) the right to select 100,000 acres of land (an area of upwards of 156 square miles) in the territory of Johore and Moar, in the Malay Peninsula, which is distant only about 90 miles from Singapore. The concessions are held direct from the Government of Johore, which has recently entered into an offensive and defensive treaty with the British Government.

Of these 100,000 acres, upwards of 80,000, believed to be the choicest and most valuable land in the territory, have already been selected, the survey being now in progress as regards the remainder. A skilled planter accompanies the surveyor, with instructions to reject any land not of the richest character.

The tenure is for a term of 999 years, and the property is not burdened with any fixed payment the rent being 2½ per cent. of the gross products on the spot.

Opium is a Government monopoly, but its cultivation by the Company is not contemplated. With the exception of Opium, Pepper, Gambier, and one or two other items of an unimportant character, Export or other Duties cannot, under the terms of the concessions, be imposed upon any of the products cultivated upon the property. As such duties, which will probably vary with the requirements and expenses of the Government, are chargeable to other Planters in the territory, it is at once apparent that the value of the concessions is enormously enhanced.

The climate of the southern portion of the Malay Peninsula, situated within three degrees of the Equator, and practically surrounded by the sea, is both humid and equable the mean variation of the temperature of Singapore and Johore being from 70° to 90° (Fahrenheit). The rainfall averages 100 inches, which renders land in this territory peculiarly adapted for the growth of tropical products, one special advantage being that they are capable of cultivation *all the year round* without intermission. There are no regular wet or dry seasons, as in most other tropical countries, but the rainfall continues at short intervals throughout the year. For example, it may be mentioned that *two distinct crops of Tobacco*, the same as the well known Sumatra Tobacco grown by the various Deli Companies can be produced in one year, Johore is only divided from Sumatra by the Straits of Malacca.

The lands acquired by the Company are of virgin soil, and contain forests of primeval timber, including Teak, Ironwood, India Rubber, and various other tropical and valuable woods. Many and various specimens of this timber were shown at the Forestry Exhibition in Edinburgh, in 1884, and a large number were awarded prizes.

The lands are remarkable for the numerous Fibrous Plants, such as "Rhea." "Mhoorva," &c., which are indigenous to the soil; "Rhea" and "Mhoorva' are used as substitutes for Cotton, Flax and Wool, the former being also employed for mixing with Silk. These fibres will, on account of their low cost, gradually but surely revolutionise the manufacture of many descriptions of staple goods, and a reference to the annexed report of Mr. W. E. Death shows the profits which the growth and preparation of these fibres are calculated to produce.

The long standing difficulty in connection with the separation of the fibre from Rhea stems which has for so many years occupied the attention of the Government of India has recently been overcome, and Machines have been invented which are able to reduce these fibres to a marketable condition.

The lands are also specially suitable for the growth of Tobacco, Pepper, and other products, and it is proposed to expend the Capital of the Company now asked for in the cultivation of about 17,000 acres in the following proportions:—

	Tobacco. 10,000 Acres.	Pepper. 2,000 Acres.	Fibres. 5,000 Acres
* Estimated Working Capital.	£275,000	£54,000	£145,000
Estimated Annual Profit.	£260,000	3rd Year £90,000; 4th „ £90,000; 5th & subsequent years £140,000	£205,000

Estimated Ultimate Annual profit on Expenditure of £500,000 ... ... £605,000.

* It must be borne in mind that a considerable portion of Capital expenditure is returned with each crop, and is available with the reserve fund for the planting of further land.

Such an Estimate of profit as the foregoing may at first glance, be sceptically regarded, but in evidence of the immense profits which are being derived through the employment of capital in undertakings precisely similar in character to that of this Company, the following particulars of dividends paid by the Deli Companies of Sumatra, may be quoted:—

DIVIDENDS PAID BY.

In	The Deli Maatschappy.	The Tabak Maatschappy.	The Amsterdam Deli Company.
1882	65 per cent.	25 per cent.	10 per cent.,
1883	101 „	50 „	30 „
1884	77 „	60 „	30 „
1885	107 „	100 „	60 „

The Returns for 1886 are not yet available.

The Singapore and Straits Directory, which contains a record of Estates and Lands held in the Straits Settlements, Sumatra, &c., shows that the lands leased by the three above-named Deli Companies, collectively embrace under 77,000 acres (of which it is understood that only a small portion is at present under actual cultivation). The total paid-up Capital of these three Companies amounts to upwards of £400,000. Not only have the Deli Companies paid these dividends, but they have in addition set aside 15 per cent of their profits towards a sinking fund for redemption of capital. The Deli Companies' Leases have moreover only been granted for a period of 75 years as against 999 years, the term for which the Johore Company's Estates are held. The present price of the Deli Maatschappy 100 guilders shares is 680.

A considerable portion of the Estate will, when cleared for cultivation, be let to tenants, who are readily obtainable from the Malay and Chinese population. The rental for which it is estimated will average £4 10s. per acre per annum.

The work of clearing and cultivating the land must necessarily occupy some time, but with special regard to tobacco, a crop can be raised and realised during the current year, and assuming that at least 5,000 acres—a moderate estimate—can be brought under cultivation within the first 15 months, and that in each following year a further 5,000 acres can be made productive at least £100,000 net profit should be realised during the year 1888, and in subsequent years this profit should be proportionately increased. The following condensed summary shows the profits which, under such circumstances, would accrue to the holders of the Ordinary Shares, a sum of £16,000 being allowed in the calculation for each year for Establishment expenses.

Minimum Estimated Net Profit during 1888, say £100,000.

6 per cent. Interest on Debenture Bonds, £250,000, will absorb £15,000

10 per cent. Dividend on Ordinary Shares, £600,000, will absorb	60,000
	£75,000
10 per cent. for Reserve Fund to be set aside	10,000
Total ...	£85,000
Minimum Estimated Net Profit during 1889, say, £200,000.	
6 per cent. Interest on Debenture Stock, and 10 per cent. Dividend on Ordinary Shares will absorb	£75,000
10 per cent. for Reserve Fund	20,000
Total	£95,000
Leaving a Balance of	105,000

Three-fifths of £105,000=£63,000, will provide a further Div. on Ordinary Shares of 10½ per cent. In all

20½ per cent.

It is considered needless to pursue these calculations further in detail, but an annual rate of increase in profits, if only half such amount, would enable the Company in the fifth year, namely, 1892 (when it is presumed that the 17,000 acres will have been brought under profitable cultivation), to divide among the Shareholdrs nearely 55 per cent., besides having appropriated to the Reserve Fund nearly £150,000.

The importance of securing skilful and competent management on the Estates is an element of the first consideration, and in order to make due provision for the same, the service of three Resident Managers (one of whom, Mr. Tom Gibson, is now on the Estates) have been secured. The other two Managers, who have been especially selected on account of their practical experience in planting, &c., will immediately proceed to Johore, both being prepared to at once enter upon their respective duties.

A plentiful supply of cheap labour is available; Chinese coolies (the best labourers in the world for tropical climates) are readily obtainable in Johore and Singapore at seven dollars, equal to 23s. 4d. per month, while in neighbouring countries their wages are not less than ten dollars, equal to 33s. 4d. per month, a difference of £6 per coolie per annum, in favour of the Company.

One of the great advantages in connection with these concessions is the water frontage which the land possesses. A reference to Map No. 1 will show that the River Moar forms a water highway for many miles through the property; the Moar is at all periods of the year navigable by vessels drawing 10 feet of water, while those of the heaviest draft can anchor off the mouth of the river, which is in the direct route of the China Mail Steamers. The water facilities thus afforded reduce the cost of transport to a minimum.

THE WEIGHT, says an American writer, affords the easiest test for the purity of guano. A bushel of pure Peruvian guano, according to most authorities, should weigh almost exactly seventy pounds. If heavier than seventy-three pounds, it is adulterated with clay, sand, marl, or some other impurity.—*Indian Gardener.*

SUBSTITUTE FOR BOXWOOD are noticed by Mr. Jackson of Kew in *Forestry*:—Amongst the woods being that of *Hunteria zeylanica*, Gard.—A small tree, common in the warmer parts of Ceylon. This is a very hard and compact wood, and is used for engraving purposes in Ceylon, where it is said by residents to come nearer to box than any other wood known. On this wood Mr. Worthington Smith gave a very favourable opinion, but it is doubtful whether it would every be brought from Ceylon in sufficient quantities to meet a demand.

MANUACTURE OF PAPER FROM WOOD.—The idea of utilizing wood for the manufacture of paper was first suggested to Reaumur in 1710, from his noticing that the fabric ot wasps' nests was formed out of wood reduced to a pulp. This industry has of late years acquired great importance, and is rapidly increasing, as the supply of rags, on which paper-makers formerly depended for their stock, is inadequate to the demand for the manufactured material. Were it not for this factor in paper-making, paper would now be one-half as much more, if not double, the price it is to-day.—*Journal of Forestry.*

THE *Pharmaceutical Journal* states that the administration of one drop of croton oil and a drachm of chloroform in an ounce of glycerine having been recommended as useful in obstinate cases of tape-worm, Mr. McCullum, of Ontario, writes to say (*Brit. Med. Journ.*, June 13, p, 1231) that the vehicle only is necessary for the purpose, since the glycerine will kill the tape-worm quite as effectually without anæsthetising it with chloroform, or purging it with croton oil. This property of glycerine, he states, he first observed one day when removing a worm from the stomach of a fish, and putting it into a drop of glycerine upon a microscope slide, where it died almost immediately. He was therefore led to try the experiment of substituting glycerine for the nauseous male-fern dose with good results. Sometimes he has found it necessary to follow the glycerine with a gentle purgative, but not always.—*Indian Agriculturist.*

ACCORDING to the *Paper-Maker*, a paper-making firm in New Jersey has for several weeks been turning out counterpanes and pillows of paper. No. 1 Manila paper is used, two large sheets being held together by a slender twine at intervals of three or four inches. The twine is gummed, so as to hold the sheets firmly together where it lies. A hem is placed on the counterpane to keep it from tearing; the safety edge is composed of twine. Ornamental designs are stamped on the outer surfaces of the covers and cases, giving them a neat, attractive appearance. When these counterpanes and pillow-cases become wrinkled from use they can easily be smoothed out with a hot-flat iron. The counterpanes can be left on the bed when it is occupied, and in cold weather will be found a warm covering, paper preventing the escape of heat. The new paper bedclothing is 75 cents per set, and will probably become popular.—*Indian Agriculturist.*

We have received Part IV of the *Journal of the Agricultural and Horticultural Society of India* which, we are glad to see, contains some very interesting papers. Mr. Wood-Mason's paper on the *Paraponyx oryzalis*, or the insect-pest of the rice plant in Burmah, heads the *Journal*. We were favoured with a copy of this publication in pamphlet form last year. Mr. R. A. Manuel contributes some interesting notes on some of the silks of British Burmah. Mr. S. Jennings, well-known to agri-horticulturists in India, has supplied a valuable paper on Rhea, which should be widely read. Mr. Minchin's note on raising Rhea from seed is also valuable. Mons. Dumaine, who is well known as an enquirer in the sience and practice of sericulture, furnishes some interesting particulars on the wild silk-yielders found in Hazaribagh. Dr. Bonavia, whose prolific pen has been busy for many years in efforts to benefit the country, has elaborated his ideas regarding the value of the citron order of plants in a paper on Citrus decoction as a fever remedy. Mr. C. Maries, who is an authority on the mango, contributes a few practical remarks on the propagation of this fruit tree. But by far the most interesting paper in the current number of the *Journal*, is the sketch of the rise and progress of the Agri-Horticultural Society of India, by Mr. A. H. Blechynden, the able and courteous Secretary of the Society, who for so many years has held this onerous post with so much benefit to the Society, and such credit to himself. He begins at the beginning, describes the early struggles of the Society after its establishment by its founder, the Rev. Dr. William Carey, one of the greatest men, in one sense, India has ever seen; traces its progress, and reviews the wide scope of the Society's labours in the fields of agriculture and horticulture, and in the development of the various industries that come within its purview. On the whole, the present number of the *Journal* contains about the most interesting papers we have seen in its pages for some time past.—*Indian Agriculturist.*

ARTS AND INDUSTRIES IN EASTERN AFRICA.

Domestic arts and industries have not yet reached a high state of development. Most of the agricultural implements are made from a hard wood, called "blackwood" or "coast ebony." The Makuas make a fine string from the roots of a tree termed *mlamba*. The Watussi draw out fine copper threads, with which they fabricate *nierees*, a kind of ring composed of giraffe-hair bound spirally with the metallic thread, and worn as leglets.

In Usambara, native talent has devised more than one form of musical instrument. A small clarionet, called *zomali*, about 18 inches long, and with a reed mouthpiece, gives out sounds much resembling those of the Welsh bagpipe without the drone; it ranks second to the drum in public favour. The *pangu*, or *zeze*, is a doble-stringed lute, in which half a calabash serves as a sounding-board. The *kwacha* is a shield-like board, about 2 feet long and 8 inches wide, rounded at the ends, into which two round notched sticks of hard wood are inserted, so as to form a curve over it; these notched sticks are then rubbed up and down with smaller sticks, so as to produce a rasping and most unmusical noise. A more capable instrument is the *riringa*, a large, rude, paino-like contrivance, formed of two thick banana-stems laid parallel, and of pieces of hard wood fastened crosswise between these, made so that those giving the highest notes are in the middle, the lower at each side. It is played upon by striking the notes with two sticks.

In the Massasi district ironstone abounds, and is utilised by the natives. They smelt this mineral in furnaces dug out of old ant-hills, and then forge hoes and axe-heads from the iron thus obtained. One of the chief employments of the people of Makua is the smelting and working of iron, the ore of which is procured from the hills of Chiga. The manner of working is very similar to that practised by the Ajawa or Yao tribe. The charcoal furnace is blown to a white heat by four separate blowers worked by hand, consisting of skins of a small deer, into each of which is bound a retort made of clay, the mouth leading into the fire. The anvil is a slab of granite; the hammer a heavy cube of stone, slung with fibre cord let into grooves at its sides. Hoes, knives, and axes are thus made at very cheap rates.

Every woman in Chole, south of Zanzibar, appears to be engaged in plaiting grass mats, which are largely exported. In this district, near each village, bark hives are fixed on cross branches about 6 ft. from the ground, bees being very numerous, and the wax of good quality, is brought to Samanga for barter. The Rufizi delta furnishes an almost inexhaustible supply of mangrove wood, which is shipped to the Red Sea and Arabia as "Zanzibar rafters." In the forests and jungles of this region the rubber vine (*Landolphia*) is plentiful, and the product is collected. The produce of the Mozambique coast consists chiefly of oil-seeds (*amendoim* and *gergelim*), rubber, ivory, copper, and wax. Rubber vines compose much of the forest in Massasi; the trees are gashed, as the escaping fluid soon assumes a pasty consistence, and is then rolled into orange-like balls for sale. Somaliland exports myrrh and incense; the forests of Usambara afford "ebony," copal, "teak," acacia, rubber, orchella, betel-pepper, prickly smilax, and other useful plants. The bagamoyo coast exports copal, grain, semsem, ivory, wax and rubber. On Lake Ugombo the hard reed-grass called *miombo*, when beaten, rubbed and twisted, makes splendid rope, while another reed termed *mdete* affords excellent material for sun-blinds. The finest timber tree met with in Gaza is a species of *gardenia*, known as *umshanatse* or *mapani*, furnishing planks 2 ft. wide and 40 ft. long. In Usambara gates to towns are made from the wood of a species of *Acacia*, called *mkongolo*, black within and white without, which is so hard as to almost withstand the attacks of white ants. The *mbunga* vine (*Landolphia*) is known from Pangani to Handei, and the copal tree (*shakasi*) is abudant in the woods adjoining the inner side of the wilderness of Usambara.—*Journal of the Society of Arts.*

101

TOBACCO GROWING IN DELI.

The *United States Tobacco Journal* published lately a report by the German Consul at Singapore on the cultivataion of tobacco in the Island of Sumatra. This report gave first a detailed account of all the localities in Sumatra suitable for tobacco raising; it then described minutely and graphically the process of planting, &c., and lastly, it gave a pretty close calculation of the cost of production. To buy a plantation of a hundred fields, says the report, and to put it in a perfect state ready for cultivation, inclusive of the erection of sheds and houses for the men and tobacco, cost about from $25,000 to $30,000. The raising of the tobacco is done by coolies, who receive from $2 to $8 for every thousand plants, the price depending on the quality and yield of the crop; while every plant is permitted to bear only twelve to twenty leaves. We will take an average of fifteen leaves to the plant, that will give 15,000 leaves to a thousand plants. Let us average a hundred leaves to the pound, of fine grade of Sumatra, and we shall get 5½ cents (of dollars) as the price of labour represented in one pound of Sumatra-grown tobacco. A plantation of a hundred fields, representing an investment of a capital of, say $30,000, will yield on an average 225,000 pounds per crop; the interest of the capital at six per cent. amounting to $1,800, will add another ¾ of a cent. The freight-charge from the eastern coast of Sumatra to Amsterdam has just been put down to $1·31, per bale by the Nord-deutscher Lloyd, consequently the entire gross outlay to raise a pound and ship it to Amsterdam amounts to about c.7½. Considering the depressed state of the tobacco leaf market of the United States, the *Tobacco Journal* refers its countrymen to this mine of wealth, open to American enterprise, and is surprised that the Americans generally having the reputation for smartness, should have allowed the Germans and other nations to get the start of them. Likely they (the Americans) are deluded by the belief that none but Netherlanders are permitted to acquire land in Sumatra. On this point we dare say that a considerable part of the tobacco growing in Deli, by which name a large part of the eastern coast of Sumatra is called, is in the hands of foreigners, notably Germans and Swiss. Among the planters of Deli proper every European nation is represented. We should have omitted this remark had it not been that in the report by the German Consul at Singapore the contrary is intimated. A report compiled by this official is certainly very inaccurate in several particulars, and no wonder that the United States Journal thinks its countrymen somewhat behind the times if such were the case.

A tobacco plantation is not a pear garden, purchased in spring to sell the fruits in autumn, however, and we need not explain how much labour and capital are required before the grounds are ready for cultivation, and ready to yield the first leaf of tobacco. But besides this, we do not understand where the Consul got his statements. He first calculates that a plantation of a hundred fields will yield on an average of 225,000 pounds of tobacco, 2,250 pounds, or 18 piculs per field; it is generally known that an average of 7 piculs per field is very satisfactory, and one of 8 piculs may be considered as very successful indeed. There are really fields yielding exceptionally 10 or 12 piculs, but, on the other hand, there are a great number of fields yielding only 3 to 5 piculs. The freight-charge calculations to raise a pound of Sumatra and ship it to Amsterdam is so ridiculous that we shall say no more on the subject. It may be sufficient to state that the following expenses are omitted, viz.:—Salary of managers, clerks, mandors, &c., in India, and in the Netherlands for directors, administration, outlay of capital on buildings and materials, carriage, freights on board, charges for unloading and storage, &c. It comes to the amount of c. 18¾ (Netherlands currency) per pound. In order to warn our American friends we add hereunto that with a single exception a pound of Sumatra

tobacco, generally bought at the Amsterdam market, costs the producer f.0.80. to f.0.90, which amount on a produce of only 4 to 5 piculs per field certainly far exceeds f.1.

In conclusion, we refer to the *United States Tobacco Journal's* assertion that Americans are not acquainted with the fact that foreigners also are permitted to acquire land in Sumatra. If we have to consider this as the opinion of tobacco-men, we think it rather naïve for smart men like the Americans, which proves at the same time that the information of American Consular officers is not always reliable. However, American people ought to know as well as we do that not every part of the east coast of Sumatra yields results like these on which the first-comers could pride themselves, and that, as Mr. G. Harkema observes in *de Indische Mercuur* of Jan. 1, the results have often proved to be very deplorable.

On this subject Mr. J. F. Cremer, member of the Second Chamber of the States-General, late Chief Manager of the Deli Company, states:—We can indeed reckon, on an average, on fifteen leaves per plant, but not that of *such leaves* as that every hundred make a pound; such is, indeed, the case with the best leaves of Sumatra tobacco, but not with an average number of leaves of the crop. For the lower leaves of a plant, especially when gathered in a rainy season, contain a good deal of broken and spotted or decayed leaf that weighs much less. On an average we may reckon that 1,800 plants furnish 1 picul, or 125 Amsterdam pounds. For this from $2 to $8 per 1,000 plants is paid; but as $2 to $4 is the exception the real average is $6 per 1,000 plants, or $10·80, so fully 8 and not 5¾ cents per pound. The freight per German Lloyd is f.55 per last of 800 K.G., or 10 bales; so not $1·31, per bale, but, reckoning the dollar at f.2·50, $2·20. Therefore if these data of the Consul are incorrect, the great fault of his computation is this, that he calculates the percentage of the capital required for the outlay of a concern at 6 per cent. per year, to pay the costs of European and Chinese supervision, of drying-sheds which require complete renewing every two years, of houses for medical attendance, of losses (absconding or deaths of labourers), of jungle clearing and making of roads and drains, of horses and carts, and the necessary drivers, of Java and Kling auxiliary workmen for the sorting and packing of the tobacco, with other needed arrangements. The Deli Company yields crops from 3¾ to 4 million pounds. The produce was lately fully f.1.60 per Amsterdam pound. If this cost 7½ dollar cents, or f.0.1875 at Amsterdam (plus 10 per cent. for tandil wages), then the gain per pound would be f.1.4,125 or 5¼ to 5½ million guilders. The dividends would then be fully 250 per cent. If the Germans and Americans are to set about colonising on such data as supplied by the Consul at Singapore, they will meet with sad disappointments.

"I can further inform you," continues Mr. Cremer "that from a statement of eleven nominally working concerns in Deli and Langkat in 1886 I perceive that they required on an average 2,000 plants per picul, which cost on an average $6.10 per 1,000, without the wages of the tandil or Chinese superintendent; with these wages the picul yielded about $13.45, or per half kilogram 10¾ dollar cents. In 1886, on account of copious rain, the crop was rather light; in more favourable years the above calculation will hold." We may add that we were officially informed by the manager of the Deli Company that in the preceding year the product of one of their estates realised f.1.60 per pound on the Amsterdam market, while the costs of production had amounted to f.2.25 per pound; a loss, therefore, of f.0.65 per pound. And yet the sale of that product had been effected under very favourable circumstances. An additional proof that not all concerns in Sumatra are remunerative. To conclude, we wonder at the startling fact that the Americans, whose Government is constantly supplied with the best and most reliable reports on everything concerning tobacco culture in Deli from their own Consul in Holland, Mr. Eckstein, should have allowed themselves to be led astray by the report of the German Consul at Singapore. In one of the reports of Mr Eckstein we read, among other things, that the costs of production on a kilo. of Deli tobacco on the Dutch market can be regarded as 70c. or 80c. per kilogram.—*London and China Express.*

ROYAL GARDENS, KEW.

Bulletin of Miscellaneous Information—Fibre Plants.—It is proposed in the following notes to deal briefly with fibres derived from tropical endogenous or monocotyledonous plants which yield what are known in commerce as Sisal Hemp, Manila Hemp, Bowstring Hemp, and Mauritius Hemp. These are used chiefly for rope making and cordage, and are to be distinguished from flax, cotton, and other fibres used purely for textile purposes.

The large and increasing interests taken in fibre plants and the numerous references made to this establishment on the subject render it very desirable to place within reach of cultivators in India and the Colonies a summary of information on the subject.

The Hemps above enumerated are derived as follows:—

i. Sisal Hemp,
Agave rigida, MILL.
(A. Ixtli, *Karw.*
A. elongata, *Jacobi.*
A. Sisalana, *Perrine.*)
ii. Mauritius Hemp,
Furcræa gigantea, VENT.
iii. Manila Hemp,
Musa textilis, NEES.*
iv. Bowstring Hemp,
Sansevieria zeylanica WILLD.*

The fibres of endogenous plants, the chief of which are enumerated above, are generally white if cleaned without fermentation, but are easily discoloured and also weakened by the decomposition of the mucilaginous and saccharine matter associated with them. Hence it is important that they should be cleaned either by mechanical or chemical processes as soon as possible after they are harvested. The resulting fibre if of good quality, is white, bright, and glossy, and the individual filaments are straight and free.

Although grouped together here for convenience of treatment, the plants yielding these hemps require severally very different treatment under cultivation, and it is important to bear in mind that they will prove objects for remunerative culture only under certain special circumstances.

For instance, the Agave plants yielding Sisal Hemp flourish in the dry districts of Yucatan, they require little cultural attention, and the fibre is cleaned by means of cheap native labour, which is probably attainable in few British Colonies.

Manila Hemp is produced entirely in the Phillippine Islands from a species of wild banana or plantain (*Musa textilis*). It requires rich moist forest land, and while in its native country it is found to be easily cultivated; it has been only moderately successful under cultivation elsewhere. Here again the industry is supported by an abundant and cheap labour supply, which enables the fibre to be cleaned by hand at a cheap rate.

Bowstring Hemp is scarcely an article of commerce at present, although locally it is used for many purposes, as in Ceylon, India, and the East and West Coasts of Africa, where species of Sansevieria are found.

Mauritius Hemp is obtained from *Furcræa gigantea*, known in the island as *Aloës vert*, but elsewhere as the green or fœtid aloe. It is a large unarmed species, native of tropical America, but found in both the East and West Indies and also at St. Helena. At Mauritius it has established itself spontaneously on abandoned sugar estates. It is easy of cultivation, and partakes much of the character and habit of the plants yielding Sisal Hemp. Machinery has been used for preparing Mauritius Hemp, and while good prices ruled the industry was fairly remunerative.

* These will be discussed in Bulletin No. 4 for April.

V.—SISAL HEMP.

Under this term are included fibres derived from probably more than one species of Agave, and it is probable also that one species of Furcræa is used. According to the locality where the industry is carried on or the port of shipment the fibre produced in Yucatan is called Sisal Hemp, which is the recognised name in the English market; or Jenequen or Henequen Hemp, which would appear to be the term more commonly used in the United States. Pita is another Central American fibre but whether the produce of an Agave (*A. americana*) or of a Bromeliad (*karatas Plumieri*) is not quite clear. Probably it is loosely applied to both.*

As regards the species of Agave yielding Sisal Hemp Miller first described *A. rigida* (Dict. Ed. 8, 1768) in the following words:—Long, narrow, stiff leaves, "entire, and terminated by a stiff black spine. These "leaves are seldom more than two feet long, little "more than an inch broad, being of a glaucous colour. "The side leaves stand almost horizontally but the "centre leaves are folded over each other and "enclose the flower-bud."

This may be accepted in a large sense as the representative species of which there are several subspecies and varieties cultivated by the natives of Yucatan from time immemorial.

According to Dr. Engelmann (Trans. Acad. Science. St. Louis, Vol. III., Dec. 1875) a common native species in Yucatan called Chelem by the aboriginal inhabitants is identical with *Agave rigida* of Miller; but a number of varieties, characterised by longer leaves or the absence of spines, have been recognised, to which names more or less distinct are now applied.

Mr. Baker has given a Synopsis of the Genus, Agave in the *Gardeners' Chronicle* (Vols. VII and VIII, New Series, 1877). The plants mentioned below are included under the Group *Rigidae*, having the edge of the thin horny leaf without any distinct border, and the teeth (when present) small but distinct and deltoid. He remarks that this is a considerable group of which *A. lurida* and *A. rigida* may be regarded as the types intermediate between the groups *Americanae* and *Aloideae*.

From a study of plants at Kew, Mr. Baker was inclined to look upon *A. Ixtli*, Karw., as the type and *A. rigida*, Mill., *A. elongata*, Jacobi, and *A. Sisalana*, Perrine, as synonyms or varieties. But as in the first place *A. rigida*, Mill., has the priority in point of time, and (if we follow Dr. Engelmann) also represents the old aboriginal fibre plant of Yucatan (the Chelem), it would be better to retain this as the aggregate species and place the others among the varieties which have arisen in course of long cultivation in different parts of the peninsula of Yucatan.

We have then.

A. RIGIDA, *Mill.*

var. 1. *A. Ixtli*, Karw.; *A. ixtlioides*, H. K. leaves 1½—2 ft. long, teeth distant.
2. *A. elongata*, Jacobi: leaves 4—5 ft, glaucescent and toothed.
3. *A. Sisalana*, Perrine; leaves 4—6 ft. long, pale green not glaucous, generally without teeth.

Dr Engelmann in his notes cited above mentions that the original plants of *A. rigida*, was, according to Miller, brought from Vera Cruz, but his own specimens were collected in Yucatan by Dr. Schott. He states that Dr. Perrine, and Dr. Schott independently studied and described in Yucatan this interesting plant, with its different forms and economic uses (Senate Doc. 300, Washington, March 12th, 1838; the latter in the Report of the Agricultural Department at Washington for 1869. According to Dr. Engelmann, "both agree that there is a common native species in "Yucatan, called *Chelem* by the aboriginal inhabitants; "but from time immemorial a number of varieties, "all characterised by much longer leaves, and one also "by the absence of marginal spines, and differing "among themselves in the quantity and quality of "their fibre, have been cultivated by the natives of "Yucatan, and are a staple product of that country "to this day, furnishing the well known Sisal Hemp. "the people know them as *Jenequen* (Schott) or *Hene-*"*quen* (Perrine), and distinguish, as Dr. Schott reports, "the *Yaxci* (Yashki) as furnishing the best quality, "and the *Sacci* (Sacqui) with the largest quantity of "fibre. *Chucumci*, larger than the last, produces coar-"ser fibre; *Babci* has fine fibre, but in smaller quan-"tity; *Citamci*, with small narrow leaves and poor "fibre, stands probably nearest to the wild plant. "Dr. Perrine mentions another variety *Istle*, evidently "the *Ixtli* of Karwinski, as furnishing a fine fibre, "called *Pita*. These plants yield a return of leaves "when four or five years old, and may last 50 or "60 years under proper management; the flowering "scape is cut off as soon as 4 feet high, when, evidently, "axillary branches continue the growth of the plant, "which is thus kept so long alive by being prevented "from flowering.

"The trunk of the wild plant of Yucatan, which "I refer with little doubt to Miller's old *A. rigida*, "is 1—2 feet high; leaves 1½—2 feet long, and as "many inches wide, contracted above the broader base "and widest about the middle; lateral teeth ¾ or "even 1 inch apart, mostly straight, from a broad "base 1—2 lines long, rather unequal, with smaller "ones interspersed, dark brown; terminal spine 1 inch "long, 1¾ lines in diameter, straight, or often some-"what twisted, terete, scooped out at base but not "channelled, dark red-brown, a dark corneous margin "extending down the leaf-edge for several inches and "bearing the uppermost teeth. Scape 12—15 feet "high; flowers pale yellowish green, 2¼—2½ inches "long, perigone 16, tubes 6—7, lobes 9—10 lines long; "stamens inserted about the middle of the tube, 'blood-"red upwards,' 1-inch longer than the perigone; an-"thers 10—10½ lines long; styles at last as long as "stamens.

"*A. Ixtli*, which in 1872 flowered in the gardens "of the late M. Thuret at Antibes, is entirely similar, "flowers of the same dimensions, anthers a little "larger (11½ lines long); capsules, which grow with "the bulbs on the same panicle, oval, over 2 inches "long, 1¼ wide, very short stipitate; seeds uncommonly "large, 4½ lines high, with a ventral hilum (in many "other Agaves I find the hilum of more basal, "a character which may be of some value). I believe "this is the first time that the flowers of the Ixtli "have been described;* they identify the plant with "the old *A. rigida*, or at least the above described "Chelem. *A. Karwinskii*, Zucc., is probably the same "thing.

"With the name of *longifolia* I designate the "variety known as *Sacci* (Sacqui) and extensively "cultivated in Yucatan; it is principally distinguished "by its much longer spiny leaves, 4—5½ feet long, "3—4½ inches wide; flowers very similar to those of "the wild plant, but filaments greenish. *A. four-*"*croyoides*. Jacobi, Agav. p. 107, probably belongs here, "and *A. elongata*, Jacobi, p. 108, I would also refer "to this form if the description did not expressly "mention a channelled terminal spine.

"*Agave Sisalana* is the name that Dr. Perrine gave "to the plant known to the natives of Yucatan as "*Yaxci*, the most valuable of the fibre-producing Agaves, "which was introduced by him into South Florida "some thirty-five or forty years ago, during his efforts "to acclimatize commercially valuable tropical plants "in that almost tropical portion of our territory, "efforts which were aided by Congress by a large "grant of land, but which were destroyed together

* According to Miller Pita fibre is derived from *Furcræa gigantea* which would make it identical with Mauritius Hemp. Dr. Perrine on the other hand mentions *Agave Ixtli* "as furnishing a fine fibre called Pita."

* This remark made by Dr. Engelmann in 1872 is, however, not quite correct. The *ixtlioides* form (*Agave Ixtli*) were fully described and figured by Sir J. D. Hooker from a plant which flowered at Kew in 1871, (Bot. Mag. t. 5993.)

"with his own life, during the subsequent Indian wars. "With this Agave, however, he has been successful, "as it is now fully natuaralized, and is quite abundant "at Key West and the adjacent coast. Dr. Parry "found it there in full bloom in February 1871, and "gives the following description of it:—Trunk short; "leaves pale green but not glaucous, 4—6 feet long "and 4—6 inches wide, generally smooth-edged, but "here and there bearing a few unequal, sometimes "very stout and sharp teeth; terminal spine stout, "often twisted, purplish-black; scape 20 or 25 feet "high, panicle 8 feet long and half as wide. One of "the largest plants examined had 35 branches in the "paniele, the largest (near the middle) 2 feet long, "upper and lower ones shorter. The flowers are "slightly larger than those described, with a shorter, "thicker ovary, stamens inserted a little higher up in "the tube. The plants bore no fruit, but produced "an abundance of buds, by which they propagate "themselves and from which this interesting form has "been multiplied in this country and in Europe.

"If this plant is, as is most probable, only a cultivated variety of *A. rigida*, it is of the greatest "importance for the study and the understanding of "the Agaves, indicating, as it does, the extent of "variation which they may undergo. It shows that "the size of leaf and scape, or colour of leaf, are of "no great specific value, and also that the presence "or absence of spiny teeth on the margin is not an "unalterable character, not any more than the cartilaginous margin decurrent from the terminal spine. "The presence of a trunk, the proportions of the "leaf (in *A. rigida* and all its varieties the length "equals 12—14 times the width), probably the form "of the terminal spine, the character of the inflorescence, and, above all, the form and proportions "of the flower and its parts, remain constant, and "perhaps also the proliferous character of the inflorescence of some species."

In a Report on fibre plants prepared by the late Director of the Botanical Department, Jamaica, in 1884, it is mentioned that with regard to the value of *Agave rigida* and its allied forms as the sources of the Sisal hemp of commerce, there are two important points deserving attention. The first is the universal increasing demand which exists in all countries for this fibre, and the, second is the drought enduring character of the plant and the simple and economical treatment which it requires at the hands of the cultivator.

The fibre of these Agaves under their own name or as Sisal hemp and Henequen is quoted at the present time at 38*l.* per ton, which is a little over 4*d.* per pound.

In Yucatan the Agaves are planted about 9 feet between the plants each way, with intervals of 15 or 18 feet at certain distances for carting out the leaves and young shoots. In regularly planted areas there should be 400 plants to the acre. Plants put out as suckers about 1½ to 2 feet high commence to yield in the fourth or fifth year and they "continue to do so for fifty or sixty years and even longer."

As an example of what the probable returns may be from a Sisal hemp plantation, it is stated by Dr. Perrine that each plant at four or five years old yields on an average 25 leaves per annum, the aggregate weight of which is one "arroba" or 25 pounds. Out of this weight of green leaves there is obtained by hand scraping one pound of clean marketable fibre, which at 38*l.* per ton is worth a little over fourpence per pound.

The annual gross return per acre may therefore be set down at 400 pounds of fibre, which at 4*d.* a pound, gives a gross yield of 6*l.* 13*s.* 4*d.* The actual cost of producing and preparing the fibre would vary according to the circumstances of the locality; but where ordinary facilities exist for the transit and preparation of the leaves, and especially with the aid of simple and effective machinery, the cost should not exceed one penny per pound. Hence the net returns may be set down at about 5*l.* per acre per annum.

The export of Sisal hemp exceeds that of any other article of Mexican growth. The export value of fibres from Yucatan in 1883 reached the large sum of 658,000*l.*

Dr. Schott. in the report of the Department of Agriculture, United States of America for 1869, remarks that "while other products of Yucatan agriculture may occasionally have become unprofitable "either in consequence of adverse climatic features "to which the peninsula is subject, or through commercial fluctuations, the Sisal hemp has never been "subject to such drawbacks, a fact attributable to the "universal usefulness of its fibre and the unconquerable vitality of the plant, which easily survives the "effects inherent to the nature of a riverless rocky "desert, and the severe trials of a six months' "tropical sun. For a knowledge of the Sisal hemp "plant," continues Dr. Schott, "its culture and uses, "Yucatan is indebted to the Maya Indians, the "direct descendants of those remnants of the Toltecs "who, after the fall of their empire in the valley "of Mexico, emigrated to Central America and "Yucatan.

An account of the Sisal hemp industry in Yucatan has lately been published by the Government of Jamaica. This was furnished by Mr. Stoddard, who for a time was practically engaged in the industry. It contains information on some points not hitherto available. According to this writer the plant known locally as Sacqui (probably according to Engelmann, the variety *longifolia*) is most generally cultivated. This is said to yield the largest quantity of fibre, which is characterised by flexibility, whiteness, strength, and weight. It has been already mentioned that Dr. Schott selected the *Yucci* as furnishing the best quality, and the Sacci (Saequi the largest quantity of fibre. It is, however, generally agreed that the bulk of the fibre exported from Yucatan, and called from the former port of shipment Sisal hemp, is the produce of the Saequi. The chief port of shipment now is Pregresso.

The land which supports the fibre industry in Yucatan is of a gravelly, stony, and in some places of a rocky character. The plants thrive best and yield the largest amount of fibre in comparatively arid districts, only a few feet above the level of the sea. Moist land or rich land is considered unsuitable, for although the plants would grow in the latter, the quantity of fibre yielded would be comparatively small. For convenience of carriage and general management level land is preferred.

Plantations are established by simly clearing the land of trees and scrub. Stumps are uprooted to give an even surface. Shade is a disadvantage. Plants are generally put out during the rainy season, at 12 feet by 6 feet (equal to 605 to the acre) in holes proportional to their sixe. All fibrous roots and lower leaves are removed before planting, to facilitate new growth. It is estimated to cost "four shillings and six pence per acre to line, dig holes, drop suckers, and plant." A well established plantation has an extensive system of roads all converging on the works, which latter are placed in as central position as possible.

After planting, the chief cultural operations are confined to keeping the fields clear of weeds, and removing suckers which grow around the parent plants. These latter are utilised to extend cultivation by being planted in nurseries, or are thrown away. Their removal is considered necessary to the success of the plantation.

A fibre plantation started with plants about 1½ feet high, begins to yield in about three years after planting. Any appearance of the "pole," or flowering spike, is watched, and when 3 or 4 feet high it is cut out. Otherwise the usefulness of the plants for fibre purposes would cease.

The length of leaves cut for fibre should not be less than 3 feet; their ripeness is judged by the colour and by their position in the rosette. Consequently the outer leaves are always cut first, being the oldest. The harvesting of the leaves, which goes on all the year after once started, is effected in the following manner:—Men armed with suitable knives select ripe leaves, cut them close to the trunk, remove prickles from the edge, and point and make them up into

bundles of 50 each. Thirty such bundles is a day's task. These bundles are put out on the edge of the cart road, and are taken up by drays, carrying 1,500 leaves to a load, to the works. Cutters, carters, and machinists are paid so much per 1,000 leaves.

The works are placed near a regular supply of water. The power of the engine and the number of machines required all depend on the size of the plantation. One fibre machine is stated to be required for every hundred acres of plants.

After the fibre has passed through the machine it is placed on a drying stand fully exposed to the sun and thoroughly dried. If it is desired to bleach the fibre to a high degree of whiteness it is left out all night and during the next day and carefully turned. The fibre is made up into bales by means of a screw or hydraulic press; care being taken to keep the fibre straight and prevent "fringes."

Each plant when matured yields 30 to 35 leaves per annum, and the return of hemp is at the rate of 1,000 to 1,200 pounds per acre, or about half a ton per acre per annum. The net return on a fibre plantation in Yucatan is estimated at between 4*l.* or 5*l.* per acre.

Plants received at Kew from Yucatan marked "Sisal Hemp" are now growing in the Succulent House No. 5, and lately an experiment was made to test the quality of the fibre yielded by them.

The fibre was extracted by Mr. W. E. Death's fibre machine, and the following report was received upon it from Messrs. Ide and Christie, fibre brokers, of Mark Lane:—

"We are in receipt of the parcel containing a leaf "of *Agave Ixtli* and sample of hemp made from "leaves grown in the gardens. These are most interesting to us, and we have much pleasure in reporting "favourably on the hemp. The quality and strength "are very satisfactory, while in respect of colour, "lustre, and fineness of fibre, your sample is superior "to the average Sisal hemp that comes to this country. "The value of this article is exceptionally high at "present, 27*l.* per ton in London. You will see from "the statistics given in enclosed circular that this "material is an important one and is extensively used "both in England and America. It enters into com-"petition with Manila hemp and was regarded as an "adulterant of the latter in rope; but as its price "is now nearly as high as that of Manila the rope-"makers have not the same inducements to mix the "hemps."

VI.—MAURITIUS HEMP.

A hemp industry was started at Mauritius to utilise the large number of plants of *Furcræa gigantea* Vent., which had spontaneously established themselves on low lying lands near the sea coast. This is one of the oldest and best known species of *Furcræa*, and is now universally spread throughout tropical America and also in India, Ceylon, Mauritius, and St. Helena. The trunk below the rosette of leaves reaches a height of 2 to 4 feet. The leaves are 4 to 7 feet long, 4 to 6 inches broad at the middle, unarmed, bright green and channelled down the face. The scape or terminal flowering stem reaches a height of 20 to 30 feet. Like all the other Furcræas this species produces copious oblong bulbillæ in place of or in addition to flowers, which falling take root and reproduce the plant. It has often flowered under cultivation in England; the last time at Kew being the autumn of 1874.

A full account, with description, of the various species of Furcræa is given by Mr. J. G. Baker in *Gardeners' Chronicle* (1879, pp. 623, 624). *Furcræa gigantea* is figured in the Botanical Magazine, t. 2250: Wight Ic., tab. 2025: Decandolle, Plantes Grasses t. 126.

Although *Furcræa gigantea*, known locally as *Aloës vert*, is the chief fibre plant in Mauritius, there is evidence that *Furcræa cubensis* is also found there as well, as species of Agaves such as *A. americana* and others.

Bojer (Hortus Mauritianus, p. 353) mentions the *Aloës vert* (*Fourcraea gigantea*) as common in 1837, and states Croit sur la Montagne Langue dans les endroits vides et les basilages des habitations dans tous les quartiers d'île." He does not mention *Furcræa cubensis* at all, so the latter must be a later production. Plants of both species have been received at Kew from the Mauritius Botanic Gardens.

Furcræa gigantea is supposed to have been introduced from South America to Mauritius about 1790. It has evidently found a congenial home there for without any effort on the part of man it has covered waste lands and abandoned sugar estates to such an extent as to lay the foundation of a considerable fibre industry. The leaves are often 8 feet in length and from 6 to 7 inches in breadth. The pulp of the leaves when crushed gives off a strong pungent odour, and hence this species is sometimes called the *foetid aloe*. The juice is strongly corrosive and soon acts upon wrought iron; it is said to produce less effect on cast iron, while it is practically inoperative on brass and copper.

The plant grows in all soils and up to an elevation of 1,800 feet about the level of the sea. It has, however, more generally disseminated itself on the lowlands near the coast, and on a few of the abandoned sugar estates that have become too dry for cane cultivation.

A fibre industry was started at Mauritius about 12 years ago when the wet or retting system was tried. The cut leaves were first passed through the rollers of a sugar mill and steeped in water for some days. The fibre was then washed and beaten out by hand in running water. This process was soon found unsuitable as the fibre was discoloured and rendered weak; consequently it obtained comparatively low prices. Attention was then directed to extraction by means of *grattense* or scotching machines. Many machines have since been tried, and it is believed that the purely mechanical difficulties connected with cleaning the fibre have been for the most part overcome. The amount of fibre obtained from leaves of the *Aloës vert* was at the rate of 3 per cent. by weight of green leaves. The yield of fibre was at the rate of about 1½ tons per acre. A set of six machines driven by a steam engine of 8-horse power (nominal) cleaned 1,155 pounds of fibre per day, which is at the rate of 197 pounds for each machine per day.

At one time there were eight fibre or hemp companies formed with a total capital of Rl,182,500. The total quantity of fibre exported in 1872 was 214 tons, of the value of 4,934*l.*, which would be at the rate of 21*l.* 13*s.* per ton. In 1880 it had increased to 662 tons, which sold in England at 28*l.* to 32*l.* per ton. Some samples in 1882 sold as high as 38*l.* per ton. Since that time low prices have ruled, and this added to the fact that the cost of production was considerably increased tended to discourage the industry. It is evident the industry was first started to work off the leaves of self-grown plants which were ready at hand in great abundance. When these leaves were exhausted it remained either to wait until the plants were regrown or to procure supplies of leaves at increased cost from the surrounding country. This latter course being adopted at a time when the market value of fibre was low rendered the enterprise unremunerative. In the returns of 1885 we find that Mauritius hemp imported to this country amounted to 255 tons of the value of 39*l.* per ton. In Messrs. Ide and Christie's monthly circular, Dec. 1886, Mauritius hemp is quoted "in good demand" at 28*l.* per ton.

The following extracts taken from Mr. Horne's Report on the Agricultural Resources of Mauritius will sufficiently explain the circumstances under which the fibre industry was started and the causes which have operated to produce the present depression, which in the interest of the island it is hoped will be only of a temporary character:—

"The industry of extracting fibres from the leaves "of the *aloës vert* is by no means exhausted. There "is ground for believing that it has yet a future in "Mauritius. The fall in the price of this fibre in "the European markets broke several local companies "that were formed for the working of the aloe

"estate. There was far too much money invested "in them for them to pay."

* * * * *

"On many of the estates self-sown plants abounded "in great numbers. It was from the leaves of these "that the companies made money and paid large "dividends when the price of the fibre was good. "The plants had grown naturally on the land, and "their presence on it had not cost a cent. In such "cases results materially differ from those of reaping "the crops of regularly laid out plantations with low "prices for the produce. The soil and climate of the "localities referred to favour the growth of the "plants in such a degree that little expense need be "incurred in introducing it to new grounds. The "plant produces plantlets in great abundance in this "colony. These plantlets grow viviparously on the "parent plant, and adhere to it till they have developed "into almost perfectly formed plants. When the "young plantlets drop from their parent they are "perfectly fitted to stand by themselves, Excepting "the want of roots they are perfect. The roots are "emitted as soon as the plantlets come in contact "with the moist soil, even when they are lying on the "surface of the ground. It seems, therefore, that to "increase this plant rapidly and cheaply over a given "area, due advantage should be taken of its peculiarities "and the facilities which it naturally affords for "propagation and increase."

At St. Helena *Furcræa gigantea* has been for some time under cultivation as an introduced plant. Experiments on a small scale have been carried on, and samples of fibre have appeared in the English market. (Report on Resourses of the Island of St. Helena, Colonial Office, African No. 275, 1884).

Messrs. Collyer & Co. reported in 1883 on fibre from St. Helena as follows:—

"Aloe fibre (*Furcræa gigantea*) St. Helena. Good "length, full strength, rather dull colour, generally "well cleaned but with some runners untouched and "barky. Value 28*l.* to 30*l.* per ton. This sample is "very different in appearance from the *Furcræa gigantea* "of Mauritius, owing probably to differences of both "growth and treatment."

While on the subject of fibre from *Furcræa gigantea* it may not be inappropriate to say a few words as regards the merits of another species, *Furcræa cubensis*. This, as already pointed out, is possibly one of the plants under the name of *Cajun* from which some of the Yucatan fibre is obtained.

It differs from *F. gigantea* in that it has no distinct trunk, or a very short one, below the rosette of leaves. The latter are 3 to 5 ft. long, about 5 inches broad at the middle, bright green, rigid in texture, and armed with regular, hooked, brown prickles.

It is a native of tropical America and cultivated in most tropical countries. A variety of this plant—*F. cubensis*, var. *inermis*—is figured and described in Bot. Mag., t. 6543

In addition to flowers it produces bulbils on the flowering scape, from which the plant is readily increased. The plant is common in Jamaica, and it is said that there "would be no difficulty in establishing there a large area under cultivation." The fibre is white, strong, and bright looking. It yields at the rate of 2·05 to 3·15 per cent. by weight of green leaf. From experiments carried on at Jamaica under a committee appointed by Government it was found that leaves of *Furcræa cubensis* weighing 366½ pounds yielded 28 pounds of green fibre, which when perfectly dry weighed 7½ pounds. This was at the rate of 2·05 per cent. by weight of green leaf. In the report of the Committee this plant and its fibre are described as follows:—

"Silk grass (*Furcræa cubensis*). Leaves 5 to 6 feet "long, generally armed with strong prickles, but some-"times unarmed or with few prickles. Common in "Jamaica and might be largely propagated at once. "Value of fibre—(*a.*) 28*l.*, good quality, but might "be whiter; (*b.*) fairly clean, fair colour, value about "28*l.* per ton; (*c.*) superior to Sisal and worth 27*l.* "per ton. A good fibre, not quite sufficiently white "in the centre."

The above plants constitute the chief species of Agave and Furcræa yielding commerical fibres.

It may be mentioned here that many Agaves yield fibre, but the fibre may, as in the case of the Jamaica Keratto, prove unsuitable for industrial purposes. The Brokers' Report on Keratto fibre was:—"Little "strength: not an even (but a curly) fibre: towy: "value 12*l.* to 14*l.* per ton."

Plants yielding true Sisal Hemp might be obtained from Yucatan in large quantities.—D. M.

THE TEA TRADE OF CHINA FOR THE YEAR 1886.—Mr. E. B. Drew, Statistical Secretary of the Chinese Foreign Customs, makes general remarks on the foreign trade of China for 1886, in the just published "Returns of Trade," for 1886. We quote the paragraph on "Tea":—"The export of Black Tea is the greatest in quantity for at least six years, and a like remark is true as to the estimated value of it. But if we turn to the Reports from Hankow, Kiukiang, Shanghai, and Foochow, we are speedily convinced that while the quantity of the export has indeed been great, the result of the year's transactions has been extremely disastrous to the Chinese teabrokers and to the Foreigners whose capital has been engaged in them. From this statement the business done for Russia, which has much increased, should probably be excepted. It is enough to say here that probably the growers of Tea and the ocean carriers are the only ones who have been benefited by the exceptionally large operations of the year,—unless we include also the Government, which gets a revenue proportional to the amount of the export."

THE CUBEB OR WILD PEPPER.—Our Galle correspondent writes:—"I read with considerable interest the contribution in your impression of the 16th instant, from your London correspondent dealing with the subject of the cubeb vine as a product suitable for cultivation in the low districts of the island. It may perhaps be within your recollection that I wrote on this subject about eight or ten months ago, mentioning that the vine, acknowledged to be that of the cubeb, and identical in its growth and produce with the cubeb of the druggist as described by your correspondent, grew in profusion in its wild state in the jungles here, especially about Baddegama, and that the berry, which has an aromatic smell, and is exceedingly acrid to the taste, attracted the attention of more than one European visitor, from whom the Mudaliyar of the district gathered the fact that it possessed some marketable value. But beyond small parcels being collected and taken away no inducement appears to have offered for growing it systematically. Now, however, that your London correspondent has fully demonstrated the worth of a product which may be very profitably cultivated with the possession of the necessary conditions of both soil and climate favorable to its healthy growth, strong encouragement is afforded for the development of the industry, as a gentleman to whom I showed the article in question has fully made up his mind to embark in the enterprize in a tentative way. But the important question which requires to be settled is whether the kind of cubeb found in its wild state in the jungles of the low country really belongs to the acknowledged genuine variety said to be grown in Central and Western Java, although the product in several particulars corresponds exactly with the description given by your London correspondent—viz., the vine attains a height of from 18 to 20 feet, climbing round large trees, it is readily propagated by cuttings, and is so grown by natives, who utilize it for medicinal purposes: and the berry is likewise small and dark-colored when dried. Whether this is really the genuine article for which a demand exists is worth knowing. I trust the subject will recieve attention at the hands of some of your readers interested in low-country products and lead to satisfactory practical results."—Local "Times."

WESTWARD HO! [OPENINGS FOR YOUNG MEN IN AMERICA.]

[TO THE EDITOR OF THE "SPECTATOR."]

Sir,—It must be nearly thirty years since I first wrote to you over this signature, but never before except in long vacations, and from outlandish parts. Why not keep to a good rule? you may ask, at this crowded time of year. Well, the fact is I really want to say something as to this "Westward Ho!" gadfly, which seems to have bitten young England with a vengeance in these last months. I am startled, not to say alarmed, at the number of letters I get from the parents and guardians—generally professional men—of youngsters eagerly bent on cattle-ranches, horse-ranches, orange-groves in Florida, vineyards, peach and strawberry-raising, and I know not what other golden dreams of wealth quickly acquired in the open air, generally with plenty of wild sport thrown in. I suppose they write from some fancy that I know a good deal about such matters. That is not so; but I do know a very little about them, and may possibly do some good by publishing that little just now in your columns.

First, then, as to cattle and horse-raising on ranches. This is practically a closed business on any but a small scale, and as part of farm work. All the best ranche-grounds are in the hands of large and rich Companies, or millionaires, with whom no new-comer can compete. It will, no doubt, be a valuable experience for any young man to work for a year or two on a big ranche as a cow-boy; but he must be thoroughly able to trust his temper, and to rough it in many ways, or he should not try it. At the end, if prudent, he will only have been able to save a few hundred dollars. But this is not the kind of thing, so far as I see, that our youngsters at all expect or want. Orange-groves are excellent and profitable things, no doubt, and there are parts in Florida and elsewhere where there is still plenty of land fit for this purpose, though the choice spots are probably occupied. But an orange grove will not give any return till the sixth year, cautious people say the seventh.

Vineyards may, with good luck, be giving some return in the third or fourth year; but the amount of hard work which must be put into the soil in breaking up, clearing out stumps, and ploughing, even if there is no timber to fell, is very serious; and the same may be said of peach-orchards and early fruit and vegetable-rearing. Moreover, the choice places for such industry, such as Look-out Mountain, are for the most part occupied. In a word, though it is quite possible to do well in other industries, and in ordinary farming, nothing beyond a decent living can be earned, without at any rate as free an expenditure of brain and muscle as high farming requires at home. On the other hand, sport, except for rich ranche-men who can command waggons, horses, and men, and travel long distances for it, is not to be had generally and apt to disappoint where it can be had.

So much for the working side of the problem. The playing side—outside whisky-shops, which I will assume the young Englishmen means to keep clear of—ought also to be looked fairly in the face before the experiment is tried. Perhaps the most direct way to bring it home to inquirers will be to quote from the letter of a young English public-school boy who has lately finished his first year as a cowboy on the cattle-ranche of one of the big Companies:—

"Friday night we had quite a time. We went to an exhibition of the home talent of ——, and really of all shows this was the worst I ever saw. One man, the town barber, and our greatest 'society man,' played a nigger, and played it so well that one could not help fancying he has at one time been a 'profesh.' The rest were so dull and such sticks that it made him shine more than ever. After the home talent, there was a 'social hop,' at which Jerry and I shone as being the 'bored young men.' You can, of course, see why I was bored; and Jerry, he is from Ohio, and of course —— cannot compete with Ohio. However, as Jerry was somewhat of a great man, the quadrilles being all called by him—*i. e.*, he stood on the stage and shouted, 'balance all,' 'swing your partners,' 'lady's chain,' at the right time—we had to stay, and more or less to dance. Jerry took great pains to find me partners worthy of a man who had danced in a dress-coat. He did not succeed but once, when he introduced me to a very lively little school-lady, 'marm,' I should say; the rest were very wooden in movement and conversation. The school-marm amused me very much. She had not long returned from the —— University, where all the young ladies, though they met the other sex at school, were not allowed to speak to them at other times. The girls were allowed to give dances, but she and three or four others thought that a 'hen-pie' dance was too much of a fraud, so they contrived a plan by which they could get three or four dancing men in without going to the door. They fastened a pulley on to the beam where the bell hung, and with the aid of a clothes-basket and a rope they spoiled the 'hen-pie' with two or three young men. This plan worked well several times, till one night three or four of them were exerting themselves to get a very heavy boy up, when instead of a boy they perceived the bearded face of the head master. In horror they turned loose the rope and fled, leaving him twelve feet from the ground, hanging on by his fingers to the window sill, from which, as no one would respond to his call for help; he finally dropped. The young lady told it much better than I have. Jerry was very popular as a 'caller.' I noticed he understood his audience well, and whenever they got a figure they didn't know, he came in with 'grand chain,' which they all knew and performed very nicely; so you would see a whole set lost in the intricate feat of 'visiting' (say) and all muddled up, when you would hear the grand voice of Jerry, 'grand chain,' and all the dancers would smile and go to it, and Jerry was quite the boss. We, however, lost our reputation as good young men, as towards midnight we were overcome with a great thirst; so wicked I, a hardened sinner, persuaded the social barber to let me have half-a-pint of whisky; and J and I were caught in the barber's shop, eating tinned oysters with our pocket-knives, and biscuits, and indulge ing in whisky-and-water. We were caught by three young men who had 'got religion' last fall, and who were, of course, highly shocked; but I think they would have overcome all their scruples but for the stern mothers in the background, and they not only envied us our whisky-and-water, but also our mothers. Half the fight in drinking, I think, is to have been 'raised' to look upon it as an every-day luxury, and not as a thing to be had as a great treat on the sly. Well, good-bye! I have written a lot of rubbish, but beyond that am fatter than I have ever been in America."

This will probably give readers a pretty clear notion of the social life available in the West. It is, as they will see at a glance, utterly unlike anything they have been used to. If this kind of social life (and there is something to be said for it) is what they want, in the interludes of really hard manual labour and rough board and lodging, let them start by all means, and they may do very well out West. Otherwise they had better look the thing round twice or thrice before starting. In any case, no young man ought to take more ready-money with him than will just keep him from starving for about a month. If he cannot make his hands keep him by that time, he has no business, and will do no good, in the West.—I am, Sir, &c.

VACUUS VIATOR.

OYSTERS.—According to recently published statistics, the export of oysters from France during the year 1885 was no less than 600 millions, 236 millions of which were supplied from the famous Arcachon oyster parks only.—*M. Mail.*

DRUGS AND QUININE.

Mr. C. W. White, who was in Ceylon on his way round the world about six years ago, is again on a short business visit here. Mr. White is well-known as the representative of the great drug houses of Burgoyne, Burbidges, Cyriax and Farries—from whose monthly publication we often extract into our *Tropical Agriculturist* with advantage to planters of new products, the T. A. being as often honoured by references in this Firm's London "Monthly"—also of Burroughs, Wellcome & Co., whose name as manufacturing chemists and wholesale drug distributors is worldknown. Mr. White also represents the house of Messrs. Wm. Harland & Son, Varnish and Japan Manufacturers. We have been urging on Mr. White to make known to his principals in the great Drug Firms, the importance of their taking special steps to bring the cheapness of quinine before masses of people in districts and countries where a febrifuge is as great a necessity almost as daily food. We had a notable case reported in the English papers the other day, in which a country druggist was tried for putting much less quinine in a preparation than was prescribed; but the important fact came out in his evidence that the rule of his establishment (and of most other English druggists' stores) was to charge 1d per grain of quinine prescribed, irrespective of ups and downs in the wholesale London market. This was, of course, at the rate of 40s per ounce! Now, we have the fact that in the malarious Fen, Essex and Kentish-Gravesend districts, numbers of poor people have got into the habit of buying laudanum (opium-drinking) by the wine-glass to soothe and check depression and other symptoms actually due to low fever. For the same reason, thousands, if not millions, of Chinese in the malarial flats of the Middle-Kingdom, have taken to opium. The cure in both cases is plenty of cheap quinine. Archibald Colquhoun, as we have often mentioned, found a pinch of quinine the most valued gift he could make to the Mandarins away up the Canton river and "across Chryse." In the same way we found Missionaries carrying packets of quinine pills back from America for the benefit of poor Chinese about the coast settlements. Again when travelling in the Southern States of America, we had repeated evidence of the immense value attached to cheap quinine: the ex-Surgeon General of the Confederate Army assured us in Richmond that Lee's Army could have withstood Grant's invading force for another campaign at least, had he (the doctor) only had quinine or "bark" to enable him to put back from the hospitals and villages in the field thousands of ague-stricken veterans. "The utter want of bark"—the blockade being strictly enforced—"more than any thing else" said the old Doctor, "broke the power and spirit of the South." Now we suspect that neither in China nor in the Southern States of America, nor yet in the Fen districts of England have the present abundance and cheapness of quinine been realised as they ought. In respect of China, we have suggested to Mr. White that the big London firms should employ Chinese as "medicine men" to travel through the country with supplies of quinine preparations, making known where such could be obtained in their coast agencies. We were interested in learning that Messrs. Burgoyne Burbidges & Co., went to the expense some years ago of printing in Chinese a list of suitable English medicines with explanations—probably the first foreign list ever printed in Chinese—and distributed the same by thousands if not millions of copies, and it must be remembered that all printed matter is venerated by the Chinese. But this ught to be followed up we think, especially in respect of quinine, by the employment of a staff of "medicine-men" to peregrinate the provinces of the great Empire, selling at least enough to pay the expense of the experiment and above all making known where the medicine to take away the taste for "the black-smoke poison" (opium) could always be procured. We trust Mr. White will forward our suggestion and that it will be acted on by the great London drug houses. To whom else are the Cinchona planters of Ceylon, Java and India to look to, for to make known the present cheapness as well as the virtues of the invaluable febrifuge which their enterprise has lowered from 11s to 13s the wholesale price between 1877 and 1881, to 2s or 3s per ounce in 1887.

JAMBUL SEEDS.—A correspondent of one of the medical journals calls attention to the value of these seeds (the produce of Eugenia Jambolana) in chronic diabetes. In what way the seeds influence this mysterious disease is not stated.—*Gardeners' Chronicle.* [This is surely the Jambo or Rose-apple tree.—ED.]

AMERICAN-GROWN RHUBARB.—The *Nationale Druggist* states that it has received a piece of the root of *Rheum palmatum*, grown in the garden of Mr. J. W. Colcord, a pharmacist of Lynn, Mass. The seed was planted in 1884. The specimen compared favourably with the foreign drug as far as taste, smell, and general appearance were concerned. A microscopic examination showed a preponderance of starch, and less oxalate of calcium. —*Chemist & Druggist.*

CEYLON GEMS, &C.—A chatty writer on "The Fashions" in the *Overland Mail* writes thus in a late No.—I lately had the pleasure of inspecting a large and very interesting collection of precious stones, brought over from Ceylon by the well-known expert, Mr. Hayward. Here they were to be seen from their rough state just fresh from the pits to the perfect gems in their artistic settings, ready to wear. He most kindly took me into his inner room where sapphires and rubies were to be seen galore. It reminded one of some enchanted place where one might pick up literally handfuls of jewels, so plentiful were they. But first I was deeply interested in an enormous hexagon crystal, one of the finest ever seen, inside which one could distinctly detect the watery fluid. Also a wonderful mineral known as rutile, full of needle-like spines, that were quite visible on looking through it. Then a curious green smoky looking stone called jargoon. I was informed that sapphires and rubies belong to the same family of stones, and are composed of the same materials. Certainly I never could have believed that what looked like a diamond could possibly be a sapphire, nor another clearly yellow, as well as a green stone; yet such strange metamorphoses do they show, and take hundreds of various shades between these hues. One of the most beautiful novelties was the star sapphires. These curious greyish stones are in cabochon form, and polished conically. On the top, if one shades them from the light, one can instantly perceive a delicate star that moves like the light in a catseye. Of catseyes, also, Mr. Hayward had a wonderful collection, as also pearls, jaciuths, moonstones, topazes, exquisite tourmalines, with their soft-green tint, and chrysoberyls. Also an Oriental amethyst, which is truly a magic stone, for by daylight it is of the richest purple, and by candlelight a superb red. As I was leaving this very interesting collection my eye caught what I took for a very fine line engraving surrounding, as a border, a map of Ceylon. In the centre was the map, beautifully executed, and, in ornamental *encavedments*, a drawing of every animal and reptile indigenous to the island. I was told to my very great surprise that the whole thing was the handiwork of a native boy. I never saw more perfect etching nor neat drawing. [This map, we believe, is a Zoological Map of the Island—the work of one of the pupils of St. Benedict's Institute.—ED. Local "Examiner."]

PLANTING IN NETHERLANDS INDIA.

(*Translated for the "Straits Times."*)

The Chinese Commissioners recently travelling through Java, have returned to China direct. The Batavia *Nieuwsblad* reports that, among the Chinese there, rumours are afloat to the effect that the Chinese Government intends, shortly, to station consuls at all the chief towns in Java. These consuls will be charged to look after the interests of the Chinese there in every way.

It is said that plently of land highly suitable for tobacco cultivation is available in the islands round Lingga and Rhio. Where the soil does not answer, there is coal enough underground to reward the judicious investment of capital. The Sultan of Rhio is reported to be well disposed towards Europeans. Assistance on his part may be confidently counted upon.

A Java Newspaper calls attention to the fact, that, though the so called betel nuts or rather arecanuts have long been articles of trade, and have been used for a considerable time as medicine in Europe, yet betel leaves did not reach Europe until recently. The latter are derivable from the betel or sirih vine. Etherised oil from them has been found useful in catarrhal affections and as an antiseptic. Experiments made in Germany, have proved that etherised betel leaf oil is a sovereign remedy in throat diseases, diptheria &c. The importation of the leaves is attended by difficulties owing to the oily substance therein deteriorating by the action of the air.

PLANTING: COFFEE, CINCHONA AND TEA IN CEYLON.

We are now in the interval of broken, but on the whole, moderate weather, between the "little" and "big" monsoons. Already this very moist hot weather has made tea come on with such a rush in the lower districts that the flushing can scarcely be over taken. But higher up there has been dry and less forcing weather. Everything however points to a very busy tea season with full croppings from all acreage in bearing. In the Kelani Valley we hear of some wonderful returns of tea: as much as 85 lb per acre being made in one month off tea bushes 2¾ years old, while 130 acres are said to have given 10,000 lb. made tea in the same time. This is from properties owned by Messrs. W. Mackenzie and Forsythe.

Coffee also is looking up with good crop prospects and high prices; while Cinchona, reviving in price with less supplies, is likely to be of great help, and Cocoa is quite as promising in price and crop as coffee. Labour supply is the present bugbear before many of our planters, but in a number of districts, Sinhalese can be freely availed of to pluck the tea leaf and do other estate work.

QUININE.

The necessity for urging the great wholesale Drug Houses or Manufacturers of Quinine, to devise and carry out some means of bringing the fact home to the masses—especially in feverish countries and districts—of the present abundance and cheapness of quinine, is being afresh realized out here. There must be immense scope for extending the use and consumption of the most valuable of febrifuges in the Fen and low riparian or marshy districts even of England; also in the South of Europe especially in the Eastern portion, and in the Southern States of America, apart altogether from the great fields presented in Asia, Africa and Central America. It would be well if English philanthropists—more especially Anti-Opium and Temperance Societies—realized that one of the best means of fighting opium, of putting down the taste for it as well as often for intoxicating liquors is by supplying cheap quinine. In this way India (and adjacent countries) may give the cure to China for the evil (opium) which it has so freely bestowed on the Chinese.

TEA.

We omitted in our last issue to give a place to some useful figures respecting the sale of our teas in Colombo compiled by Messrs. Wilson & Co., Brokers of this city. A glance at the table we append shows that "during the past six months 14,752 packages have been offered at Public Auction locally (against 11,637 packages during the corresponding months last year) at rates which must be very satisfactory to Planters. Judging from the prices realized in London of some of the Colombo bought teas which we have been able to trace, we cannot but think that those planters who have sold their teas locally have benefited considerably in a pecuniary point of view":—

TABLE showing the Colombo monthly sales of seasons 1885-1886 and 1886-1887 with averages, also London sales and averages for the corresponding months.

	Season 1886-1887				Average price about per lb. in cents and equivalent value in London calculating exchange at 1/6 per rupee.	Season 1885-1886.				Public sales in London Season 1886-1887	Average price per lb. in London
	Offered		Sold			Offered		Sold			
	Pkgs.	lb	Pkgs.	lb.		Pkgs.	lb.	Pkgs.	lb.	Pkgs.	
					Cts. Ster.						
October...	1,635	105,445	1,625	105 445	60 1/1¼	1,596	95,228	1,132	65,237	6,408	1/2¾
November	1,682	110,391	1,670	109,801	61¼ 1/1⅛	1,070	63,207	911	55,318	8,702	1/3
December	2,549	154,918	2,342	142,794	62 1/1⅛	1,290	78,198	975	55,934	6,082	1/2¼
January .	3,481	210,219	2,873	170,726	59 1/1	2,512	160,601	2,446	152,652	9,165	1/2¼
February	2,697	168,591	2,341	148,450	56¼ 1/0½	2,351	131,998	2,159	119,729	11,325	1/1½
March ...	2,708	161,291	1,698	99,393	60 1/1½	2,718	165,119	2,511	153,199	12,200	1/0½
April.....	...	...	...	...	...	2,179	119,214	1,925	120,863	...	...
May	...	...	...	...	...	2,532	146,401	2,193	102,699	...	...
June	...	...	...	...	...	3,025	195,986	1,905	123,716	...	...
July	...	...	...	...	...	1,799	123,238	1,218	82,218	...	...
August ...	...	...	...	...	...	1,527	101,615	1,388	91,939	...	...
Sept. ...	...	...	...	...	...	1,368	88,024	1,347	85,714	...	...
Total...	14,752	910,855	12,559	776,669	59½ 1/1	21,067	1,473,829	20,110	1,209,218*	53,982	1/1¾

* The average of seasons 1885-1886 was 60 cts.= in London 1/1¼ per lb. calculating Exchange at 1/6 per rupee.

WILSON & Co., Tea Brokers.

In this connection we may mention as an instance of the progress making in tea that at last Colombo sales, tea prepared by Mr. De Soyza's Sinhalese Superintendent on Charley Valley estate, Maturatta, realized over R1 a lb. Mr. De Soyza's extensive properties will no doubt turn out an immense quantity of tea by-and-bye; but still

more, we may be sure that a large body of Sinhalese ex-coffee-cultivators in the high, as well as low country, will very soon be cultivating and preparing large quantities of tea through small gardens opened on their own account.

We have advocated the grouping of three, four or even six adjacent tea properties in Ceylon into one proprietorship and management so as to arrange for one thoroughly well-equipped Central Factory sufficing for all. We call attention to our remarks on the subject elsewhere, and trust home capitalists will take an interest in the matter, as only through Limited Companies could this great economic reform be effected.

COMPETITION IN THE SALE OF CEYLON TEA.

It would be impossible to deny that competition is the very soul of trade, and that healthy competition does perhaps more than anything else to produce success. But all experience teaches us that, when that competition passes a certain boundary line, it almost invariably produces precisely opposite effects to those we have referred to as being beneficial. A friend writing to us from England expresses the fear, lest the very numerous agencies started for the sale of Ceylon teas may tend towards exciting a competition, which, passing the limits of prudent trading, may constitute an element of some danger to the high reputation at present maintained by the produce of our island tea-gardens. He tells us that those agencies now amount to nearly twenty in number. The greater part of them are supported by influential and moneyed men, nearly all of whom have an interest in the tea estates of the island, and that so strong is the rivalry between these agencies, that, although for the present the field is undoubtedly wide enough for them all, he thinks there is reason to dread a coming time when their endeavours to out-do one another may bring about results much to be deprecated.

Certainly, if in the future, Companies formed for pushing the sale of Ceylon tea increase in number in anything like the ratio that the past twelve or eighteen months have witnessed, it will be difficult to deny our correspondent's proposition that sooner or later they will be likely to perform that cutting of one another's throats which has been proved to be the bane of so much of the speculative trading which has been so rife in England during the last half century. As yet, as we have said, the field of operation is wide enough for all; but we may be sure that for some time yet to come the adventurers with Ceylon teas must to a great extent restrict their operations within a comparatively narrow circle. It requires a very large expenditure of capital, and must probably entail a very considerable initial loss, to extend that circle so as to compensate for the overworking of the area first occupied. That area may be described as at present almost confined to London and the home counties. When the force of circumstances renders necessary the extension of trading to the more distant parts of the United Kingdom, our friend fears lest the harm that he anticipates may already have been accomplished by the high reputation of our teas being lowered by the course forced on by the keenness of the rivalry existing within what may be termed the Metropolitan sphere of occupancy.

London and the home counties, it is known to a very large extent direct and guide the tastes of the more distant provinces. Appreciation in London means appreciation throughout the Kingdom. If, from any cause whatsoever,—be it that to which our correspondent makes allusion or any other,—the reputation of Ceylon tea is made to suffer at the heart of British trade, it will be found, when that outer extension which we have named occurs, that the loss of the present standard will have inclined the extremities to view with distaste that which has lost the *imprimatur* of the "head centre."

All the gentlemen who have associated themselves together to form the many Ceylon Tea Agencies now established in London have started with the declaration, honestly enough made no doubt, to sell none but the highest classes of our island produce. So long as they adhere fully to that stated intention, the results that are deemed probable of realization, are not likely to make themselves apparent. But we know too well what competition, when carried to an excessive degree, has done in the past not to think it wise to raise a word of warning as to what it may effect in the future. Companies as well as individuals must live. Their directors must be on the *qui vive* to seize every opportunity of so extending trade that they may meet their shareholders with a satisfactory balance-sheet. To do so under the circumstances of strong competition they must put a certain amount of driving pressure on their *employees*. It is in that necessity that there exists the risk of those evil effects arising to which our correspondent draws attention. Those employees will almost be forced to buy in the cheapest market, and it may well be dreaded if, under such compulsion, the guarantee can always be assured that inferior grades of tea may not be distributed bearing the trade mark of Companies which at the beginning sold nothing but the finest and made a public reputation thereby.

Directly such a result is attained, then that boundary line that we have mentioned as existing between healthy and unhealthy competition will have been passed and the worst prognostications of our correspondent will approach realization. We always much regretted the failure to establish what might have been termed an *official* Syndicate of Ceylon Tea-growers. That failure has necessarily led to an extension of private enterprize which is, no doubt, at present doing great things for our Tea Industry; but there is the danger we have pointed out that that enterprize may extend itself beyond the bounds of prudence. It is to be hoped, therefore, that for some time to come we may hear of no further Companies being formed for the sale of Ceylon teas as a speciality. To those already established we wish every success, and we are certain that they are sufficient in number for effectual and profitable work.

CHEAP QUININE—HOW TO SELL IT!

The purest, cheapest, simplest and most invaluable medicine in the world and its growers starving owing to defective (?) machinery at present employed in its distribution.—*Merchant.*

With reference to our remarks on page 809, a merchant writes:—

"Taking quinine, say Howard's, at 2s 8d per oz., surely it would pay to make up small phials—sealed with Howard's seal—and stitch them in cards to be sold at all Railway Book stalls and elsewhere under the veteran Bookseller's (W. H. Smith's) world-known name to prove the genuineness of the article. A good lot could now be given for 6d and leave W. H. Smith a vast profit in a year, and that net profit he might be disposed to give to hospitals

throughout the United Kingdom in honour of the Queen's Jubilee year. This would more than anything else that I can think of help to break the necks of the members of that cruel gang (as far as quinine in feverish districts is concerned) at any rate (and *especially cruel to the poor!*)—the dispensing chemists in the regions referred to. They could not complain and if they did, who would pity them?—Or, if W. H. Smith would not care to do this, would he allow an Association of philanthropists the use of his vast machinery (his bookstalls) for distribution of *quinine*. To carry out the idea a few thousand pounds to float it would be all that would be required."

ROYAL BOTANIC GARDENS: CEYLON.

REPORT OF DR. HENRY TRIMEN, DIRECTOR, FOR THE YEAR 1886.

INTRODUCTORY.

As I have been absent from the Colony on leave since the middle of March, I am necessarily dependent for much of the contents of the following pages on the reports of the subordinate officers of my department. During my absence the general oversight of all the Gardens was entrusted to Mr. Nock, the Superintendent of Hakgala, who, I am glad to be able to report, carried out his additional duties with energy and discretion. The other members of the Establishment have all worked well and diligently, and on my return I have found the condition and progress of the Gardens all that I could wish.

As regards the *personnel* of the Department, it is with much regret that I have had to record the death, on Oct. 10, of an old and devoted native member of the staff, Don Seman De Silva Gunaratne, Muhandiram, the principal plant collector at Peradeniya for many years. His death is a serious loss, not only to the Gardens, but to me personally, for he has been my constant companion (as before of my predecessors Thwaites and Gardner) in all my botanical tours, when his intimate knowledge of the country and extensive acquaintance with its flora have been of the greatest assistance. He was a first-rate and untiring collector, and the discoverer of many novelties. I have commemorated the name of this unassuming votary of practical botany in a new species of *Sonerila* which he collected in the Pasdun Korale. The native rank of Muhandiram was conferred on him by Sir H. Robinson, in 1866.

PERADENIYA GARDENS.

RODS AND PATHS.—The principal heavy work, which has taken up the greater part of the year, has been the re-making of some of the carriage roads in the Garden. The greater part of the Main Central Drive and its branch to the Museum building, the Monument-road, and that round the large circle (in all over 1,500 yards) have been thoroughly re-made, re-metalled, and gravelled, and will now last for many years. We are fortunate in possessing in the grounds an abundant deposit of rolled flint pebbles, which form excellent road ballast when broken; I regret, however, to notice that the beds of gravel which have supplied the wants of the Garden for over sixty years are now beginning to give out.

With the object of improving the appearance of the entrance I planted, a few years ago, a row of Saman trees on the opposite side of the high road where the race-course runs alongside it. At the request of the Race Committee I have now planted a mixed ornamental hedge along the whole length of the road where it bounds the course. This will much improve the appearance of the surroundings of the Garden entrance.

BUILDINGS.—These are, generally, in satisfactory repair, it being always my practice to attend to small dilapidations at once. The building, however, now used as the Director's Office and Museum requires some general attention, re-painting, and whitewashing, by the Public Works Department.

The new cooly lines were completed during the year, and now consist of three substantial buildings, well built and tiled, and containing twenty-six rooms. Their cost has been entirely met out of the Departmental vote, and I am very pleased to have been thus able to do away with the old lines, which were a disgrace to a Government establishment. As the lines are very close to the high road, a dwarf bamboo hedge has been planted, which will form a screen; and behind the buildings the river bank, which is here very steep, and constantly wearing away from the set of the current against it, has been strengthened and planted with riverside bamboos.

THWAITES MEMORIAL.—This little Kandyan building has been finally completed by the addition of four strong seats of "Wa" wood and the erection of a brass tablet with a memorial inscription.

CULTIVATION, NURSERIES, &C.—New and extensive nurseries have been formed, as planned out in my last year's report, in that part of the Garden abandoned in 1881 and lying fallow ever since. The ground has been deeply trenched and well manured, there is a constant supply of water, and the locality is convenient for the Garden Office and Stores. This nursery is 350ft. long by 70ft. wide, and contains 132 beds 28ft. long.

A raised bed has been made round the interior of one half of Plant Shed No. 3, for plunging pans with germinating seeds.

The Herbaceous Ground in the South Garden has been taken in hand and well manured. This is very exposed, and it is found that only a limited class of plants will grow in it; a large additional number of species have, however, been planted during the year, and the condition of the beds is improving.

In the Orchid House a great number of species have flowered during the year. Mr. Clark has effected an improvement in the cultivation of these plants, by obtaining from Horton Plains—the only locality in Ceylon—some sacks-full of *Sphagnum zeylanicum* This useful moss is, however, so rare, that it will not I fear, be possible to use it generally. I contemplate if funds will allow of it, the erection of a new and more suitable house for the cultivation of Orchids, as it is found that the present glass-roofed structure is too hot and dry for most species.

Much attention has been paid to the flower-beds and borders during the year, and a very large number of new plants have been put out. The circular bed near the Garden Office was planted at the end of the year with a collection of varieties of *Hibiscus*.

The paths of the Ferneries near the Plant Sheds have been laid with a gravel of broken white quartz, which has a clean and cheerful effect.

LABELLING.—The new teak labels are gradually taking the place of all other kinds, and prove the most durable yet tried. About 250 have been put in position during the year. I have now a man constantly employed in painting the names, and the work will be more rapidly pushed forward.

VISITORS.—The Gardens are becoming increasingly popular, but are perhaps better known to travellers from abroad than to the residents in this country. No numeration of visitors is attempted, but a book is kept at the lodge, in which those Europeans who are not known by sight to the gate-keepers are invited to enter their names. In 1886 as many as 1,090 such visitors signed in this book.

I feel sure that these beautiful grounds would be much more frequented if access from Kandy were easier. The distance (four miles) is beyond a walk for the majority of persons, and the road hot, glaring, and dusty. The railway station called Peradeniya is a mile from the Garden gate on the opposite side of the river, and awkward of access. To get thence to the Garden involves the payment of a heavy toll for horses or carriages at the Satinwood bridge, and neither the one nor the other are to be obtained at the station unless previously sent out from Kandy. Since the formation of the loop line this station has ceased to be a junction, and is no longer on the main line from Colombo to Nanu-oya, but merely a station on the Kandy branch; and I would wish to represent that the public would be better served if it were moved from its present position on the Gampola-road, where it now serves no useful purpose, to a point within a

quarter of a mile from the Garden, viz., where the line crosses the Deltota-road. Trains have already several times found it convenient to stop here on the occasions of the annual Peradeniya races and school treats in the Gardens, and I believe that if a permanent station were placed here a large local passenger traffic would result between Kandy and the Gardens. [N. B.—ED.]

WEATHER.—The rainfall was much as usual, but August appears to have been remarkably wet. Mr. Clark's record is given below:—

1886.	Rainfall.	Rainy Days.
January ...	5·10 ...	8
February ...	0·75 ...	2
March ...	3·84 ...	5
April ...	8·61 ...	13
May ...	11·24 ...	10
June ...	8·02 ..	11
July ...	11·66 ...	14
August ...	12·88 ...	17
September ...	11·63 ...	12
October ...	8·00 ...	16
November ...	7·74 ...	10
December ...	1·99 ...	9
Total ...	91·26 ...	127

The heaviest fall in any 24 hours was 5·82 in. on August 6-7.

2.—HAKGALA GARDEN.

The alterations and improvements commenced in 1882 have now been almost wholly carried out under the zealous superintendence of the Superintendent, Mr. Nock. By the gradual way in which they have been effected, scarcely any extra cost on the whole departmental vote has been involved; yet we have at length what in my Report for 1881 I set before me as the object to be attained,—an interesting and beautiful botanic garden, well stocked with the useful and ornamental plants of the sub-tropical and warm-temperate regions of the world, and possessing some facilities for their culture, propagation, and distribution. Much of course remains to be done, but it is with great satisfaction that I see the increasing utility of the Garden and the public interest taken in its welfare. The carriage drive through the Garden has been finished during the year: the whole metalled and gravelled, the embankments and verges turfed throughout, and several culverts and drains put in. This has been a heavy piece of work, and as usual labour has been lent from Peradeniya to carry it out. The additions and improvements to the Superintendent's bungalow have been finally completed, and the building is now in very good order. The long verandah has been fitted with flower-stands, and now gives considerable additional accommodation for pots, which was much needed. All the smaller buildings were re-thatched with mana-grass during the year. The new cooly lines commenced in 1885 were completed. They are much better placed than the old ones, and contain ten rooms. The old lines will now be pulled down to allow of an extension of the nurseries and kitchen garden, which are too small, and have much deteriorated in soil. The glass propagating house has been re-painted, and a coating of cement laid over the brick floor. This small house requires to be supplemented by a few brick frames or pits, so as to enable sufficient plants to be raised to keep up a succession of flowers in the house, which at present has to be itself mainly employed for propagating purposes. I purchased in London a small "Easy" lawn-mower for Hakgala; this has proved of great use, and saves much labour. Several other garden implements would be supplied if my resources were larger. The small vote for labour renders it especially desirable to employ means of rendering rapid and easy the work of the labourers. I extract for publication the following portions of a very comprehensive report of the Superintendent for the year:—[We give only a few paragraphs here.—ED.]

"No less than 45,948 cuttings of various plants have been put in the nursery beds and propagating-house 24,600 seedling plants picked out in pots and pans 5,472 plants potted or re-potted, and 426 pans of seeds sown.

"Seven hundred and twenty plants of various species of eucalyptus were planted in the patana round about the new lines. Of the plants planted on the patana above the road by the entrance gate, the junipers, *Capressus torulosa* and *Frenela rhomboidea* are doing very well indeed, but the species of pinus have nearly all died. *Cryptomeria japonica* is doing fairly well here.

"The little dwarf variegated bamboo (*Bambusa Fortunei*), which was brought by the Director from the Darjiling gardens three years ago, has now become quite established. It grows only about 4 in. high here, and forms a very pretty edging plant.

"VISITORS.—The number of visitors during the year was 1,011, April again showing the largest number (193) and July the smallest (35).

"The total rainfall for the year was 86·43 in., which fell on 211 days. The greatest fall in any 24 hours was 3·92 in., which fell from the 7th to the 8th of August."

HENARATGODA GARDEN.

This garden suffered severely from drought in the earlier part of the year, and several palms, cacao trees, and one of the cow trees (*Galactodendron*) died as well as the majority of the foliage plants and flowers in the borders; a fresh supply of all these was, however, planted up in the S. W. monsoon, and the opportunity taken for raising and manuring the beds. A new fernery was also made in a more sheltered position.

An improvement of that part of the garden near the river has been made by the formation of a new path to the mangosteen plantation through the strip of wild jungle.

The old plant-shed being in a decayed condition a new one of a more permanent character, with brick pillars, has been put up, but is not yet finished.

The various tropical plants of interest in this Garden are for the most part in a flourishing condition, and notes on several of them will, as usual, be found in the section referring to economic plants. I regret that no more of the *Lodoicea* seeds have germinated, and I fear that, as it is nearly three years since they were planted, there is now little chance of their doing so. The one which sprouted, looks vigorous, and has sent up a second leaf, standing about 6 ft. high. A considerable distribution of seeds of economic plants, such as Castilloa and Hevea rubbers, cacao and shade trees, pepper, &c., has been made during the year, but the demand for such does not increase. The Muhandiram in charge continues to give complete satisfaction. He complains of a great falling-off in the number of visitors to the Garden, and indeed there were scarcely any in 1886. This diminution is obviously due to the new train arrangements, by which only the slow trains stop at the Henaratgoda station. I would venture to suggest whether it would not be a matter of easy arrangement, that (as is the case at many small stations in England) the quick trains might stop by signal to take up or set down passengers here. The stoppage, which would not very frequently be required, could not delay the train more than two or three minutes.

ANURADHAPURA GARDEN.

The rapid growth of most plants in this Garden is remarkable, and strikingly exhibits the great capabilities of the soil for varied cultivations, given only a water-supply and ordinary attention. Though only in the fourth year of its existence, the Garden already begins to look stocked. As was expected, however, many of the economic products so freely grown in the south of Ceylon will not thrive here, and no further attempts to grow to any advantage tea, cocoa, rubbers, nutmegs, cloves, &c., need be made. On the other hand, several plants belonging to the same class appear to be fairly well suited here, such as cinnamon, breadfruit, pepper, cashew-nut, and Liberian coffee. Of the latter, there are numerous bushes cropping well, and if this cultivation prove to be permanently successful, no more useful introduction to the villages of the North-Central Province could be found. Of plants native to the drier tropical countries, many succeed here much better than at Peradeniya or Henaratgoda, such as cotton, tobacco, and numer-

ous ornamental and fruit trees and shrubs from India, N. Australia, and the West Indies.

A large collection of additional plants and seeds have been sent from Peradeniya during the year, and I am glad to be able to report that the Conductor, by the careful attention he gives to their culture, continues to merit my approbation.

Notwithstanding this success, it is disappointing to find that, at present at all events, one object of the formation of the Garden remains almost in abeyance. The natives and settlers show no inclination, and indeed are averse, to cultivating anything beside paddy. Areca and mango plants are offered at a nominal price, and jak plants free, but almost in vain. So far from seeing any advantage in possessing these additional future sources of food or income, it is but too evident that the ordinary cultivator regards them with indifference, and would consider any official recommendation to plant them as merely an additional trouble and hardship forced upon him by Government. But it may be hoped that when the tanks are more steadily full and paddy cultivation more regularly established and easier, a different temper will prevail.

The vote for this Garden is very small but, as previously, I have had this year the use of a small provincial vote also, and this has enabled the Conductor's little house to be properly finished, and lines for the coolies to be made. We have missed this year the assistance of prison labour, nearly the whole having been required for the clearing and repairing of the ancient ruins*; and in dry weather our staff of five coolies find it difficult to keep up with the necessary watering.

BADULLA GARDEN.

The piece of land acquired for an experimental garden in Badulla has been taken in hand, and a commencement toward fitting it for its intended purpose has been made. I find that some dissatisfaction with the site and surprise that it should have been selected, have been locally expressed. Certainly, had it been possible to secure a piece of jungle near the town I should have preferred it to old paddy land, but none such was available, and of the three plots of ground I had to choose from, that selected was unquestionably the best. It is at present of course quite bare; and several years must elapse before any efficient shade and shelter can be provided: but it will, I hope, prove of some utility before it presents much beauty.

Work was commenced, on February 10th, by putting up a temporary bamboo fence round the ground, and planting outside it a line of green aloes (*Furcræa gigantea*). It is intended to form a bank along the whole boundary, and plant a strong live fence of Madras thorn; and this would have been done during the year but seeds were not to be obtained.

A small bungalow has been erected for the Sinhalese conductor at the east end of the ground, where are also placed the cooly lines and a bamboo shelter for raising seedlings, &c. In front of the bungalow a flower garden of 47 beds has been made, and separated from it by a hedge of Hibiscus, a nursery of 32 beds.

By far the principal work of this first year has consisted in the formation of a carriage drive. In the making of this, which is nearly completed, we have had the advantage of prison labour, and for this and much other help my thanks are due to the Government Agent, Mr. Æ. A. King, and his Assistant, Mr. S. M. Burrows. The drive is 365 yards long, and forms a direct continuation of a new road leading by the mosque; it passes out of the Garden into the "Green-lane," This is not the course which I had planned for it, but the change was necessitated by the abandonment of a projected public road to the cemetery, which was to have formed the northern boundary of the Garden, and from an entrance gate on which I had intended the drive to make the circuit of the Garden. It is hoped that this road, or some equivalent public one, may still be made; as when the Garden gates are put up it will not be possible for the present garden drive to be constantly used as a public thoroughfare. A large collection of ornamental shrubs, palms, &c., sent from Peradeniya, have been planted out along the sides of the drive, and efforts are being made to get up a stock of economic plants and fruit-trees suitable for Uva. A commencement of sales has begun, and a small quantity of young trees, &c., supplied for planting about the town. Ordinary garden plants appear to have done very well in the new beds, and Mr. Nock tells me that the show of dahlias and chrysanthemums was really very fine. I observe that the chocho, the loquat, and *Erythroxylon Coca* are all growing vigorously. The climate of Badulla differs from that of the other Gardens under my charge, The rainfall is mainly under the influence of the north-east monsoon, and is heaviest in November and December, but rain falls more or less in all months of the year, June and July being the driest months. The mean of the years 1876-1885 was 78·62 in., falling on 91 days. The elevation of the meteorological station—a few feet higher than the Garden—is 2,225 feet above mean sea level, and the annual mean temperature 72·2.

NOTES ON ECONOMIC PLANTS AND PRODUCTS.

COFFEE.—The export of coffee from Ceylon has sunk, in the commercial year ended September 30th 1886, to the very low figure of 223,693 cwt., being over 65,000 cwt. less than in the previous one, and lower than any year since 1846. In rightly estimating this fact, however, one must not fail to take into full consideration the greatly reduced area under this crop. I do not think that there is now going on a further progressive diminution in the yield *per acre* on estates in good cultivation; in the Province of Uva especially, as I gather from the reports of planters and others, there are no signs now of increasing deterioration, and coffee-growing remains a remunerative industry. The general destruction of badly diseased coffee over many square miles has doubtless greatly diminished the supplies of *Hemileia* spores, and there is good evidence that, as was to be expected, since the chances of infection are lessened, the "attacks" of leaf-disease occur less frequently and at longer intervals, and the trees suffer less proportionally. It is satisfactory to learn that in Uva, though a considerable acreage of tea has been planted, this has not been done to any large extent by the sacrifice of coffee,—as in other parts of Ceylon,—but mainly by opening new land; for I cannot but think that a *general* substitution of the new product for the old one is not justified, either by existing circumstances or in view of the future.

Apart from coffee, the increase in the exports of all estate products during the past year is very striking.

TEA.—Over seven million pounds (7,170,329), or nearly double that for the previous one, were exported during the financial year; and an immense impetus to the demand at home has been given by the costly advertisement at the Colonial and Indian Exhibition in London, where Ceylon tea gained a very great popularity. Otherwise there is nothing in the position of this product that calls for any remark from me beyond what is contained in my last report. The amount of land now under tea is estimated at over 130,000 acres, but this is to be regarded only as an approximation.

As anything relating to this product, which has now stepped into the first rank of our exports, has become of interest, this is the proper place to put on record the facts with regard to the first introduction of Assam tea into this Colony. In December, 1839, Dr. Wallich, the eminent Indian botanist, at that time at the head of the Calcutta Botanic Gardens, sent to Peradeniya seeds of the then recently discovered "Indigenous Assam Tea"; and these were followed in February, 1840, by 205 plants. In May, the then Superintendent at Peradeniya, Mr. Normansell, sent several plants to Nuwara Eliya, and a man was supplied to look after them. This was after a representation to Government that tea was likely to prove a "new and profitable speculation" and a "valuable source of revenue." Again, in April 1842, another instalment of Assam plants was received from Dr. Wallich, and in October some

* Too bad.—ED.

of these were sent to Mr. Mooyart at Nuwara Eliya with directions for cultivating them. I had often wondered what became of these, and by accident in London I met the gentleman to whose care they were committed, the Rev. E. F. Gepp, at that time tutor to the son of Sir A. Oliphant, Chief Justice of Ceylon. He informed me that in October 1842, he received the plants from Mr. Mooyart at Nuwara Eliya, about thirty in number, and cleared a piece of jungle for them on Sir Anthony's land there; they were doing well when he left the Island a few years after. Mr. Gepp thinks the ground was somewhere in the neighbourhood of the present Queen's Cottage, and it will worth a search to discover whether some of the plants may not be still in existence.*

CINCHONA.—In spite of the low prices prevailing, the export of bark continues to increase, and the enormous quantity of over fifteen million pounds (15,364,912) was sent from the Colony during the year. This is the more surprising, as at present the margin of profit to the producer of bark must be very small, especially as there are scarcely any choice varieties in cultivation here. As regards the future, it appears impossible to form any trustworthy idea as to the amount remaining in Ceylon, but it must be greatly lessened by this vast export of late years, during which very little has been planted. As soon as shipments from Ceylon drop, as they must do, prices may be confidently expected to rise.

CACAO.—It is gratifying to see that the unnecessary check to this cultivation has been of every short duration. The export (15,347 cwt.) for last year is more than double that of the previous one (6,578 cwt.). The "Forastero" kinds (see last Report) appear to be increasing in favour with planters as being heavier croppers and hardier, notwithstanding the fact that they do not yield so fine a product as the old Red Caracas variety. Cacao cultivation, I regret to see, has taken little or no hold on the Sinhalese villagers. As often pointed out, it is not possible to conceive a more suitable plant than this for the villager's little garden, if only the owner will pay it a little attention for the first two years of its life. After that, no further trouble is necessary, and the plant takes care of itself. In past years large quantities of seed have been distributed to the villagers in the Central and Western Provinces, and in 1884 I circulated printed instructions for their cultivation, but no results are apparent. Injury from *Helopeltis* is no longer dreaded, though it is by no means infrequent. With regard to this insect, it appears from a paper by Mr. Waterhouse,† chiefly based on specimens I gave to the British Museum, that our Ceylon species, the original *H. Antonii*, is distinct from the Java Cinchona-bug, which he names *H. Bradyi*, as well as from *H. Theivora*, the destructive Tea-bug of Assam. This gives some explanation of the immunity of our tea and cinchona, for it is probable that these species, though so much like one another, are restricted as to food to particular plants. A large consignment of Forastero cacao seed was sent to the Queensland Acclimatisation Society, and it is satisfactory to learn that fully 90 per cent. were raised there.

INDIA-RUBBER TREES.—The Para rubbers (*Hevea brasiliensis*) are now over ten years old, and the largest tree has a girth of 49 in. at a yard from the ground. Some plants have been sent to Queensland.

The *Castilloa elastica* trees are the same age. They are not now growing so rapidly as at first; the largest is 38 in. in circumference at a yard from the ground. A Wardian case with 250 seed of this was sent in May to the Conservator of Forests, Tavoy, and fifty young trees have been planted at Kandy. The paper by Sir J. D. Hooker, referred to in my last report, has been published ‡ It is illustrated by a fine coloured plate of the tree cultivated here, drawn by W. De Alwis, the draughtsman of the gardens. Sir Joseph points out that our plant, which it will be remembered is the "Caucho" tree collected by Cross in Darien in 1875, differs slightly from the original *Castilloa elastica*, Cav. (the "Ulé" tree of Mexico and Central America), in having the leaves less hairy beneath, and the seeds of a somewhat different shape. He does not, however, apparently consider these differences sufficient to warrant another specific name, and our plant may continue to be called *C. elastica*.

Of the East African rubbers, the oldest plant of *Landolphia Kirkii*, the climbing stem of which is now about 10 in. in circumference, produced fruit this year for the first time. The seeds are few in number, and contained in a thin-coated globular berry, and each is covered with a sweet orange-coloured pulp.

GUTTA-PERCHA TREES.—The "Gutta Tabañ Patih" (*Dichopsis pustulata*) have attained 12 ft. in height at Peradeniya, and the "Gutta Sundek" (*Payena Leerii*), which does better at Henaratgoda, are now about 16 feet-high at that Garden.

NEW VEGETABLES.—The "Chocho" of the W. Indies (*Sechium edule*) has been widely distributed, and has rapidly become common in the country. It is liked both by Europeans and by natives, and its easy culture is especially appreciated by the latter by whom it is much esteemed for curries. I have noticed it for sale in the Kandy market at 1c. and 2 the fruit. The tree tomato (*Cyphomandra betacea*) has also spread rapidly through the hill-country. The fruit keeps well after being gathered, and as it has a tough skin, and travels well, it might be largely cultivated in the villages for sale in the towns. The Arracacha (*A. esculenta*) is not generally liked by Europeans (though some like it), but much enjoyed by all the natives who have tasted it. Mr. Nock reports a good stock at Hakgala, and I am prepared to distribute, through the Government Agents, small quantities to the headmen of villages at 2,000 feet or more elevation, in the hope of its culture being taken up by the villagers. Much interest has been excited in India by the successful introduction of this vegetable into Ceylon, and in answer to applications we have sent boxes of the roots to the Botanic Garden at Saharunpore, the Agri-Horticultural Society of Calcutta, and the Chief Commissioner of British Burmah.

ULLUCUS TUBEROSUS.—As recorded in my last Report, a few tubers of this vegetable—the "Oca-quina" of Peru and Bolivia—were received from Kew at the end of 1885. They were sent on to Hakgala, and Mr. Nock reports as follows:—

"Planted in a nursery bed they grew rapidly, and the tops did not die down till November. They were then taken up, and the crop produced weighed 11½ lb. The tubers from which these were produced could not have weighed more than an ounce, and they were all very small, the largest being scarcely the size of a hazelnut, whilst the average size of the crop produced here was about that of walnuts. The largest—shaped like a kidney potato— was 3¼ in. long by 3⅜ in. in circumference, or 1¼ in. in diameter in the middle."

These tubers are largely consumed in Peru, like potatoes. Judging from those produced here, I think them too "waxy" to suit English taste generally.

FRUITS.—The Cherimoyer (*Anona Cherimolia*) is now well established at Hakgala; there are numerous plants in perfect health, and likely to do well; the largest is as yet, however, only 4 ft. high.

Pineapples.—During my visit home I was successful in interesting the authorities at Kew in an attempt to obtain additional varieties of this favourite fruit, and they with some difficulty secured from private sources twenty-six shoots of the following well-known varieties:—"Black Jamaica," "Queen," "Lord Carrington," "Smooth Cayenne" (which is already well-known in Ceylon), "Black Prince," "Charlotte Rothschild," "Lady Beatrice Lambton," and "Enville Queen." The plant of the last named was dead, but the rest arrived in excellent order, and were planted at Peradeniya at the end of September.

* Since writing the above, I find that Mr. Gepp communicated these facts in a letter to the London *Times*, dated August 19. He is, however, mistaken in supposing the plants to have come from China.

† Trans. Entomolog. Soc., 1886, page 457.

‡ Trans. Linnean Soc., ser. 2, II., page 209.

Oranges.—In answer to request, a fine selection of choice grafted oranges, &c., of twenty-five kinds, was despatched from the Queensland Acclimatisation Society early in October. I regret to say, that in consequence of a series of careless blunders the cases containing these were twice carried past Colombo, first to Aden and then to Calcutta. On finally arriving at Peradeniya (on January 2nd) they were, it is needless to say, all dead from drought. These were intended for the new Garden at Badulla. Another collection has been applied for.

Jamaica Billberry (*Vaccinium meridionale*).—On this plant Mr. Nock has the following:—A few plants of this fruit were raised three years ago, but until this year they remained almost stationary. They have, however, now made a start, and look as though they will yet do well. This plant in the mountains of Jamaica grows into quite a big tree; the wood is very hard and durable, and one of the very best for posts. It bears heavy crops of fruit, which is very good cooked, at elevations from 2,000 ft. to 6,000 ft.

Eucalyptus Plantation.—Mr. Nock reports:—The high winds at the end of May did much damage to the plants in this plantation. Some of them were blown clean out of the ground, and many others lost their heads. The trees are now nearly five years old from seed, and the following measurements of the fifteen kinds selected for measuring in 1884 will show the rate of growth for four years:—

Names	1884 Height ft.	1884 Girth in.	1885 Ht. ft.	1885 Gth. in.	1886 Height ft.	1886 Gth. in.	1887 Height ft.	1887 Gth in.
E. robusta	14	0 8	24	15	30	0 22	39	0 30
longifolia	14	0 6	24	14	35	0 19	43	0 26
marginata	13	9 6	25	13	36	0 20	44	0 24
Gunnii	13	6 5	26	10	33	0 16	40	0 20
cornuta	13	4 5	22	10	32	0 15	top bro.	20
colossea	12	0 7	21	15	30	6 18	37	0 23
viminalis	10	9 6	18	14	25	6 19	30	0 20
botryoides	10	0 7	22	14	29	0 20	31	0 26
microcorys	9	7 5	22	12	25	0 18	34	0 24
Sieberiana	8	0 6	16	13	26	6 17	31	0 20
amygdalina	7	10 7	15	12	22	6 19	28	0 22
piperita	7	9 6	17	13	25	0 19	top bro.	19
hæmastoma	7	2 5	15	12	23	0 18	27	6 25
Lehmanniana	6	5 4	12	9	21	6 13	29	0 18
alpina	2	8 3	5	5	12	6 9	15	0 12

Eucalyptus acmenoides has commenced to grow rapidly during the last two years. It stands the wind well, and the growth is as straight as an arrow. At five years old from the seed it is 32 ft. high and 28 in. in circumference at the ground. *E. alpina* has a curious swelling at the base, which seems to be natural, as all the plants have it. Close to the ground it measures 25 in. round the stem, and 6 in. higher up only 12 in. This and a few of the other species are now flowering.

Conifers at Hakgala.—Though several species of *Thuja*, *Cupressus*, *Juniperus*, *Araucaria*, *Frenela*, *Cryptomeria*, &c., grow well in the hills (as also lower down), nearly all the pines and firs that have been tried have been more or less failures, and I believe very few will succeed in our climate. There is, however, a large tree of *Pinus longifolia*, which must be of some age, by the Office, 40 ft. high, with a girth, close to the ground, of 6 ft. 4 in. It has produced cones freely during the year, but none of the seeds were fertile. Some other young plants of this species, raised from Indian seed and planted in good soil in the Garden, are doing well, but those in the old cinchona plot have not come on at all well.

Seed of *Pinus sinensis* was obtained in 1884. The largest plant in the garden is 11 ft. high, but one left in the nursery bed, where there is probably better soil, is 20 ft. high and 10 in. round the stem at base. The plant evidently requires rich soil, as others of the same age in other parts of the grounds are not more than 18 in. high.

Receipts from Sales.

The commencement of more prosperous times is indicated by somewhat improved returns from sales, especially at Hakgala, where the dealings are mainly with the planting community. At Peradeniya the principal purchasers are still travellers, and the chief thing purchased are Wardian cases or boxes of orchids, &c., for taking away from Ceylon. No less than thirty-four of these were supplied in 1886.

The following are the receipts for the year:—

	R.	c.
From Peradeniya	2,136	99
Hakgala	877	68
Henaratgoda	191	82
Anuradhapura	34	44
Badulla	24	16
Total	3,265	9

[For parts omitted here, see further on.]

THE KANDY AGRI-HORTICUTURAL SHOW.

6th May, 1887.

The second Agri-Horticultural Exhibition of Kandy was opened today. The arrangements for the public were in many respects better than the former Show: there was more room and consequently less crowding. The buildings—mere sheds—lacked the artistic beauty or finish of those of two years ago—doubtless the effect of the hurry-scurry at the end—nevertheless to have got such houses up in so short a time, and decorated them as they were decorated said much for the energy of all concerned, and reflected considerable credit on the Committee.

There is so much floral wealth in Ceylon which even in inartistic hands readily lends itself to decorating a building that we are all more or less accustomed to seeing the effects in some style or another. But I do not remember to have seen anything so perfect in form, colour, and lightness, as a kind of canopy over some splendid ferns. It was, indeed, "a thing of beauty" apt, however, to be missed by the sight-seer owing to its height.

Perhaps the best Court in the Show was the one at the East-end, filled without art treasures. Here there were collections of native jewels of untold value; fine displays of moonstones; ivory carvings to please the eye of the connoisseur; samples of Kandyan painted pottery, the usually too glaring colours considerably toned down. Heaps of embossed silver work, for which some districts of Ceylon are so famed, and a fine silver salver, made in the Kegalle district, and lent to the exhibition by His Excellency. There were also rich cloths embroidered with gold, furniture, brass work, paintings, photographs, and a book of great beauty, gorgeously illuminated, and written in clear characters, a gift from the King of Siam to some of the Buddhist temples.

This Court was always crowded, it had colour and glitter in it, and had evidently attractions which were not present anywhere else within the walls of the Show.

There was a fine display of Ferns of all kinds and the cut flowers were in greater plenty and variety than formerly. Some of the flowers too in pots were pretty, and told of care, but there was much in this division of the Exhibition unworthy of a place.

As to the new feature—the Cattle—there is nothing special that lives in one's memory. You saw a notice "gold medal," "silver medal" tied on the forehead of very ordinary animals, the owners of which must have been more astonished than the public, at their being deemed so highly worthy of honour. It evidently did not want very many high points to get a first position on the list of prize cattle.

The Fruit and Vegetables were poor as compared with what might have been. They were only a shade better than the Estate Products, which may be pronounced all but a failure. It was almost laughable, the meagre display. Whatever product you were interested in, the poverty of the show was sickening. As to tea, the competitors were so few that the day before the Exhibition, frantic efforts were made to get *any*

body to exhibit, and it was quite pathetic to see how miserably those efforts had been responded to and how poorly our rising product was represented. People who had hunted round the place in search of the tea exhibits were often like the ships that tried to find St. Helena and couldn't. "But where *is* the tea?" they would ask you and would find it at last in a corner of a bench! I fancy a cooly could have cleared the Show of all the tea on exhibition and had a light load. The other products were not a whit better.

ARTS AND MANUFACTURES.

Jewelry exhibited by C. B. Nugawella, R.M. of Udanuwara; Ancient Kandyan sword (short) with elaborate ivory handle and sheath; Fret-work, ebony bracket by A. C. Lawrie; Porcupine quill work-box, price R200 by D. F. de Silva & Co.; Porcupine quill writing-desk, by D. F. de Silva & Co.; Porcupine quill inkstand, by D. F. de Silva & Co.; Kandyan pottery (20 pieces), K. Artwork Aassociation. One pair chair designed by H. Fraser, l Matale, and made by Thomas Fernando, Moratuva; Ebony chair mounted with ivory from Asgiriya Vihare; Turkish modelled Mattress and cushions, by Bunder Saibo (with cushions); Kandyan embroidery work (1 lady's jacket and 1 gentleman's belt), T. B. Banabokka; Old Kandyan cloth, by Rambukwelle R.M.; Nilgarunda cup, salven and plate, by T. B. D.; 2 Brass chembuws, by V. Valoo; Betel stand &c. by V. Valoo; 2 Large brass trays, by V. Valoo; Silver trays, chembuw bowls, jewel cases, &c., copper, ebony, brass, cases, by K. A Association; Map of Ceylon shewing some of the principal animals and natural products drawn by W. Francis Magnes Perera; one pair Indian Orchids from G. S. Saxton; a Centenerian, a Talipot Palm in blossom, by E. F. VanDort; an Elk Hunt, by E. F. VanDort; a Tropical Nocturne, by E. F. VanDort; Watercolour Pictures by Miss Mary F. A. Tench Glentilt, Maskeliya; Two Glasses with Water-colour painting, by Mrs. F. Braine; Moonstones from Attaragalla, Kandy, by Sinne Marikar Madar Saibo including the best and biggest moonstone ever confound in Ceylon; two Ivofy Scent Bottles, by Utumana Mulacharige Muhandirum; Ivory Chessmen K. A. Association; Chessmen, by K. A. Association; Ornamental Coconut Ladle, by T. B. Panabokke; 13 Clay Plates illustrating Perehera; Fretwork, by Mr. Wood; Revolving cannon in miniature by U. B. Dehigama; Ancient Iron Artistic Adze by Kotmale Ratamahatmaya; Collection of Brass articles from Mr. F. R. Ellis.

Native plough, by Uudawella Arachchi; Native plough, by Rambukwella R. M., of Uda Dumbara; Native kake, by Rambukwella R M.; Various instruments of husbandry by Rambukwella R. M. of Uda Dumbara; Aloe fibre rope from Kadawella estate (25 fathoms); Collection of paddy (native varieties) exhibited by S. Ratwatte, Lower Dumbara; Paddy (native, 4 varieties) T. B. Dimbulana R. M.; Paddy (native, 7 varieties) by C. B. Nugawela R. M.; Arecanuts (2 varieties) by L. B. Yatiwara; Arecanuts (4 varieties) by S. Weerakody Mudaliyar; Indian corn by L. B. Yatiwara; Indian corn by Dimbulana R. M.; Indian corn by Rambukwella R. M.; Small grain (8 varieties) by T. B. D.; Small grain (5 varieties) by H. Abyegoonasekara Korale Upper Hewahetta; Cotton, sample of crop grown in the Government Experimental Garden, Kegalla, exhibited by S. Weerakody; Tree and American cotton from J. P. Cotton; West Indian arrowroot from J. P. Cotton; Marketable leaf tobacco by Panabokke R. M.; Honeycombs with living bees by Yatiwara R. M.; Jaggery (6 varieties) by L. B. Nugawela; Jaggery by M. B. Nugawela (6 varieties); Ginger by L. B. Yatiwara; Ginger by S. Ratwatte R. M. of Uda Nuwara.

7th May, 1887.

The tea contest, as between Blackstone and Agar's Land, was said to have been very close. The matter of two points or so, so fine a thing indeed, that only a highly educated palate would pretend to distinguish the difference. Still there *was* the difference, and to Mr. Barber fell for a second time the much-coveted gold medal. Mr. Barber may be proud of the high place he has taken, and few, I think, will grudge him this honest congratulation. At the final testings, I believe, the tasters were quite in the dark as to what was what, or which was which. So few teas were offered, that a race was nowhere except between the two well-known brands, and then it was neck to neck, till the peculiarly fruity flavour of Ceylon teas which Blackstone possessed in a slightly higher degree than Agar's Land landed the formed with "the blue ribbon." What we want now is trial in the Colombo or London sale rooms, to test how the tea buyers regard the award. If each estate were to offer at the same time a break of 3,000 lb. or so, there would be a considerable public extremely interested in the result.

Those who have tasted the two teas, will bear me out that for strength they are very remarkable. It is when you try to describe such teas that you are impressed with the necessity of cultivating the jargon of the tea taster and you produced a result like the following:—"Strong, little, thick, deep, rasping, brisk, full rich powerful liquor, with great character and fine flavour." There is in that sentence a vocabulary enough for any man to set up as a Colombo tea broker—and as for its hidden wisdom goodness only knows all it means or if it has any meaning.

To supply omissions in my last I may say that as to Estate Products, fancy tea was very poorly represented. The commercial tea samples shewn were said not to be equal to the best that could be produced, but the average quality was good. The first and second estate teas which secured prizes far surpassed all the others and fairly represent the highest class of commercial tea being good in every part. Riverside would seem to be a bad third. Kandenuwara estate cardamoms presented a very fine appearance, but unfortunately the box in which they were contained could not be opened, and was thus out of competition. There was a disarrangement of words in the telegrams as to prize winners in this class which has been since rectified as follows: Mr Tatham silver medal, Cinchona bark. Mr. Milne, Liberian coffee. Mr. E. Anderson, Cardamoms. Waterantenne, Cacao. Roseneath, Nutneys Chocolate, L d'Espagnac. The rest were correct. A complete list is sent. The chief prizes for "Cut Flowers" were given to 1st A. Tabor, 2nd J. F. Hadden, 3rd A. Whyte. The up-country flowers were worth looking at. The roses raised by Mr. Whyte in Kandy were not so good when compared with those from the higher districts, nor could this be expected, and some distinction must be drawn in future Shows between Kandy and up-country flowers. Mr. Whyte's vegetables got mixed up with others and could not get a prize on the first day, but on Saturday the mistake was rectified, and a silver medal was awarded to him. Salem estate got silver medal for some excellent pine-apples which many visitors were tempted to taste on the spot. Some rare king coconuts were sent by Mr. J. G. de Silva; best mangoes silver medal same exhibitor, who exhibited also limes and other fruits. Mr. W. V. Woutersz shewed "silver cotton" preserves, jaggery &c. The pomegranates came from Morupola estate, Heneratgoda, J. G. de Silva. As will be seen, there was very little shown under Class S. (preserved fruits.)

The collection of Cut Flowers were added to by the contribution of bouquets on second day. Mr. A Whyte, Waller and De Livera and others got silver medals for these. Mr. Whyte's table bouquet was in the form of a pyramid terminated with fine variegated plants with graceful hanging palm-like leaves, and very much admired. Miss C. Reimers well deserved the prize she got for the show of flowers and Miss Kelly received also a silver medal for her beautiful bouquet. Under the head Live Stock were exhibited devil bird by Dr. E. Fitzgerald, M.D.; bear, jackal and porcupine (exhibitor not named); three elks by Girihagama R. M.,

"baby elephant by J. H. Girihagama; best Coast bull gold medal,) two bulls by G. Ross, Le Vallon gold medal, he buffalo by L. B. Nugawela.

Mr. Alfred Ambrose exhibited a fine pair of sky tumblers and pair fantails; Mr. Austen game-cock and two dorking game. Mr. Woth of Kandy sent the best pair rabbits, Mr. F. Ondartje three monkeys, some one sent two squirrels, Mrs. Alexander of Anuradhapura exhibited ducks, and Mr. W. R. Waller pair of fat geese. Mr. Vollar's English bull attracted attention (gold medal) as well as Mr. F. W. Gray's boar (gold medal). Best Coast bull (gold medal) belonged to Mr. A. Silva. Mrs. Shelly sent some good fowls as also Mr. Austen.

Amongst the Art collection His Excellency the Governor sent a large silver dish, lent for the occasion. Ratnapura District was to the front with a splendid casket which was much admired, as also was "bronze mould for silver ornaments for the King's feet" and "mould for silver ornaments" by Nelawala Muhandiram. Some one sent ancient Siamese Buddha excavated among the old ruins of a large Wihara at Thiriyawa, near Trincomalee. "The Taj in marble" with cover was also admired. It was of solid marble representing the burial place of the King and Queen of Agra, near the town of Agra; and an ornamental flower vase, Kandyan workmanship, with 15 cobra-images around it. The jewellery was contributed by Messrs. L. B. Nugawela and Panabokka. "Paiistana" was contributed by Tikiribanda Paranatalle. A beautiful ebony box by L. B. Nugawela, native clay, (native preparation). "Hand-cut" wood carving cut by Mr. W. G. Wood, Bogambera, Kandy. Models of ships also by same gentleman. Some excellent drawings and plans by Mr. F. W. Thomson, Surveyor. The Artwork Association sent silver-work and painted pottery. There was a large collection of old books.

Another correspondent writes :—Two pictures of two large groups of orchids carried the silver medal for paintings—but no ticket seemed to be attached, so that the exhibitor remained unknown. This we believe is contrary to the rule which required the name of the exhibitor to be attached. These drawings are admittedly copies and have been accepted by the judges and prepared to original designs by native artists. We have heard it said that the copyists are some ladies in England. There were besides, about half-a-dozen water colour paintings of local scenes. "The talipot palm in blossom" with the lights of early morning on the distant hills being particularly effective and a sea-scape "Crossing the Surf" deserves much attention. We were surprised to notice that a series of etchings of much merit sent in by the same artist was passed over, and it is not understood why the prize for this section was withdrawn. This seems a queer and novel way of encouraging native talent. It was a pity that the refreshment stall was so placed that the Arts department was at a disadvantage for the best light, it being in deep shadow towards the latter part of the afternoon. There was a large exhibit of Kandyan pottery in native lacquer work which carried the prize although the exhibitor did not profess that he did them. It was all the work of native (Kandyan) artists whose names even did not transpire. There was also a group of hand-painted pottery of very original design, but these were scarcely seen to advantage owing to their being sealed up with other exhibits on shelves behind a glass case. We have reason to know that they however attracted the attention of the Governor. Did the judges take the trouble to examine the details of the work and thus find out its merits? The representations of the Sinhalese in childhood, youth, manhood, and old age, and the four principal products of the island viz: tea, cinnamon, coconut and paddy were most original in design, and very well carried out, and it was explained to us that even the conventional designs were taken from leaves and flowers native to the island. It is very much to be regretted that there was no recognition of the merits of this original exhibit, nor of the beautiful fret-work exhibited by an Industrial School boy and Mr. Wood of the Garl,

LIST OF PRIZES PRESENTED BY LADY GORDON.

CLASS I: GARDEN PERENNIALS, in pots:—Roses, best collection of not less than 18 different varieties, Silver Medal, Mr. A Whyte; Begonias, best collection of not less than 12 different varieties, Silver Medal, Mr J D Jonklaas; C. H. Pate bronze special award; Begonias, best collection of not less than 6 different varieties, Bronze Medal, Mr. A. C. Lawrie, D J Kandy; Best Geraniums, collection of not less than 6 different varieties, Silver Medal, Mr J V H Owen; Pelargoniums, Silver Medal, Mr E J Thwaites; Gloxinia, Silver Medal, J V H Owen; Amaryllids and Lilies, Silver Medal, E J Thwaites, Bronze; Orchids in flower, Silver Medal, J Fenton Wingate, Bramley estate; Fuchsias, Silver Medal, J V H Owen; Achimenes, best collection of not less than 3 varieties, Bronze Medal, J V H Owen; Primulas, Silver Medal, E J Thwaites.

CLASS II: GARDEN ANNUALS, in Pots.—Best Balsams, Silver Medal, A Whyte; Phlox, Bronze Medal, Mrs E R Whitfield; Violets, Silver Medal, Mrs T G Baker; Violet, second best, Bronze Medal, Mr E J Thwaites; Mignonette, Bronze Medal, 'no exhibit'; Calceolarias, Silver Medal, Mr E J Thwaites; Cinerarias, Silver Medal, Mr A Whyte;

CLASS I: SPECIAL PRIZES.—Cyclamen, Mr E J Thwaites, Bronze; Tuberous Begonias, Mr E J Thwaites, Silver; Best Geranium plant in class, Mrs J G Baker, Silver; Spinosa, Mr A Whyte, Bronze.

CLASS III: FERNS, in pots.—Best general collection of not less than 18 different kinds, Gold Medal, Mr C H Pate; Best collection of Adiantums, Silver Medal, C H Pate, A R Lewis, Bronze, special award; Best single Fern, Silver Medal, J D Jonklaas; Second best Fern, Bronze Medal, C H Pate.

CLASS IV: FOLIAGE PLANTS, in pots.—Crotons, best collection of not less than 12 varieties, Silver Medal, Major Byrde; Dracænans of not less than 6 varieties, Bronze Medal, Mr H Neville; Palms, Cycads, &c. not less than 6 varieties, Silver Medal, Major Byrde; Caladiums not less than 6 varieties, Silver Medal, J D Jonklaas; Marantas not less than 6 varieties, Silver Medal, T C Huxley; D F de Silva, Silver, special award; Alocasias of not less than 3 varieties, Silver Medal, J D Jonklaas; Cleus. best collection of not less than 18, Silver Medal, J D Jonklaas; Cleus. best collection of not less than 9, Bronze Silver, Mrs Jeffries.

CLASS V: CUT FLOWERS.—Roses, best collection of not less than 24 different varieties, Gold Medal, Mr A Tabor; Roses, best collection of not less than 18 different varieties, Silver Medal, Mr F Hadden; Roses, best collection of not less than 6 different varieties, Bronze Medal, Mr. A Whyte; Roses, best three blooms of a white rose, Certificate of Merit, Mr R A Ferdinands; Roses, best three blooms of a yellow rose, Certificate of Merit, Mr R A Ferdinands; Roses, best three blooms of a pink rose, Certificate of Merit, Mr A Tabor; Roses, best three blooms of a dark-red rose, Certificate of Merit, Mr R A Ferdinands; Best Dahlias, double, Silver Medal, Mr L H Kelly; Geraniums, in trusses of three, Silver Medal, Mrs J G Baker; Geraniums, in trusses of three, second best, Bronze Medal, Mr T C Huxley; Pelargoniums, in trusses of three, Silver Medal, Mr E J Thwaites; Pelargoniums, in trusses of three, second best, Bronze Medal, Mrs J G Baker; Hibiscus, best collection of not less than six, Silver Medal, D F De Silva; Hibiscus, best collection of not less than three, Bronze Medal, Mr A Whyte; Carnations, Silver Medal, Dr E Livera; Carnations second best, Bronze Medal, Mrs Baker; Phlox Perennials, Silver Medal, Mr T C Huxley; Phlox Drummondii, Bronze Medal, Dr E Livera; Chrysanthemums, Silver Medal, Mr T C Huxley; Verbenas, Silver Medal, Dr E Livera; Pansies, Silver Medal, Mr E J Thwaites; Violets, Silver Medal, Mrs E G Hardinge; Violet, second best, Bronze Medal. Mr A. Tabor; Best arranged table bouquet, Silver Medal, Miss Constance Reimers, Mr L D'Espagnac, Silver extra; Best arranged hand bouquet, Silver Medal, Miss Kelly; Best arranged 3 button-hole bouquets, Bronze Medal, Mr A Whyte;

Best arranged collection of native flowers, Silver Medal, D Wijeyerame; Bouquets on second Six day, Silver Medals, Messrs A Whyte, W R Waller, Dr, Livera, D F De Silva and Gabriel Perera

CLASS III: SPECIAL PRIZES.—Single Fern, extra, Silver, Mr E F Wingate; Single Fern, extra, Silver, Mr A C Lawrie.

CLASS IV.—Miscellaneous collection of plants, extra, Silver, Mrs W G Wood.

CLASS V.—Pinks, extra, Silver, Mr T C Huxley.

CLASS VI: Vegetables.—Best collection of English vegetables grown upcountry, not less than 6 different sorts as below, Silver Medal, H Young and A Whyte; Best collection of native vegetables, as below, Silver Madal, Nugawela, R M; Best potatoes, 12 tubers, Silver Medal, D W Perera, Nuwara Eliya; Carrots, 6, Bronze Medal: R N Knight; Turnips, 6, Bronze Medal, H Young, Nuwara Eliya; Cabbage, 2 heads, Bronze Medal, H Young; Beet Root, 3 roots, Brone Medall, R N Knight; Clery, 2 roots, Bronze Medal, A Whyte Cauliflower, 2 heads, Silver Medal, E G Hardinge: Cauliflower, second best, Bronze Medal E J Thwaites; Lettuces, 3 heads, Bronze Medal H Young; Vegetable Marrows, 2, Bronze Medal R M Kmght; Raddishes, 18, Bronze Medal, H Young Cucumbers second best, Bronze Medal, M Badar Deen, Arachchi; Knol-kohl, 6, Bronze Medal, R N Knight; Yams, Silver Medal, J P Cotton, Watarantenne; Sweet Potatoes Bronze Medal, Proctor Girihagama; Pumpkins, 2, Bronze Medal, M Badar Deen; Breadfruit, 2, Silver Medal, M Badar Deen; Breadfruit, second best, Bronze Medal, Nugawela R.M.; Cho cho, 3, Silver Medal, Mrs. W G Wood; Cho cho second best, Bronze Medal, D F de Silva; Bringals, 6, Bronze Medal, J R Greve, Matale; Pot-herbs, Mint, Sage, Basil, Parsley, Marjoram, fennel, &c., Silver Medal, H. Young; Salad-herbs, Cress, Endive, Lettuce, Beet, Watercress, Onion, &c., Silver Medal, H. Young; Curry-vegetables, Murunga, Karavila, Podivilanga, &c., Silver Medal, Ratwatte, R.M.

Best general collection of plants and flowers in classes, 1, 2, 4, 5 and 6 excluding roses, Gold Medal, J V H Owen.

CLASS VII: FRUIT.—Mangoes, best general collection of not less than 6 different varieties, named, Silver Medal, J G de Silva, Colombo; Mangoes, best general collection of not less than 3 different varieties, Bronze Medal, D J Perera; Mangoes, second best, collection of not less than 3 different varieties Bronze Medal, Mrs. Poloris; Plaintains, best general collection of not less than 4 different kinds, named, of which Suwandel shall be one Silver Medal, A L J L Marikar; Plantains best Hanbanpuwalu, Bronze Medal, J G de Silva; Best Pineapples, 3, Silver Medal, Salem estate, W H Newman; Finest "Kew" Pineapple, Bronze Medal, Mrs. Jeffries; Best Oranges, 12, Silver Medal, Hanga Duriya; Best Oranges, second best, Bronze Medal, Mrs. Jeffries; Limes, 2 measures, Silver Medal, J G de Silva; Lovi-lovi, 2 measures, Bronze Medal, Major Byrde; Granadillas, 6, Bronze Medal, Mrs. W G Wood; Jaks, 2, Bronze Medal, P B Dassanayake; Rhubarb, 6 sticks, Silver Medal, R M Knight; Rhubarb, 6 sticks, second best, Bronze Medal, E J Thwaites; Tree Tomato, 12, Silver Medal, E J Thwaites; Tree Tomato second best, Bronze Medal, D H Perera, Nuwara Eliya; Grapes, best bunch, Silver Medal, W J F Soyza.

CLASS VIII: PRESERVED FRUITS, VEGETABLES, &c.—Jellies, fruit, &c., Silver Medal, A Alwis.

CLASS VII: Special Prizes.—Pomagranates, Extra Bronze Medal, J. G de Silva; Pears, Extra, Silver Medal, S Weerakod Mudaliyar

CLASS IX.—NATIVE PRODUCTS.—Best general collection of native products grown by one Exhibitor, Gold Medal, J F Soyza; Paddy, best collection of the following sorts:—Hatiyal, Mawl, Hondarawala, Hinati, Elwi, balwi, ¼ bushel of each, Gold Medal, C B Nugawala R.M.; Paddy, best collection of the following sorts:—Muttu-samba, Kaivra Samba, Sulai, Carolina, or any of them, ¼ bushel of each or any, Silver Medal, L B Yatiwara, R.M.; Indian Corn, Eringu, Silver Medal, Dimbulana R.M.; Cholum: Karal Eringu, Silver Medal, Rambukwella, R.M.; Kurakkan, Silver, Medal, Rambukwella R.M.; Small Grains: Amu Meneri, Tana-hai, &c., Silver Medal, L B Yatiwara, R.M.; Arrowroot, Silver Medal, J P Cotton, Watarantenne; Jaggery, Silver Medal, M B Nugawela R.M.; Tobacco, cured, Siaer Medal, Panabokka, R.M.; Cotton, Silver Medial, S. Weerackody Mudaliyar; Tree Cotton, Pulun, Silver Medal, A. L. J. L. Marikar; Ginger Silver Medal S. Ratwatta, R. M; Areca Nuts Silver Medal, Crystal Hill, Matale; Betel Leaves, Silver Medal; T. B. Panabokke R M; Honey, Silver Medal, T. B. Panabokke, R. M; Jungle Seeds, Resins, Silver Medal, M B Nugawela R M; Cocoanuts, Silver Medal, J G de Silva; Native Ploughs and other Instruments of Husbandry, Silver Medal, T B Rambukwelle R M.

LIVE STOCK.—Ceylon-bred Buffalo, best, Gold Medal, S Ratwatte R M; Ceylon-bred Buffalo second best, Silver Medal, Punchi Rala Korale; Native Bull best, Silver Medal, L B Nugawela R M; Native Cow best, Silver Medal, L B Nugawela Junior.

CLASS X: ESTATE PRODUCTS.—Best general collection of Estate Products from one estate, Gold Medal, Kandenuwara estate, Hugh Fraser; Tea: best set of samples of *bona fide* commercial teas, broken pekoe, pekoe and pekoe souchong, from one estate 5 lb. of each grade, Gold Medal Blackstone estate; Tea second best set of similar samples, Silver Medal Agar's Land; Tea: third best set of similar samples, Bronze Medal, Riverside; Tea: best set of samples of fancy Teas; 2 lb. of each grade, Silver Medal, Castlereagh estate; Liberian Coffee accompanied by one bushel in parchment, Silver Medal, Wm. Milne, North Matale. Cacao second best of commercial Cacao 28 lb., Silver Medal J P Cotton Watarantenne; Cardamons 5 lb. Silver Medal, Eric S Anderson, Loloowatte estate; "Mysore" Cardamoms 5 lb. Silver Medal, Eric S Anderson, Kobonella estate.

SPECIAL PRIZE.—Native Bull, extra William Dullewe; Paddy, extra, Gold Medal, L B Nugawela R. M. Paddy plants, extra, Silver Medal, A Ratwatta.

CLASS XI: TEA MACHINERY.—For the best individual machine used in the manufacture of Tea including motors, see rule 10, Gold Medal, Messrs. John Walker & Co., for Jackson's Excelsior Tea Roller: For the second best, see rule 10, Silver Medal, Messrs. Mackwood and Co., for Davidson's Sirocco. For the best collection of a complete set of machinery, with or without motors, in position as in factory, machines need not necessarily be by the same patentee, Gold Medal, Messrs. John Walker and Co.

CLASS XII: LIVE STOCK.—Best Coast Bull, Gold Medal, A de Silva; Best English or Australian Bull, Gold Medal, H J Vollar, Pallikelly; Best pair of cart Bullocks, Gold Medal, G Ross, Le'Vallon estate, Best Coast Cow in or out of milk, Silver Medal, J R Greve Matale; Best Native Cow in or out of milk, Silver Medal, Jacob Ambrose; Best English or Australian Cow Silver Medal, R E Waller; Best Boar, any breed, Gold Medal, F W Gray, Kondesalle; Best Sow; with or without litter, Silver Medal, F W Gray, Kondesalle; Poultry, best pen cock and 2 hens, Fowls any pure breed, Silver Medal, S Shelly; Poultry, best pen cock and 2 hens, Fowls any cross breed, Silver Medal, G M Austen; Poultry, best pen cock and 2 hens, Turkeys, Silver Medal, W R Waller; Poultry, best pen cock and 2 hens, Geese, Silver Medal, Mrs. Alexander; Poultry, best pen cock and 2 hens, Ducks, Silver Medal, W R Waller; Rabbits best pair, Silver Medal, W Woth; Pigeons, best pair, Silver Medal, Alfred Ambrose; Cream Cheese, best 1 lb., Silver Medal, no exhibit; Fresh butter best 2 lb., Silver Medal, Mrs. Forbes-Robertson; Fresh butter second best, Bronze Medal, R E Waller.

Cinchona, best collection of Barks grown by the Exhibitor, 20 lb. in all, Gold Medal, Frederick Tatham Yarrow estate; Cinchona, natural Ledgeriana Bark, 2 lb., Silver Medal, Frederick Tatham, Yarrow estate; Cinchona, natural, Robusta (hybrid) Bark, 2 lb. Bronze Medal, J Fenton Wingate; Cinchona, natural Succirubra, Bark 2 lb., Bronze Medal, J G Macfarlane; Cinchona, Renewed Succirubra Bark, 2 lb., Bronze Medal, J G Macfarlane; Vanilla, 3 lb., Bronze Medal, H J Vollar, Pallikelley; India-rubber ½ lb,

Silver Medal, H Fraser; Cinnamon, 25 lb., J F Drieberg; Nutmegs, 12 lb. Silver Medal, Mrs. J. L. Dewar, Roseneath; Cloves 5 lb. Silver Medal, L. B. Yatiwara, R.M; Pepper 3 lb, Silver Medal, L. B. Yatiwara R. M; Cuca, Silver Medal, no exhibit; Tobacco best selection of marketable leaf under same rules as Tea samples, Gold Medal, J. K. Ingleton, Rajawella; Cigars, Best 100, Silver Medal, J K. Ingleton, Rajawalla; Best collection of Medicinal Plants Kapok, Annatto Dye, Croton Seed, Kola Nut, Sapanwood, &c. &c., Silver Medal, W.F. Gomesz Kandy.

CLASS X. SPECIAL PRIZE.—Ceylon Chocolate, Extra, Silver Medal, L. d'Espagnac.

This special Medal was awarded, the Judges being of opinion that the Exhibit was worthy of special notice.

XI. CLASS.—Concentric Tea Roller, extra Silver Medal.

CLASS XII: WILD ANIMALS, extra, Silver, W. R. Waller.

DR. TRIMEN'S REPORT ON THE ROYAL BOTANIC AND ECONOMIC GARDENS.

The most important document in our present issue is the Annual Report of Dr. Trimen, Director of our Royal Botanic and Economic Gardens and of his trusty practical lieutenant Mr. Nock of the Hakgalla Garden. Dr. Trimen's Reports are always models of excellence, of scientific accuracy combined with practical and popular instruction. He writes with admirable precision, and he does not (like his predecessor) allow his love of science predominate to the exclusion of adequate interest in the everyday work and requirements of the planter and native agriculturist. In the latter department as well as in the management of the old and new Gardens, Dr. Trimen is faithfully seconded by his Assistants, Mr. Nock (who acted as Director part of last year, and who has simply revolutionised Hakgalla and all for the better), by Mr. Clark and by that fine specimen of an intelligent, unobtrusive Sinhalese gentleman, Mr. Ferdinandus who will one of these days well deserve to be made a "Maha Mudaliyar." It is particularly encouraging to learn of the progress and good prospects before the new Experimental and Economic Gardens started at Anuradhapura and Badulla, and that although the Railway Department did their best to "boycott" the Heneratgoda branch Garden, the persevering Sinhalese Manager has done his best to keep up the status of his charge. Under new train arrangements we have no doubt the encouragement of visitors will once more be afforded to the Heneratgoda staff, while Colombo residents and their guests will be able to revive the pleasure, picnic and other trips to Heneratgoda have so often afforded. It is particularly unfortunate that Dr. Trimen's Report did not see the light a little earlier, in order that the press and the public might have energetically backed up his enlightened, public-spirited suggestion that a station for the chief Gardens (and for the general convenience of the neighbourhood as well) should be opened at the Deltotte Crossing. We feel sure that the Hon. the Acting General Manager would do what he could to meet this suggestion had it come before him during the recent revision of train services. But perhaps it is not too late now; for, very clearly such a station would be an additional source of profit to the Government, while one calculated greatly to benefit the poeple who would be enabled so readily to visit the Royal Botanic Garden near by, of which it may be more forcibly said than of most applications of the line,—that it is

A thing of beauty and
a joy for ever.

As regards Experimental, Economic Gardens, we trust the Government will enable Dr. Trimen to open two or three more branches:—Ratnapura, for instance, the capital of the far-reaching and important Sabaragamuwa district, deserves to have a Garden of its own; so with Galle, or perhaps better, Matara for the Southern Province; nor should the East and North be forgotten. We should like very much too, to see a closer alliance promoted by Government between the Agricultural branch of the Educational Department and the Botanic-Economic Department. No two officers in the Ceylon Service have a more single eye to the good of the island and its people in performing their duties than Mr. Green and Dr. Trimen, the respective Directors, and we have no doubt that they would be exceedingly ready to co-operate in promoting agricultural knowledge and improvements in every way possible. One way might be by taking advantage of the Gardens to train some of Mr. Green's Agricultural students in practical Horticulture. Mr. Nock would no doubt, do full justice to a class of such lads and the healthy bracing climate of Hakgala, ought to put new life into Sinhalese and Tamil youths.

We have so far dealt with matters rather outside the scope of Dr. Trimen's Report; but we must call attention to its substance (see pages 420-422) and especially to the remarks on our staple products—Coffee (markedly encourging), Tea (with a suitable warning), Cacao (thoroughly satisfactory) and Cinchona, &c. In reference to bark Dr. Trimen judges—and his opinion ought to carry much weight in the local as well as home bark markets,—that the quantity to go forward from Ceylon cannot be kept up to recent exports, but must soon fall off, the reserves being largely encroached upon. What is said about Coffee ought certainly to encourage every man with living coffee trees to do his best to conserve, cultivate and strengthen them. We have no doubt this is being done on all sides. When R62·50 to R65 per cwt. for high-grown coffee is the current rate, it requires no urging on outsiders to get our planters to do their level best for coffee. Indeed there is the risk of their going a little too far in new born-zeal. Meantime we commend Dr. Trimen's wise and suggestive words to all interested in the prosperity of Ceylon.

DELI PLANTING.

(*Translated for the Straits Times.*)

The *Java Bode* calls attention to the contest between planters and brokers in Deli regarding coolie prices, now in full swing. To planters just embarking in business, who find now that, under these circumstances, labour costs twice as much as formerly, this is a matter of the highest importance. This unfortunate result is due to want of unanimity among the planters. Owing to some of them falling away, they could not present a united front to the broker's ring. Those who stood out against the brokers to the last, are now casting about for means to remedy the evil. This can only be done by combined action against the Penang and Singapore brokers, who have become emboldened by their triumph. The planters who will not bow the knee to them, will have themselves to see to the importing of coolies direct from China and the Straits Settlements. By striking into this course they would save a large sum of money which, now, the brokers appropriate as advances and charges.

CUBEBS IN THE GALLE DISTRICT.

Our correspondent at Galle forwarded us the other day a small tin containing a sample of cubeb pepper gathered wild in the Galle district, and asked us to obtain a report upon it. We at once forwarded the sample to Dr. Trimen, who writes as follows:—

"I opened the box accompanying your letter and found within a small kind of pepper in fruit. This is not cubeb pepper, and bears indeed no resemblance to it. True cubebs are not found wild in Ceylon, and is a plant about which very little is known though the medicinal product has been common in trade since the 10th century, I believe it is cultivated in the south of Java only for commercial purposes."

The sample sent us, therefore, must be a species of wild pepper, and not cubebs at all. We should much like to be informed as to where it was found, and whether it is to be obtained in any quantity. The following particulars as to the production of cubebs, taken from the Pharmacographia, are of interest:—

Cultivation and Production.—Cubebs are cultivated in small special plantations, and also in coffee plantations, in the district of Bangoemas, in the south of Java. The fruits are bought by Chinese, who carry them to Batavia. They are likewise produced in Eastern Java, and about Bantane, in the north-west; and extensively in the Lampong country, in Sumatra. There has of late been a large distribution of plants among the European coffee planters. The cultivation of cubebs is easy. In the coffee estates certain trees are required for shade. Against these *piper cubeba* is planted, and climbing to a height of 18 to 20 ft., forms a large bush.

Description.—The cubebs of commerce consist of the dry globose fruits, gathered when full grown, but before they have arrived maturity. The fruit is about 1-5th inch in diameter when very young sessile, but subsequently elevated on a straight thin stalk. By this stalk the fruit is attached in considerable numbers (sometimes more than 50) to a common thickened stalk or rachis, about 1½ inch long.

Commercial cubebs are spherical, sometimes depressed at the base, very slightly pointed at the apex, strongly wrinkled by the shrinking of the fleshy pericarp; they are of a greyish brown or blackish hue, frequently covered with an ashy grey bloom. The stalk is the elongated base of the fruit, and remains permanently attached. The common axis or rachis, which is almost devoid of essential oil, is also frequently used with the drug.

Cubebs have a strong, aromatic, persistent taste with some bitterness and acridity. There smell is highly aromatic, and by no means disagreeable.—Local "Times"

TRADE OF THE PHILIPPINES.

MANILA.

The report of Mr. Alex. Gollan on the consular district of the Philippines for the year 1886 states:—

I had occasion to point out in my report for 1885 that the official statistics are never published here until about a year after the period to which they relate. I am, therefore, only able to give the full figures, in the form prescribed by the recent instructions, for the year 1885; but through the courtesy of some of the leading merchants I am enabled to give the following particulars of the export trade for the year ending Dec. 31, 1886.

The receipts of hemp from the districts where it is grown have been:—

	In 1886. Bales.	In 1885. Bales.
At Manila	342,015	362,024
„ Cebu	60,693	61,051
Total ...	402,708	423,075

or a falling off of about 20,000 bales. The shipments during 1886 have been:—To United States, 186,211 bales; to Great Britain, 164,148 bales; to other countries, 21,323 bales; total, 371,682 bales.

The local consumption of hemp in 1886 is estimated at 5,000 bales, and the stock afloat and in store on Jan. 1, 1887, at 26,363 bales, while 21,500 bales are on their way to the consuming markets. The market value of hemp at the end of the year was about $16 per bale. The total value of the shipments during 1886 amounted to about $6,000,000, or at an average rate of exchange of 3s. 10d. per dol. (£1,150,000).

Coffee.—Exports have been about 7,500 tons in 1886, as against 5,000 tons in 1885, and as the price steadily advanced during the year from about £37 per ton in January, 1886, to about double that figure in December, 1886, it is to be supposed that a considerable impetus will have been given to the further cultivation and development of the article.

Other articles of export in 1886 are:—

Articles.		Quantity.
Cigars	Number ...	103,000,000
Leaf tobacco ...	Quintals ...	183,943
Indigo	„ ...	1,284
Sapanwood ...	Piculs ...	70,748

IMPORTS, 1886.

I am sorry to say that I have found it quite impossible to obtain the necessary data for 1886.

CEBU.

Mr. Vice-Consul Cadell writes as follows:—The value of the exports from this district during 1886 shows a marked falling off as compared with the figures for the preceding year, the decrease being due mainly to the smaller shipments of sugar. Prices of this commodity have ruled on the whole low throughout the year, and consequently less cane has been planted than in former years, whilst a good deal of sugar is no doubt being held back in the provinces by those whose means permit of their waiting for an improvement in prices. The coming crop of cane, however, promises to be a good one.

Return of principal exports for 1885-84:—

	1885. kilos.	1885. £	1884. kilos.	1884. £
Hemp ...	53,330,554	1,244,000	51,085,027	1,441,000
Sugar ...	204,222,480	1,936,000	122,128,325	1,375,400
Coffee ...	5,467,830	183,800	7,529,564	254,000
Cigars ...	972,975	226,000	800,093	252,000
Unmanufactd. tobacco	5,831,379	290,000	1,246,470	110,000

—*London and China Express.*

THE INDIAN CONSERVATORY.

[BY A PRACTICAL GARDENER.]

Of recent years, amateur gardening in India has become a very popular amusement. Many of our compounds are gay with flowers, and our verandahs with pot plants and foliage shrubs, but the general tendency of Europeans in India is to cultivate our home species, and the wide and interesting field of tropical flower gardening is considerably neglected. At a little cost, however, the amateur gardener could add to his collection many a "thing of beauty" from the plant world of India, and so enrich his collection. I have managed an Indian conservatory, or, as it is called a Betel House, for several years, and my experience may be of some value to others. The site for the building should be in the open and not underneath trees, as the drip from the branches in the rains, and the falling of dead leaves in the dry season, are objectionable. The size and shape of the structure must be regulated by taste and condition; and the material used for the framework of building, iron, wood, or bamboo, is a question of cost and durability. Many of us are not permanently placed in India, and it would often be folly to erect a heavy structure at considerable expense. To birds of passage, I would recommend a bamboo house, say 18 or 20 feet long, by 14 or 16 feet wide. The roof should be sloping, the ridge being 14 or 15 feet from the ground, sloping down on each side to nine or ten feet. Care should be taken to procure strong seasoned bamboos; those used for the posts and for the ridge of the roof should be stout, and those for the framework of the roof much lighter. If the posts and the framework of the roof are given a couple of coverings of coal tar, the house will last

well for three years. The walls should be made of bamboo trellis, openings for doorways being left at convenient places. The trellised sides should be clear of the ground by six inches, and also clear of the top, where the side joins the roof by six inches. Creeping plants should be grown on the trellis, but they should never be allowed to surmount the trellis and climb on the roof. In selecting the creepers, do not choose grass and rampant varieties. Among the most suitable are the Hoyas (nox plants), Stephanotis, Cissus discolor, the smaller varieties of Passifloras (passion flower), the climbing fern and some of the smaller spomoeas. The best, most durable, and neatest material for roofing is a coarse netting made of coir twine; this is much in vogue on the Bombay side though scarcely known elsewhere.

The next best thing for roofing is long elephant or Moonj grass, which must be thinly spread over the frame, so as to admit a checkered sunlight and a modified rain; it must be tied on with laths of bamboo. The leaves of the cocoa or of the toddy palm may also be used, of course tied on in such a way as to admit partial sun or rain, but they are not tidy. Grass or palm leaves will want renewing at the beginning of each monsoon, whereas the coir netting is calculated to last for at least three years. In tying on the trellis, &c., only use split cane, or coir twine as these two materials stand the monsoon without rotting. The floor of the house should be raised a few, say six inches; and the best material for the floor is a depth of three or four inches of coal ashes, which material never gets sloppy in the rains, and if thoroughly watered once or twice a day in the dry season, keeps the atmosphere in the house cool and moist. If these ashes or cinders cannot be procured, broken brick is the next best thing, and then gravel or small *kunkur*. Take care to have a drain round the house outside.

Rockeries are a favourite embellishment to an Indian conservatory. They may be made of rough stones and rocks where procurable, but fused bricks, which can be got anywhere, answer admirably. Having selected the place where it is intended to make the rockery, mark it out and remove the soil to the depth of one-and-a-half inch, and fill up the space with slaked lime; the object of this is to keep white ants away. The best soil for the rockery is a mixture of two parts leaf mould, one part common loam, one part coarse sand. The same soil is suitable for ferns, begonias, and other delicate plants grown in pots. As you build up the rockery, fill in the spaces between the stones with the above soil, and water freely as you fill in, so as to consolidate the soil, and completely fill in the spaces. Take care that your rockery is clear of the woodwork and trellis of the house.

In spite of every care and cleanliness, white ants will at times appear; but the best preventative is *kerosine oil*, prepared and applied in the following manner, the discovery of which is due to Mr. Ridly, of the Lucknow Gardens. Take a quart bottle and fill it one-third with milk, let it stand till the milk turns sour; then nearly fill the bottle with kerosine; let a cooly churn the mixture as cream is cuhrned for butter; it will form a thick, white emulsion which mixes freely when stirred into water. Use a sherry glassful of this emulsion to a kerosine tinful of water. Stir well and water the whole of your conservatory freely with it out of a rose waterpot. It will not harm the most delicate plants. The floor and rockery should be saturated with this effective insecticide; and if this process be adopted every two months, white ants and other pests will give your conservatory a wide berth. The only plants likely to be injuriously affected by this kerosine compound are *orchids*, but as they are usually mounted on hanging blocks they are not likely to come in the way of the *mallee* in his general watering of the house.

Stands for pot plants should be made of wood and painted green. Tubs and large flowerpots should not be placed directly in contact with the ground but should stand on inverted bottles sunk to half their height in the soil. Having described the manner of constructing the conservatory, the next thing is a list of some of the most suitable plants with which to stock it. Among the best are orchids, marantas, ferns, palms, canes, begonias, dracoenas, dieffenbachias, selaginellas, alocasias, anthuriums, caladiums, colei, crotons, fittonias, poffmanias, nepenthes, (pitcher plants), peperomias. In the North, West Provinces, the Punjab, and other localities where extreme heat prevails in the hot season, and frost at night in the cold season, matting should be used on the roof in the day time as a protection against the heat and at night against the cold. —*Englishman.*

HORTICULTURE IN NATAL.

The Colony of Natal, though younger considerably than the *Gardeners' Chronicle*, has had a chequered history. Our concern with it arises chiefly from the development therein of cultural enterprise, which may be expected to increase if the unhealthy excitement of the gold fever do not afford a check to it. By opening up new districts and making their resources known the search for gold may, however, effect much indicate good, which will remain after the gold fever has subsided. The late Indo-Colonial Exhibition served to indicate the resources of the colony so far as timber and sugar are concerned. Coffee, Tea, fibre plants, Tobacco, Arrowroot, Maize (Mealies), drugs, and fruits were also exhibited. But we are more especially concerned here with the growth of plants for horticultural purposes. The exports of plants and bulbs in 1885 comprised 845 packages, valued at £911. This is no doubt not a large sum, but one which serves to show how much it is likely to be increased in the future.

"The suitability of this colony," we cite from the official catalogue," for the growth of many plants and bulbs in demand abroad, and especially those required for the perfumery trade, has lately received attention. The double-flowering Tuberose is now cultivated on aconsiderable scale, and tubers have become an article of export. It has been stated by a local florist that the following plants would pay to grow in quantity if appliances were also provided for extracting the perfume, viz.:—Gardenia, Rose, Jasmine, Violet, Patchouli, Verbena, Geranium, Vetivert, Iris, Carraway, and Anise; and that there is every reason to believe that flower farming will become a profitable, as it is a pleasant pursuit. The export of plants and bulbs averaged only about £30 per annum till 1881; since then it has advanced considerably, and for the last three years has averaged £900 per annum."

As an illustration of horticultural enterprise we append, by the courtesy of Mr. Adlam, a list of plants shown at a resent flower show at Maritzburg. All the plants named are worth cultivation, and, with few exceptions, are found within a radius of 20 miles from the town, at elevations of from 2000 to 4500 feet. We heartily congratulate the promoters of this show, who seem to have done what we have so frequently urged our colonial friends to do, viz., to promote a knowledge of their own native flora and its capabilities rather than to attempt a servile copy of a European flower show. How rich in garden plants the Natal flora is, is shown in a letter from Mr. Adlam, in which he says that:—

"Owing to the' gold fever, which has seized so many in South-east Africa the country has been hunted over by prospectors with an eye to goldbearing quartz, and many a solitary mountain has been surmounted, many dense forests penetrated, and rivers forded in places in which, till now no white man has ever set foot. Thus from time to time I have received fragmentary imformation regarding new plants seen, and fresh localities for old ones, lighted on.

"Very recently some dried specimens were brought me from the Zululand border. A showy terrrestrial Orchid, bearing a spike of thirty-six spreading light purple flowers, each an inch across. The two lateral sepals are narrow and spreading; the upper sepal, which has a long spur, bends with the two upper petals over the minute column, which was too decayed for examination. The lip is remarkable, long, narrow,

thread-like, upright. We have reveral good Streptocarpi, but one from the same locality as above surpasses all hitherto seen. About a foot high, flowers very many, a deep intense blue; leaves unknown—in fact only a scrap was given me.

"Cymbidium Sandersoni was first sent to Harvey by the late Mr. Sanderson in 1860. In habit it is most distinct from any other epiphytic Orchid we have. Long spindle-shaped pseudobulbs, evidently tending to a true stem, 1½—2 feet long, covered by a tuft of robust two-ranked leaves. A tall scape ending in a panicle of pale yellow flowers. I am told of a forest where it was seen growing in abundance on trees. It is a plant I have often searched for, but hitherto it has never been my luck to come across it.

"*Disa macrantha, or crassicornis.*—I have seen this very fine plant in the same locality from whence Mr. Sanderson obtained his specimens, now in the Kew Herbarium, and can confirm Mr. N. E. Brown's remark, that it runs D. grandiflora very close. It is rare, and affects deep black, rich loam on sloping hillsides fully exposed to the sun. It has been found recently close to town at an elevation of 2200 feet, and also 20 miles from here; elevation, 4000 feet."

The following is the list of the native plants exhibited at the Maritzburg flower show in January of this year:—

Aristea Eckloni
Anemone Fannini
Agapanthus umbellatus
Aloe sp.
Begonia dregei
„ natalensis
Burchellia capensis
Bauhinia natalensis
Brunsvigia multiflora
Clerodendron glabrum
Calodendron capense
Cyrtanthus Mackeni
„ collinus (?)
Chlorophytum Bowkeri
Cymbidium Sandersoni (?)
„ Buchanani
Calhurnia lasiogyne
Crotalaria globifera
„ capensis
Duranta sp., white flowers, doubtful native
Disa polygonoides
„ sp., white and green flowers
Dais cotinifolia
Dianthus sp.
Disperis Fanniniæ
„ Cooperi
Eulophia ensata
„ Dregei
„ sp., yellow and maroon flowers
Erythrina Humei
Eucomis punctata
Gomphocarpus albens
„ sp., brown and yellow flowers
Gerbera aurantiaca
Gloriosa virescens
Galtonia candicans
„ princeps
Habenaria sp.
Hæmanthus natalensis
„ Baurii
Hypoxis latifolia
„ elata
Kalanchoe crenata
Lasosiphon sp.
Lissochilus Krebsii
Littonia modesta
Montbretia Pottsii
Moræa bicolor
„ iridioides
„ „ sp., large pale yellow flowers
Nycterinia nataleusis
Nerine flexuosa
„ pudica
Nymphæa stellata
Osbeckia Umhlasiana
Pavetta assimilis
„ Bowkeri
Phygelius capensis
Plumbago capensis
Polygala virgata
Protea sp.
Richardia africana
„ hastata
Satyrium sp., orange flowers
„ „ sp. white and pink flowers
Sandersonia aurantiaca
Tritoma natalensis
Tritonia aurea
Vernonia mespilifolia
Watsonia meriana
„ densiflora
„ „ alba

—*Gardeners' Chronicle.*

THE DRUGS OF MAURITIUS.

Medicinal plants have been but little studied in Mauritius. A remedy for dysentery is sought in the *ipica sauvage* or *ipica du pays* (*Tylophora asthmatica*). A decoction of the slender thread-like stem of the parasitic *tsihitrafototra* (*Cassytha filiformis*) is given for intestinal derangement, and as a tonic for scrofulous and rachitic infants. An oleoresin resembling elemi, probably produced by *Canarium Colophania*, is employed in the form of plaster as a detersive. The yellow juice which flows from the incised stems of the guava (*Psidium pomiferum*) is used as an application to ringworm, and a skin disease called *tampane*. The wood of the shrub *liane poilly* (*Embelia micrantha* is administered as a tonic, and given in decoction for nephritis. The leaves and seed of the *sogar gota* or *cadoque* (*Cæsal-pinia Bonducella*) are used for certain diseases, and the seeds, powdered and mixed with pepper, constitute a febrifuge. Small senna (*Cassia occidentalis*) is used in asthma, and as a fomentation in some skin diseases. A decoction of the root possesses diuretic properties, and the leaves are used by the negroes, when smeared with a little candle grease, as a substitute for adhesive plaister.—*Journal of the Society of Arts.*

THE CLOVE TREE.

The clove tree (*caryophulus aromaticus*) says Rumphius "appears to me the most beautiful, the most elegant, and the most precious of all known trees." In form, it commonly resembles the laurel, and sometimes the beech. Generally of the height of an ordinary cherry tree, its trunk is straight, and rises to four or five feet before it throws out branches. The bark is smooth, thin, and adheres closely to the wood, which is hard and strong, but of an ugly grey colour, and, therefore, not suited for cabinet work. In the commencement of the wet season, which is the month of May in the native country of the clove, the tree throws out a profusion of new leaves. Soon after, the germs of the fruit are discovered at the extremities of the young shoots, and in the four following months the cloves are completely formed. The fruit, at first of a green colour, assumes in time a pale yellow, and then becomes of a blood-red colour, if of the most ordinary variety. It is at this period that the clove is fit to be used as a spice, and of course, this is the period of the clove harvest. It is not, however, the period of the full maturity of the fruit, which requires three weeks longer to perfect itself, and serve for the purposes of propagation. In this short period the fruit swells to an extraordinary size, loses much of its spicy quality, and contains a hard nucleus like the seed of the bay. This state of the fruit is what Europeans call the mother clove, and the natives *poleng*.

There appears to be five varieties of the clove, *viz* the ordinary cultivated clove, the clove called the female clove by the natives, which has a pale stem—the keri, or loory clove, the royal clove, which is very scarce, and the wild clove. The three first are equally valuable, as spices, the female being considered fittest for the distillation of essential oil. The wild clove has hardly any aromatic flavour, and is, of course, of no value.

Of all useful plants the clove has perhaps the most limited geographical distribution. It was originally confined to the five Mollucas islands, and chiefly to Machian. From these places it was conveyed to Amboyna a very short time only before the arrival of the Portuguese. The portion of Amboyna called Leytimeer, and the Uliasser islands, produced no cloves until the arrival of the Dutch, by whom the cultivation was restricted to Amboyna, every effort being made to extirpate the plant elsewhere. To what distance from the parent country the culture might be successfully extended, there has been no opportunity of ascertaining.

Rumphius informs us, that the plant is not partial to large islands, and does not answer well in Gilolo, Ceram, Beuroe, or Celebes. It is probable that Beuroe and the Xula isles are the utmost western limit of the successful culture of the clove. The same writer adds that the Javanese and Maccassars, when they were the carriers in the spice trade to the western emporia of the Archipelago, conveyed to their own country, with great care, young clove plants and mother cloves, from which trees were reared that produced no fruit. Through the speculative enterprise of Europeans the clove has in latter times been cultivated so as to bear fruit in some of the western parts of the Archipelago, in the Mauritius, and in the West Indies. They have been cultivated for nearly fifty years in the Mauritius, where they bear fruit, of inferior quality and high price. The fact sems to be, that like the grape, but in a much higher degree, the clove may be raised at a heavy expense, and of inferior quality, in soils and climate little suited to it. How wonderfully restricted

the soil and climate of the clove is may be gathered from this well-known fact, that, in the parent islands, the tree yields fruit in the seventh and eight year of its growth, and grows almost spontaneously without care or culture, whereas, at Ambonya, where it is an exotic, it does not bear until the tenth and twelfth year, and demands very considerable attention.

The clove neither thrives well near the sea, where it suffers from the spray, nor in the higher mountains, where it suffers from the cold. The soil which suits it, is a dark loam, having underneath a layer of dusky yellow earth, intermixed with gravel. A sandy soil, a hardy clay, and the wet ground in which sedges grow are to be avoided. The tree may be propagated either directly from the mother cloves, or by transplanting the young plants found in the clove gradens from the natural propagation of the seed. The plants raised by the first method grow luxuriantly, but are alleged to yield more leaves than fruit, and growing remarkably straight, to be difficult to climb for the purpose of reaping the harvest. The trees propagated by the latter method are prefferred, but the culture is laborious, and the success of the operation uncertain until the plants have attained the heigh of five or six feet. The young plants at first require the shade of other trees, and must therefore be planted among them. As they grow up the other plants must be removed, leaving here and there a few fruit trees, such as the Kanari and the coconut, &c.; the neighbourhood of which, it has been discovered, is favourable to the clove. The clove trees must themselves be kept pruned, and care be taken that they are not choked with weeds, or by too many of the fruit trees just mentioned, in failure of which attention the plants will languish, or degenerate into wild cloves.

Such is the culture requisite in Amboyna, a soil and climate foreign to the plant, where comparatively much care and attention are required. In its native country, on the contrary the clove grows luxuriantly and almost spontaneously, being propagated and coming to perfection with hardly any culture. In its native country, the clove tree as already mentioned begins to yield fruit in the seventh or eighth year, but at Amboyna not until the tenth or twelfth.

Examples are given of clove trees living to the age of one hundred and thirty years, but the ordinary duration of its life in Amboyna does not average above seventy five. Much depends upon the nature of the soil and ground in which the tree has taken root.

The clove, though generally a hardy plant, suffers from excessive drought, and is apt to be destroyed by the depredations of a worm which insinuates itself into the wood and kills the tree. In particular seasons thousands perish from this cause.

The reaping of the clove harvest is perfectly simple. When the fruit begins to grow red, the reaping is begun. The ground underneath the tree is clean swept. The nearest clusters are taken off with the hand, and the more distant with the assistance of crooked sticks. Great care is necessary that the trees, in this operation, should not be rudely handled, as an injury offered to them in this way, would prevent them from bearing for years. The curing of the cloves consists in placing them for some days on hurdles, where they are smoked by a slow wood fire, which gives them a brown colour, and afterwards drying them in the sun, when they turn black, as we see them, in the article of commerce. In some places they are scalded in hot water before being smoked, but this practice is not common. Such cloves as casually fall on the ground, and are picked up in small quantities, the cultivators do not think it worth while to subject to the process of smoking, and they are merely dried in the sun; they are discoverable by their shrivelled apperance, and are of inferior value. The period of harvest is from October to December.

Of the fecundity of the clove it is not very easy to speak distinctly. The produce from one year to another is very unequal. At intervals of from three to six years they usually yield one extraordinary crop, but then a year now and then intervenes when they do not bear at all. At other times, again, they will give a double harvest. Some extraordinary instances of fecundity in particular trees are quoted. Rumphius and Valentyn speak of a remarkable tree, a hundred and thirty years old, which one year gave the enormous crop of eleven hundred pounds and another year half this quantity. About the propotion of two-thirds of a clove cultivation is considered to be bearing trees, the remaining third being allowed for barren and young trees. According to the present mode of culture, perhaps, it would not be safe to average the production of all trees at above five pounds.

According to the data, the produce of an acre will be 375 lb. avoirdupois, and deducting one-eighth for young trees under ten years, 328 lb. By a free culture, as in the case of pepper, a much larger produce than is here stated would, no doubt, be obtained.—*Indian Agriculturist.*

NEW YORK EXPERIMENTAL STATION.—The fifth annual report is now before us, comprising a record of the work done at the station, meteorological details, results of experiments, &c. The object of the station is to ascertain and apply the principles of natural history to the profitable cultivation of plants or the mainteuance of animals. Passing the experiments on cattle feeding as not coming within our scope, we may mention a few of the more important matters discussed, such, for instance, as the relation of soil temperature to produce, in which it is shown that for the cultivation of Potatoes a relatively cool soil is favourable. In the case of Lettuces, a cross between the Red-edged Victoria and the Deer-tongue, thel atter yielding the pollen, resulted in the production of seedlings referable to seven differnt types, the most interesting being one which reproduced the characters of the wild Lettuce, Lactuca scariola. Mr. C. S. Plumb gives a summary of his efforts to classify and arrange the synonymy of a large number of varieties of Wheat and Oats. A curious corelation is mentioned between the number of rows in the ear of Barley and the tendency to tiller; thus in the two-rowed varieties the maximum number of plants that tillered was 28·00, while in the six-rowed varieties the tendency to tiller was less, *i.e.*, 18·00; so the open-panicled Oat averages more fruitful culms per plant than the side panicled variety. The winter Oats tiller far more than the summer varieties. Mr. Goff, the horticulturist, reports on Potatoes, root growth orchards, Grapes, Tomatoes, insects, the influence of foreign pollen on fruit, &c. A Potato known as "Buffalo Bill" was found to be the most productive. It is calculated that this variety yielded at the rate of 275 bushels per acre. As regards the question of the relative produce of cut sets or whole tubers for planting, the difference was markedly in favour of the latter. With a view of testing whether regularity of form can be secured by careful selection of tubers, eyes were taken from the most ill-shaped tubers that could be got, and others from the most symmetrical tubers. It was found, however, in the result, that there was no material difference either one way or the other in the character of the produce. The observations on root growth have been continued, some interesting details being given as to the length, ramification, depth below the surface, &c. A root of Vegetable Marrow was measured to a horizontal length of 10 feet when it was unfortunately broken, evidently at a long distance from its extremity. The chief feeding ground for the roots seems to be between 3 and 10 inches below the surface, though others go much deeper; the plants that make the largest development of stem or foliage during the summer are those of which the feeding ground is shallowest in the soil. Experiments made to determine what, if any, influence on the fruit is caused by the application of stranger pollen, led, as in former years, to no definite result. Mr. Arthur's report on the Bean blight (Micrococcus amylovorus) has already been mentioned in our columns. The report concludes with the record of the work done by the chemists.—*Gardeners' Chronicle.*

ENGLISH TOBACCO.—The following is a letter which appeared in the *Times*, and which we reproduce as being of interest to our readers:—"It may be of benefit to intending planters of British Tobacco this year to learn that a parcel was exposed for sale by public auction in the City yesterday. It is described in the catalogue of the selling brokers, Messrs. Grant, Chambers & Co., as seven drums of English leaf Tobacco, per railway from Wittersham, warehoused at Haydon Square December 2, 1886. The first four lots sold at one half-penny per pound, and there were no bids for the other three. The attendance of the trade was a little below the average, and as to the Tobacco, I think if it had come from any foreign country it would not have fatched the price it did as it was unfit for trade purposes.—J. J. JONAS, 51 and 52, Fenchurch Street, E. C., April 7."—*Gardeners' Chronicle.*

THE KEW "BULLETIN".—The April number contains articles on Manilla Hemp (Musa textilis), which yields an excellent fibre, the supply being derived from the Philippine Islands. It may be grown where and in the same way as the common Banana, and its cultivation should therefore be taken into consideration in our tropical colonies, but only where labour is cheap and abundant, and where the best methods of preparation can be carried out. Mr. Morris gives details as to the best method of culture and preparation, but, on the whole, the culture does not seem to be very promising, although the price per ton of fibre is as high as £36, or even £45 - two-thirds more than the price of ordinary Plantain fibre, which also receives attention in this *Bulletin*. Plantain-fibre might be utilised for paper-making. The fibre of the Pine-apple plant is stated to have a future of considerable importance before it.—*Gardeners' Chronicle.*

"A SIGN OF THE TIMES" may be found in a letter from a China tea merchant received by us by a recent mail, from which we quote as follows:—"As regards trade, India and your rapidly developing tea trade has knocked poor old China about sadly and it seems to me nowadays that a China Chaasze's (or tea taster) life somewhat resembles that of a 'frozen-out gardener!' and scented Canton teas especially are bound to give way (as gracefully as they can) year by year to your deliciously flavoury and pungent pekoe and pekoe souchongs. As I could not help seeing this about June 1885 after I had been at home 6 months, I resolved to give up Canton, and to ally myself with some friends—tea brokers—here, who besides the waning China trade are cultivating the Ceylon tea trade." Any Ceylon tea planters in want of good London Brokers can have the name of our China friend's firm on application.

INDIAN AND CEYLON TEA.—The Indian Tea market remains generally firm, and the smaller supplies offered have met with a fairly active demand. The finest Teas, owing to the small quantities offered, have sold more readily than other grades, and at rather higher prices. There appears every prospect of the comparative scarcity of these sorts increasing until the new Teas come to hand, as from the last Calcutta advices very few lots of fine Tea appear to have been cleared from thence of late, and the range of prices paid at the Calcutta sales was exceedingly low. On the other hand, it is obvious that any material rise in the value of fine Teas would have the effect of curtailing the already limited demand for them, and this is the more probable as the new Ceylon crop, of which the first arrivals are now in the market will continue to be brought forward freely. Buyers of fine Tea, who are not in a hurry to purchase, will naturally be disposed to wait and see what Ceylon sends, as the improvement in the quality of last season's Ceylon crop was very encouraging, and the finest parcels are now often substituted for the finer kinds of Indian Tea, the value of which is not likely to advance much if the Ceylon crop turns out well. The market has also been strong for the medium descriptions, particularly for good Pekoes and Pekoe Souchongs, for which there has been a brisk inquiry at rather firmer rates. For the cheaper kinds values have been comparatively steady, although some common Broken Teas have sold at very low prices. Any reaction in the values of the latter sorts could only be brought about by a curtailment in the supplies, and this at present does not seem at all probable. All the better descriptions of Ceylon Tea have been in good demand at steady prices, but commoner parcels have sold at slightly reduced quotations. For the higher grades of Java Tea there has been an improved inquiry at better rates, but common sorts are less firm. —*Produce Markets' Review*, April 2nd.

USEFUL PLANTS.—There are one or two plants which Mr. R. Harding, of the Botanic Gardens, Toowoomba, strongly recommends as likely to prove useful to settlers. One is the *Phyllaria augustifolia*, which, for hedge purposes, on the Downs is unsurpassed by any other plant. A hedge of this shrub can be seen near the entrance gates of the gardens, where it has been one of the ornaments of the grounds for several years past. It grows dense and tall, and is admirably suited for planting as a break-wind to any garden situated upon a bleak plain. The only bamboo he has found to withstand the cold climate is the variegated species, which is very ornamental but does not attain to the height of the common kind. It is easily propagated by cuttings. For fodder purposes specially suited for the cultivator in the interior, he recommends the "Tonga" bean. Two seeds received by him from Mr. J. H. Young, Toowoomba, have made such marvellous growth that they cover the ground for an area of 20ft. square as completely as it could be done by sweet-potato vines, and the plants are loaded with pods, although it is only three months since the seeds were sown. This plant would take possession of the garden if allowed. These beans have a special aptitude for leaving behind them when cleared away a good bed of leaf mould.—*Queenslander.*

THE INFLUENCE OF FORESTS UPON rainfall is said to be now quite observable in the Hawaiian islands. It is recognised, according to a paper upon the subject in an American exchange, that since the plain and town site of Honolulu have been covered with trees the rainfall on that side of the island of Oahu has sensibly increased. The same observation has been made on the island of Hawaii under similar conditions. This may be so, but we are inclined to think the time required for observations in this case is too brief for correct deductions to be drawn from it, and that the conclusion as just stated does not cover what may be more than an ordinary recurrence of wet seasons after a period of dryness. Some twenty-five years ago the forests trees upon a large area of that good land which lies north of Belfast, and south of Hamilton, in Victoria, all died and the whole country was "sailing under bare poles." It looked very dreary, but the fattening properties of the grass increased and the residents became reconciled. However, the common remark at the time was that the climate would deteriorate to a dry one. About eight years after the commencement of the trouble a series of dry seasons did come round, and every one said it was the result of the forest denudation and would be permanent; indeed that henceforth they must expect a climate similar to their northern neighbours on the Wimmera. The supposition proved wrong, for the dry seasons were followed by wet ones with such a vengeance that fluke ran its ravages through the flocks to an alarming extent. That the destruction of forest trees, which by attracting and entangling clouuds would naturally produce rain, may undoubtedly alter a climate few will dispute, but a longer time is required to establish the fact than a five years' obsevation in a newly inhabited country. We are glad to see that our neighbours on the Hawaiian islands are continuing their experiments and planting extensively Australian varieties of trees, for certainly no forest growth is so suitable for the purpose aimed at, inasmuch as once get them established it will probably prove, as in the case of the coast districts of Queensland, almost impossible ever again to denude the hills.—*Queenslander,*

ROYAL BOTANIC GARDENS: CEYLON.
REPORT OF DR. HENRY TRIMEN, DIRECTOR, FOR THE YEAR 1886.

(*Continued from page* 815.)

Roads and Paths.—A large number of new paths, 4 ft. wide, have been formed during the year, the total length of such being 423 yards; 332 yards of old paths were gravelled.

The steep and unsightly path at the south end of the old ornamental pond has been done away with, and the space planted up with shrubs. A stone culvert was built in the gully between the plant sheds and nurseries, and a wooden bridge made across the gully in the new road to the fernery; also one by the carriage shed, and another leading over the water-course by the foreman's quarters. Retaining walls were built—one to support the road leading into the nursery, and one just below the carriage turn.

Turf verges, 12 in. wide, were laid down on each side of the new drive and on the sides of portions of the new paths, the total length being 840 yards; 338 cart loads of turf were required for this and the turfing of the banks. Most of this was obtained from the public roadsides, and the rest was kindly given by Mr. W. I. Cotton, from his property opposite the Garden. The turf laid on the banks measures 1,417 yards.

All the paths have been repaired and gravelled, and most of the beds have been dug up and mulched with surface soil from the jungle. A light top dressing of lime was forked in about May, the benefit of which was soon seen in the general healthy appearance of the plants where it was applied.

The scrub and jungle on the north side of the lower entrance to the fernery has been grubbed up for a distance of 108 ft. long and 12 ft. broad. A rockery bank has been formed here to correspond with that on the opposite side. This has been planted with mixed ferns and begonias.

A path has been opened from the corner of the flower garden leading past the thermometer shed, and winding through the jungle into the fernery on its upper side. The undergrowth only has been cut away, leaving all the jungle trees; and 1,250 plants of ferns and begonias have been planted out under the trees. This path not only gives a new access to the fenery, but affords an opportunity to visitors for seeing something of the hill-jungle and its native trees.

Borders and Shrubberies.—The chief work done during the year has been the digging up of the soil among the plants to let in light and air, manuring, staking, and pruning and thinning out the trees and shrubs; 53,900 plants were set out during the year, the greater part of these, as usual, being showy garden plants and annuals.

I may mention that hares have this year been most destructive to young plants. All efforts to get good beds of such things as verbenas, carnations, lobelias, &c., have been of no avail, for as soon as they begin to strike into healthy growth, they are eaten off and destroyed. The hares have become so bold that one night they came to a border within nine yards of the bungalow door, and 170 plants of choice poppies, which had been planted out some time, and had put on three or four inches of healthy growth, were eaten off close to the ground.

At different times during the year much pruning and thinning out of trees has been done. A good many of the casuarina trees near the gates died during the year from the effects of a little borer. These have been cut down and removed to the wood pile. Fifty-nine cart loads of timber for the stoke hole fire were cut out of the Garden from the thinnings and prunings of the trees. From the entrance gates to the old China tea plot, and running parallel with the public road for 80 yards, a hedge of *Duranta Plumieri* has been planted. No alterations were made in the arrangements of the beds, and they were filled with similar plants to those of last year. The only improvement to the flower garden was the building of a retaining wall and culvert at the north-west corner, and making a path across the drain there.

Rose Garden.—For the first-half of the year this garden was very attractive. The gladiolus, pansies, and portulacas bloomed remarkably well, and continued in flower for a long time. Some of the pansies attained 2½ in. in diameter.

The rose plants for the latter part of the year have not done well, and though they have received every attention in the way of manuring, &c., they have made but very little growth, and I fear the whole lot must be taken up and new plants put in.

Herbaceous Garden.—The beds at the lower end of this garden have been completed. A few plants have been set out in their places, in the orders to which they belong. The monocotyledons planted last year have done very well indeed, and have flowered freely. The planting here requires to be done personally, and I have had little time during the year.

Weather.—The weather in January was remarkable for wet, foggy, misty days and rainy nights, and up to the 29th of the month, the sun was but rarely seen. February, March, and April were fine, rain scracely ever falling before 2 P.M. During May the weather was variable, but up to the 16th the mornings were generally fine, and the afternoons more or less cloudy and rainy. From the 16th to the 28th it was very wet, though heavy rain only fell on one day, the 24th. The first half of June was fine, followed by ten days very wet rough weather. The weather in July was most unusual, being generally wet and foggy, with very high winds, and certainly the roughest month in the year. August was also very wet and cloudy for the first nineteen days. The rest of the month was fine and bright and very hot, the thermometer in the shade rising to 75·0 on the 21st, 22nd, and 29th. and on the 25th the thermometer in the sun went up to 142·0. In September rain was registered on twenty-three days, heavy rain falling on the 24th and 29th. From the 14th to the 23rd it was very fine and bright. October gave much the same sort of weather as September, heavy rain falling on the 2nd, 12th, and 25th. November was remarkable for the absence of the dense fogs which usually prevail during this month. From the 15th to the 25th the days were very fine and bright, and the nights cold, more like February than November. Though it was dull and wet in December up to the 22nd, the rainfall was not heavy. The temperature was very low several times during the month, and on the 8th and 9th a very strong cold wind passed over.

The following table will show the monthly rainfall from July 1, 1883, and the number of days on which rain fell during the last five years:—

Month.	1886. Rainfall.	1886. No. of Days.	1885. Rainfall.	1885. No. of Days	1884. Rainfall.	1884. No. of Days.	1883. Rainfall.	1883. No. of Days.	1882. No. of Days.
January	11·30	21	5·56	24	4·07	17	—	22	10
February	2·66	9	2·42	5	1·85	7	—	11	16
March	3·28	9	3·12	12	3·90	9	—	8	6
April	3·43	15	4·16	12	3·02	12	—	18	12
May	9·13	18	8·52	19	4·48	12	—	18	15
June	7·60	17	15·57	26	2·23	11	—	23	18
July	8·18	24	4·77	18	3·09	17	11·96	22	31
August	8·45	19	3·47	11	4·33	22	7·96	25	31
September	6·79	20	4·21	14	8·32	20	3·27	14	27
October	9·61	21	10·60	26	14·07	25	6·80	22	27
November	6·97	18	8·03	23	9·81	19	9·24	21	20
December	9·03	20	12·71	25	15·47	25	7·83	19	22
Total...	86·43	211	83·14	215	75·24	196	47·06	226	235

The average number of days on which rain fell during the five years is 216·6, and the average monthly rainfall for three and half years is 6·95 in. nearly.

The wind was light or moderate until May 20, and the direction was pretty steady from the S.E. It then turned to N.W. and blew very strong and steady from that quarter until June 22. From this to July 8 it was unsettled, sometimes going round to S.E., and the force was light or moderate during that time. It then settled, down to N.W., and continued to blow from that quarter till October 21, being at times very strong. From then till November 22 it was very variable, and light or moderate in force. On 22nd it settled down to S.E., and continued so till the end of the year, and the force was generally light, with the exception of December 8, 9, and 10. On these three days it blew very strong from the N.W.

The greatest pressure per square foot registered during any 24 hours was 8·333 lb., equal to 4·80 miles an hour, on June 16. This is the highest recorded during the three and half years the observations have been taken.

The mean daily horizontal movement of the air for the year was 207·49 miles. The most windy month was July, with a mean daily horizontal movement of 349·31 miles. The calmest month was February, with a daily mean of 106·15 miles.

The barometic pressure and the temperature of the air was as follows:—

BAROMETIC PRESSURE. 5,581 (ft.)

1886.	Mean.	Range.
January ...	24·547 ...	·275
February ...	24·556 ...	·233
March ...	24·557 ...	·208
April ...	24·541 ...	·171
May ...	24·480 ...	·239
June ...	24·474 ...	·209
July ...	24·462 ...	·152
August ...	24·475 ...	·210
September ...	24·503 ...	·189
October ...	24·507 ...	·191
November ...	24·523 ...	·281
December ...	24·542 ...	·276
The 12 months ...	24·513 ...	·395
Highest reading...	24·726 on January 5.	
Lowest reading ...	24·331 on May 23.	

TEMPERATURE OF THE AIR.

1886.	Mean.	Range.
January ...	59·8 ...	23·0
February ...	61·0 ...	28·0
March ...	65·0 ...	30·5
April ...	65·7 ...	30·0
May ...	65·6 ...	24·5
June ...	64·5 ...	22·0
July ...	63·3 ...	22·0
August ...	62·9 ...	22·0
September ...	62·5 ...	24·5
October ...	62·4 ...	21·0
November ...	64·3 ...	26·0
December ...	59·1 ...	25·0
The 12 months	63·0 ...	36·0

Maximum temperature of air, 78·0 on March 23-24.

Minimum temperature of air, 42·0 on December 25.

The highest temperature during the year in the sun's rays was 145·0, on April 20 and June 27, and the lowest on grass was 38·0 on December 25.

The mean amount of cloud for the year was 7·05. The cloudiest months were January and November, with a mean of 8·1. The brightest month was March, with 4·7

6.—INTERCHANGE OF PLANTS AND SEEDS.

My absence from the Colony during the greater part of the year interfered to some extent with the exchanges with British and Foreign Gardens, but Mr. Clark has kept up most of our relations, and initiated a few new ones.

During the year we received Wardian cases and boxes of living plants from the Botanic Gardens of Kew (2), Calcutta (2), Madras, Singapore (4), Penang, Buitenzorg (Java) (2), and British Guiana; also from Colonel Berkeley (Rangoon), R. B. White, Esq. (Scotland), and Messrs. Weigandt, of Dusseldorff.

Packets of seeds were received from the following places and persons.—The Botanic Gardens of Kew, Cambridge, Calcutta, Buitenzorg, Melbourne, Mauritius, Hongkong, Natal, Jamaica, and British Guiana; the Agri-Horticultural Society of Madras, the Queensland Acclimatisation Society, Baron von Mueller (Melbourne), T. Hanbury, Esq. (Ventimeglia), E. M. Holmes, Esq., F. L. S. (London), H. Travers, Esq. (New Zealand), Adam & Sons (New Zealand), Dr. Henderson (Jamaica) T. Christy, Esq. (London), Messrs. Linden (Ghent) and Messrs. Haage & Schmidt (Erfurt). I have also to thank the following donors in the Colony:—Lady Hamilton Gordon, Mrs. Baker, Mrs. Grinlinton, Mrs. Jeffries, Rev. G. W. R. Mackenize, Captain F. Bayley, and Messrs. C. Badger, P. Bois, D. F. Browne, W.J. Cotton, W. Ferguson, F.L.S., T. C. Huxley, J. D. Jonklaas, W. Jordan, A. C. Lawrie, A. G. Kellow J. Kelley, H. Nevill, C.C.S., C. Strachan, A. Tatham, J. Wickwar, A. Whyte, G. W. Wood, and J. H. Wright.

The Parcel Post now affords great facilities for the carriage of many sorts of plants, and a box of *Cattleya superba* arrived in November in excellent order from so great a distance as Demerara by this means.

We have despatched Wardian cases and boxes of plants in exchange to the following:—The Botanic Gardens of Kew (3), Singapore (5), Penang, Saharunpore, Buitenzorg (2), and British Guiana; to the Conservators of Forests, Rangoon and Tavoy, to Colonel Berkeley (Rangoon), R. A. White, Esq. (Scotland) and Messrs. Weigandt, of Dusseldorff.

Seeds, &c., have been supplied to the Botaic Gardens of Kew, Glasgow, Calcutta, Singapore, Penang, Hongkong, Buitenzorg, Jamaica, and British Guiana, to the Acclimatisation Society of Queensland, to Messrs. Haage & Schmidt (Erfurt), and to Messrs. Veitch (Chelsea).

It may be worth putting on record here that thirteen stems of our mountain tree-fern (*Alsophila crinita*), sent home at the end of 1885, with the view of using them as decorative plants in the Ceylon Court of the Exhibition in London, all, with one exception, survived the voyage and recovered their health in the houses of the Royal Horticultural Society at Chiswick. This is, I believe, the first successful attempt to introduce this beautiful species into England. Four of the plants are now at Kew, two at Glasgow, and one at Glasnevin, Dublin.

We have made the customary *gratis* distribution of plants and seeds on application to public officials and places within the Colony. The Government Agents and Assistants at Anuradhapura, Badulla, Ratnapura, Hambantota, and Kegalla; the Museum Ground, Colombo; the Director of Public Instruction; the Forester, North Central Province; the Municipality of Kandy; the Local Board of Nuwara Eliya; the Superintendent of Police, Galle; and the Stationmasters at Matale and Rambukkana.

7.—PRINCIPAL ADDITIONS TO THE COLLECTIONS.

The following list, in continuation of those of previous years, contains the names of such of the freign plants received during 1886 as are additional to those already in the Gardens, and seem likely to succeed here. There are not among them many plants of economic value, but a considerable number of ornamental ones especially among the orchids, are included, as well as some species of great botanical interest.

I hope this year to find time to complete a Catalogue of the present contents of the Gardens, which is greatly needed.

(A)—PERADENIYA, &c., GARDENS.

DICOTYLEDONS.

Hibiscus liliiflorus, Cav. Mascarene Islands. (T. Hanbury.)

Sterculia quadrifida, Br. Queensland. (F. v. Mueller.

Theobroma bicolor, Humb. and Bonpl. New Grenada, &c. A wild chocolate, cultivated and used on a small scale by the Indians of Central America. (Buitenzorg.)

Grewia caffra, Meisn. Natal. (Natal)

Vepris lanceolata, A. Juss. S. Africa, Mauritius. (Natal.)

Canarium strictum, Roxb. S. India. Affords black dammar resin. Madras.
C. Mehebethene. Gaertn. Moluccas. (Buitenzorg.)
Dalbergia armata, E. Mey. Natal. (Natal).
Erythrina caffra, Thunb. S. Africa. (Natal.)
Millettia caffra, Meisn. Natal. Wood very hard. (Natal.)
Calpurnia sylvatica, E. Mey. S. Africa. (Natal.)
Ormosia coccinea, Jacks. Trop. S. America. (Kew.)
Colvillea, sp. (Calcutta.)
Maniltoa gemmipara, Scheff. New Guinea. (Buitenzorg.)
Acacia Kraussiana, Meisn. Natal. (Natal.)
Acacia, sp. "Black Boy." (Kew.)
Mouriria guianensis, Aublet. Guiana. (British Guiana.)
Combretum erythrophyllum, Sond. S. Africa. A handsome tree. (Natal.)
Trevesia palmata, Vis. Nepal, Malay Peninsula, (Singapore.)
Burchellia capensis, Br. The "Buffeldoorn" of S. Africa. (Natal)
Exostemma caribbæum, R. & S. West Indies. The "Jamaica Bark," a substitute for cinchona (Jamaica.)
Oxyanthus natalensis, Sond. Natal. (Natal.)
Pavetta lanceolata. Ecklon. S. Africa. (Natal.)
Gardenia globosa, Hochst. Natal. (Natal.)
Ardisia Oliveri. (Kew.)
Mimusops Kauki, L. Malaya, Trop. Australia. Fruit edible. (Buitenzorg.)
Willughbeia edulis, Roxb. (W. martabanica, Wall.) Assam to Malacca. A large climber yielding abundant caoutchouc. (Singapore.)
Jacaranda mimosæfolia, Don. Brazil. A beautiful flowering tree. (British Guiana.)
Aphelandra, sp. (Calcutta.)
Coleus. Many Garden varieties. (Calcutta.)
Lagetta lintearia, Lam. The lace-bark tree. W. Indies. (Kew.)
Piper, sp. Malaya. (Calcutta.)
Artauthe Veitchii. (Kew.)
Nepenthes marginata. (Penang.)
Artocarpus, rigidus, Bl. Java, &c. (Penang.)
Podocarpus, sp. (Singapore.)
Dacrydium elatum, Wall. Malay Peninsula, Sumatra, and Borneo. A handsome pyramidal coniferous tree. (Penang.)
Cycas tonkinensis. (Haage & Schmidt.)
Stangeria paradoxa, T. Moore. S. E. Africa. A very singular fern-like cycad. (Kew.)

MONOCOTYLEDONS.

Orchideæ.

Dendrobium Bensoniæ, Rchb. f. Moulmein. (Col. Berkeley.)
D. Brymerianum, Rchb. f. Burmah. Col. Berkeley.)
D. albo-sanguineum, Lindl. } Moulmein. (Col. Berkeley.)
D. Jamesianum, Rchb. f. }
D. Wardianum, Warn. Burmah, Assam. (Col. Berkeley.)
Acanthephippium javanicum, Bl. Java. } (Buitenzorg.)
Phajus Blumei, Lindl. Java. }
P. albus, Lindl. (Thuia, Rchb. f.) N. India, Burmah. (Calcutta.)
Calanthe curculigoides, Lindl. Malaya. (Penang.)
C. speciosa, Lindl. Java. (Buitenzorg.)
C. (Limatodes) rosea, Lindl. Burmah. (Col. Berkeley.)
Epidendrum eburneum, Rchb. f. } Weigandt.
Panama. }
E. oncidioides. }
Cattleya bicolor, Lindl. Brazil. }
C. citrina, Lindl. Mexico. } (Weigandt.)
C. crispa, Lindl., var. Brazil. }
C. Gaskelliana, Rchb. f. Brazil. } R. B. White, Esq.)
C. imperialis. }
C. Loddigesii, Lindl. S. America. (Weigandt.)
C. Purpurata. (R. B. White Esq.
C. speciosissima, Rchb. f. Venezuela. (R. B. White, Esq.)
C. superba, Lindl. (Brit. Guiana.)
C. Trianæ, Linden & Rchb. f. New Grenada. (R. B. White, Esq.)
C. velutina, Rchb. f. Brazil. (Weigandt.)
Lælia albida, Batem. Mexico. }
Stanhopea alba. }
S. maculata. }
S. tigrina, Batem. Mexico. }
Acineta Barkeri, Lindl. } (Weigandt.)
Oncidium alatum. }
O. elegantissimum. }
O. multiflorum. }
O. ornithorhynchum, H. B. & K. Central America. (Weigandt.)
O. prætextum. }
O. reflexum, Lindl. Mexico. } (Weigandt.)
O. stramineum, Lindl. Mexico. }
Gomeza recurva, Lodd. Brazil. }
Phalænopsis violacea, T. & B. Malay Islands. (Penang.)
Cypripedium barbatum, Lindl. Malay Peninsula. (Penang.)
C. Hookeri, Rchb. f. Borneo. (Penang.)
C. Stonei, Low. Borneo. (Penang.)
Billbergia Bakeri. }
B. Euphemiæ, E. Morr. Brazil. } (Kew.)
B. macrocalyx, Hook. Brazil. }
B. olens. }
Moræa iridioides, L. (Dietes. Sal.) S. Africa. (Natal.)
Eucharis pumila. (Calcutta.)
Asparagus virgatus, Baker. S. Africa. (Natal.)
Forrestia, sp. Malaya. (Calcutta.)

Palmæ.

Pinanga coronata, Bl. Java. (Buitenzorg.)
P. disticha Miq. (sub. Ptychosperma.) Sumatra. (Buitenzorg.)
P. paradoxa, Scheff. New Guinea. (Ptychococcus Becc.) (Buitenzorg.)
Drymophlœus ceramensis, Miq. Ceram. (Buitenzorg.)
Ptychandra glauca, Scheff. Malay Islands. (Buitenzorg.)
Arenga obtusifolia, Mart. Java, Sumatra. (Buitenzog.)
Caryota furfuracea, Bl. Java. (Buitenzorg.)
Sabal Ghiesbrechtii (Buitenzorg.)
S. glaucescens, Lodd. Trinidad. (Buitenzorg.)
Nannorrhops Ritchieana, W. & D. Afghanistan, &c. A desert palm. (Kew.)
Livistona humilis, Br. Trop. Australia (Buitenzorg.)
L. subglobosa, Mart. Java. (Buitenzorg.)
Calamus, sp. Demerara. (Calcutta.)
Korthalsia Junghuhniana, Miq. Java. (Buitenzorg)
Plectocomia elongata, Bl. Malaya. (Buitenzorg.)
Martinezia Lindeniana, Wendl. New Grenada, (Buitenzorg.)
Attalea Guichire, Karst. Trop. America. (Buitenzorg.)

Philodendrum gloriosum, André. New Grenada (Calcutta.)
Aglaonema, sp. Malaya, (Calcutta.)
Sagittaria montevidensis, Cham. & Schlecht. S. America and W. Indies. A beautiful water-plant. Fig. in Bot. Mag. t. 6755. (Kew.)

FERNS.

Dipteris Horsfieldii, Br. Polynesian Islands, Moluccas, (Penang.)
Niphobolus Penangianus, Hk. Malay Peninsula (Penang.)

(b)—Hakgala Garden.

DICOTYLEDONS.

Alyssum saxatile. Eastern Europe. (Cambridge.)
Pittosporum, revolutum, Aiton. N. Zealand. (H. Travers.)
P. tenuifolium, Banks & Sol. N. Zealand. (H. Travers.)
Viscaria corymbosa. Europe. (Cambridge.)
Herniaria hirsuta, L. S. Europe. (Mrs. Baker.)
Hibiscus africanus. (G. H. H. Austen.)
Elæocarpus oblongus, Gaertn. India, Malaya (Madras.)
Lagunaria Patersoni, Don. Norfolk Island. (Melbourne.)
Nephelium leiocarpum, F. Muell. N. S. W. (J. P. William Bros.)
Hardenbergia monophylla, Benth., alba. Australia. (Melbourne.)
Rosa Banksiæ. (A. Tatham.)

Saxifraga Aizoon, L. Europe. (Cambridge.)
S. sarmentosa, L. China and Japan. (A. O. Lawrie.)
Echeveria, sp. (Capt. Bayley.)
Melaleuca parviflora, Lindl. W. Australia. (J. P. William Bros.)
Cuphea miniata (Lady Gordon and Mrs. Baker.)
Eucalyptus crebra, F. Muell. Australia. (Kew.)
E. resinifera, Sm. N. S. Wales, Queensland. (Kew.)
E. regnans. (Melbourne.)
Begonia Rex, several vars. (T. C. Huxley.)
Epiphyllum, sp. (Mrs. Grinlinton.)
Cereus, sp. (Mrs. Grinlinton.)
Mesembryanthemum crystallinum, L. Mediterranean. (G. W. Wood.)
Cornus capitata, Wall. (Benthamia fragifera Lindl.) Himalaya. (Kew.)
Scabiosa columbaria, L. Europe. (Cambridge.)
Bellis perennis, L. Common Daisy. Europe. (C. Badger.)
Antennaria Leontopodium, G. "Edelweiss." European Alps. (Mrs. Baker.)
Centaurea macrophylla. (Cambridge.)
C. nigra, L. Knapweed. Europe (Cambridge.)
Chrysanthemum indicum, several vars. (T. C. Huxley.)
Clintonia pulchella, Lindl. California. (Lady Gordon.)
Specularia Speculum, DC. Europe. (Cambridge.)
Erica ventricosa (?) (T. Hanbury.)
Azalea, sp. (Capt. Bayley.)
Primula sinensis, var. splendens. (T. Hanbury.)
Primula sinensis, var. rubro-tigrinum. (T. Hanbury.)
Myrsine variabilis, R. Br. E. Australia.) (J. P. William Bros.)
Phlox speciosa, several vars. (T. C. Huxley and A. White.)
Anchusa italica, Retz. S. Europe. (Lady Gardon and Mrs. Baker.)
Solanum aviculare, Guill. New Zealand, Tasmania, S. Australia. (H. Travers.)
Schizanthus papilionaceus, Hort. Chili. (Cambridge.)
Verbascum olympicum. (Cambridge.)
Linaria purpurea, Will. Italy. (J. Gray.)
Pentstemon ovatus, Doug. N. America. (Cambridge.)
Collinsia bicolor, Benth. Calcutta. (Cambridge.)
Veronica longifolia, Linn. S. Europe. (Cambridge.)
Achimenes. sp. (Mrs. Jeffreys.)
Achimenes, sp., double. (Capt. Bayley.)
Gesnera bulbosa (?) (Mrs. Jeffreys.)
Catalpa Kæmpferi, S. & Z. Japan. (T. Hanbury.)
Salvia camphorata. (T. Hanbury.)
S. hispanica, L. America. (T. Hanbury.)
S. interrupta. (T. Hanbury.)
S. canariensis, Linn. Canary Islands. (T. Hanbury.)
Coleus, several garden vars. (A. C. Lawrie.)
Cryptocarya glaucescens, R. Br. Queensland, N. S. Wales. (J. P. William Bros.)
Nesodaphne Tawa, Hk. f. New Zealand. (H. Travers.)
Araucaria imbricata, Pav. "Puzzle Monkey." S. Chili (Haage & Schmidt.)
Picea Fraseri, Loud. Carolina. (Kew.)
Abies Smithiana, Forbes. W. Himalaya. (Kew.)
Pinus Strobus, Linn. N. America. (Kew.)

MONOCOTYLEDONS.

Dendrobium nobile, Lindl. China (T. C. Huxley.)
D., sp. (T. C. Huxley.)
Phalænopsis grandiflora, Lindl. Java. (A. C. Lawrie.)
Freesia Leichtlini, Klatt. Cape. (T. C. Huxley.)
Crinum, sp. (W. J. Cotton.)
Agave Xalaapensis. (T. Hanbury.)
A. xylinacantha, var. univitatta (T. Hambury.)
Commelyna cœlestis. (Mrs. Baker.)
Also bulbs of Hyacinths, Tulips, Crocus, &c., from W. Jordan.

9.—HERBARIUM AND LIBRARY.

Herbarium.—During my absence the opportunity was taken of going through, cleaning and sorting all the duplicate specimens of the "C. P." (Ceylon Plants) series, and re-arranging them under covers for easy access, in accordance with my new Catalogue of the Ceylon Flora. This has been completed during the year by the draughtsman, who acts also as keeper of the herbarium. Twelve new cabinets have been set up, and the duplicates accommodated in them; it is a great convenience to have them thus readily accessible, and in a parallel series with the herbarium itself. As time serves I am incorporating with these the numerous duplicates which have accumulated since I took charge of the Department, hitherto separately arranged.

The late Muhamdiram made several collecting expeditions in the earlier half of the year, and on two occasions was accompanied by the draughtsman several interesting and a few new plants were discovered, preserved, and sketched on these excursions.

In all, the draughtsman completed fifty-eight drawings of plants during the year, in addition to seven arge drawings of estate products, which were exhibited at the Exhibition in London, and subsequently presented to the Museum of Economic Botany at Kew.

The additions to the General Herbarium have been:—

From the Kew Herbarium:—(1) A collection of plants from Penang, collected by Curtis; (2) miscellaneous plants from the East.

From Dr. G. Watt, Calcutta, a collection of plants fron Munipur.

From Dr. G. King, Calcutta, a valuable serious of named specimens of *Ficus*.

From Dr. Engler, Breslau, Nos. 1 to 200 of his "Araceæ exsiccatæ."

Library.—The following books have been added during the year, many of which I purchased, cheaply during my stay in London:—

Clarke, B., New Arrangement of Phanerogamous Plants, third ed., 1886.

Miquel, De vero Pipere Cubeba, 1839

Regel, Monogr. gen. Eremostachys, 1886. (*Presented.*)

Trimen, Systematic Catalogue of Plants of Ceylon 1885. (*Presented.*)

Hooker, J. D., flora of British India, pt. 13, 1886. (*Presented.*)

Hollingsworth, Lists of Plants found in Guindy Park and in the Grounds of Government House, Madras 1886. (*Presented.*)

Seemann, Flora Vitiensis, 1865—73.

Lunan, Hortus Jamaicensis, 2 vols., 1814.

De Candolle, A., Origin of Cultivated Plants. English Edition. 1884.

Church, A. H., The Food Grains of India, 1886.

Acta Hort. Petropolitani, vol. IX., pt. 2, 1886. (*Presented.*)

Icones Plantarum, Ser. 3, vol. VI, pt. 2, and vol. VII, pts. 1, 2, and 3.

Thompson's Gardener's Assistant, edited by T. Moore 1884.

Vilmorin-Andrieux, The Vegetable Garden. English Edition, 1885.

Williams, Orchid Grower's Manual, edition 6, 1885.

Bull, W., A set of his Annual Retail Lists from 1870 to 1885, wanting 1871 and 1874. (*Presented.*)

Plukenet, Opera omnia, 4 vols., reprint, 1769.

Dillenius Hortus Elthamensis, 2 vols., 1732.

Hart, Botanist's Ramble in Central America, 1886. (*Presented.*)

Moore, Lepidoptera of Ceylon, pts. 11 and 12 (*Presented.*)

Museum.—I was much occupied in the early months of the year with the formation of a set of wood specimens for the Colonial and Indian Exhibition. The actual number ultimately selected and exhibited was 243, no duplicates or doubtfully identified specimens being sent home. As I anticipated, I was also able to supply a set of 126 numbered specimens in the rough to the Colombo Museum, which were sent there in September, and I have left a somewhat larger series—many of which are, however, duplicates of one another, or doubtfully determined—at Peradeniya. I purpose at once to arrange these here as a nucleus of the long-contemplated economic museum. They will form a good substantial commencement, and can be set up without much expense, but nothing can be done for the conservation of more perishable objects until some expenditure can be sanctioned for glass-fronted, well-made cabinets and glass-stoppered bottles.

And the following the number of purchasers:—

At Peradeniya	...	438
Hakgala	...	166
Henaratgoda	...	46
Anuradhapura	...	37
Badulla	...	32
Total	...	719

11.—EXPENDITURE.

The cost of the Botanic Gardens Department for the year has been as follows:—

		R.	c.	R.	c.
Salaries		—		18,342	78
Gardeners' and Labourers' wages:—					
Peradeniya	...	8,189	58		
Hakgala	...	3,000	0		
Henaratgoda	...	1,999	58		
Anuradhapura	...	999	75		
Badulla	...	1,496	98		
				15,685	89
Office Contingencies	...	—		3,087	22
Stationery	...	—		76	47
Travelling and Collecting		—		1,997	1
For the Pavilion, Kandy		—		2,205	0
				41,394	37

HENRY TRIMEN, M.B.
Director.

Peradeniya, February 28, 1887.

PLANTING IN BRAZIL:

COFFEE—CINCHONA—TEA—SUGAR—COTTON—JUTE —LABOUR.

[I enclose you part of a letter I received from Mr. A. Scott Blacklaw, Brazil—by last mail. You will see by it that he gives some interesting facts in connection with agriculture and the labour question there.—*Cor.*]

I hope Ceylon has a good coffee crop this year, for the price is to be high. Brazil is to give a small one. The planters have no expectation of getting even half an average crop. This is proved to a good extent by the reports of those who sell imported articles, machinery &c., to planters, all complaining they can do nothing and the promised orders have been postponed for a year. There has been little coffee blossom. The great blossom of October did not make its appearance owing to drought in some parts and cold and frosts in others. A few blossoms showed themselves in January and February but they were like those that appear out of season in Ceylon; if they come to anything like fruit they do not pay for picking.

Coffee is selling in Rio at present some 10 per cent more than the prices of same quality in New York: you know of course the market at the latter place rules the price of Brazilian coffee.

There is a talk of growing cinchona here, but they want Government to take the initiative.

Tea has been tried, but the sample was rather gross and wanting in flavour, but as a proof that it will grow I may mention that I pass on the railway a piece of an old tea plantation which was abandoned some fifteen years ago and left for cattle to graze on, in spite of the neglect the bushes are standing up in beautiful line, and would well repay being taken care of again.

We are an enterprizing people but at the same time a great protectionist people, and our enterprise often goes in the direction of developing industries which are protected by heavy import duties. Large Cotton Mills have sprung up in all directions and owing to the heavy duties on manufactured goods these mills pay and are expected to pay even with the prospect of having to import the raw material. There is now a rage for Jute Mills and already machinery from a Dundee firm (Parker's) is being put up for a number of rooms. These machines are made and worked by British people at first. Cotton cultivation is not extending and as these industries look for their profit in manufacture only protected by import duty, we are not to suppose that jute cultivation will extend beyond the experimental process. Coffee and cane are the two products that can profitably employ the agricultural labourer in this country and will continue to be so. Ceylon and India need not fear competition in the cultivation of cotton and jute. Coffee will hold its own for a long time here, and were it not for the large export duty cane sugar from this country need not fear the great beet-root competition in Europe.

The labour question is in the way of being solved by the introduction of European families of the country labouring class. Government pay the passage from their homes to the place they choose to settle.

The doom of slavery is now fixed and it will be at an end by the advent of the Twentieth Century. Benevolent people are anticipating it by liberating their slaves on condition of working for a few years, say from three to five. Almost every newspaper contains some paragraph notifying such charitable intention. Our Emperor has been very sick for the last two or three weeks, but has now happily recovered. The addresses which have been presented to him since his convalescence from all classes, both Brazilians and foreigners, show how well he is liked and how much he would be missed. A. S. B.

TEA IN CEYLON.

In a recent article we discussed the probable future of Indian tea, a future which must be greatly influenced by the yield of Ceylon, and we now propose to specially consider the prospects of the industry in that island. Some marvellous results have undoubtedly been attained in the way of made tea per acre, notably from Mariawatte, but there are many reasons for thinking, it unlikely that the average yield per acre of the future, when Ceylon has settled down with its permanent area in full bearing, will exceed that of India. Much tea has been put down on old coffee land, and on poor soil, and though the tea plant is far more hardy than its rivals, coffee and cinchona, yet it cannot for long give paying results except in good soil, or unless it is well manured. Also, though as good land can probably be shewn in Ceylon as in India, yet on the whole, it is the opinion of such Indian planters as have been over Ceylon tea districts, and of not a few Ceylon planters, who have visited Indian plantations and are therefore in a position to form an opinion, that the average Ceylon soil is poorer than that on which Indian planters work. The size of the tea trees and their leaf bearing surface at Mariawatte probably the best known of Ceylon tea estates, compare unfavourably with the aspect of the tea on some of the Nilgiri plantations, though the yield of the latter is far inferior to that of the former. The explanation of this and of the strength and flavour of Ceylon tea seems to be that the climate there is perfection, as far as the tea plant is concerned. But climate, though it will induce a large yield to begin with, will not keep tea going for long, and the poorer the soil the sooner will exhaustion take place, so that it seems likely that, without heavy manuring, involving proportionate expense, many Ceylon tea estates will be early worked out. Of course this is only theory at present, and we have no desire to see it practically proved, as if ever a community set an example of pluck and enterprise under difficulties it was the Ceylon planters when their coffee was devastated by leaf disease and they turned to tea. Still, there must be a reason for abnormal yields from

comparatively poor soil, and as far as can be seen at present that reason is a forcing and, consequently, an exhausting climate.

It is difficult, then to believe that tea will pay in Ceylon to the extent that some of its sanguine supporters imagine, though, given proper cultivation, the Ceylon planter should in no way be worse off than the best of his Indian brethren. He has had a good start which is a great thing. Partly through judicious advertising and partly through its own merits Ceylon tea has taken the fancy of consumers, and is steadily making its way on the Continent, a noteworthy point. True, its average price has fallen to 1s 1d. per lb. from the 1s 3½d of 1885, but, considering the increased supply, this is only in fair proportion to the fall in other teas, and the highest average price on the London market is still held by a Ceylon estate, Blackstone, which obtained an average of 1s 9¼d per lb. for 20,000 lb. sent home during 1886. The group of estates represented by the K.A.W. mark realized 1s 3½d per lb. for 300,000 lb. the largest quantity sent home under one brand, and Mariawatte obtained 1s 2½d per lb. for 137,000 lb. shipped during the same period. As to the acreage now under tea in Ceylon, planters themselves seem to have but little idea of what it is, and extensions are still the order of the day. No deduction can be drawn from the export of tea, as might be done were the plantations in full bearing, for the greater portion is still immature, so there is nothing to go by except Ceylon estimates of future yield, (and how these are arrived at it is hard to say), bearing in mind that of two estimates it is safest to take the lower. This brings us to the figures given in our recent article on India tea as to the probable yield of Ceylon,—35 millions in 1890, and beyond this it is idle to look at present. With a poorer soil than India, a forcing climate, and no annual period of rest, such as the old season ensures in the north, cultivation expenses must be increased if the trees are to live and thrive, and unless this is speedily recognised by those who are rushing into tea in Ceylon they will have to face, later on a congested market and lower prices, both of which may be expected, with a reduced yield resulting from exhausted trees.—*Madras Mail.*

COFFEE AND GREEN BUG—AND THE NEED FOR LOOKING AHEAD.

We publish elsewhere three letters on this subject from planters of very long experience in the colony. The fact that these letters have reached us almost together within the past few days is a simple coincidence; for, even if known to each other, the writers, one in the Northern, one in Uva and the other in Colombo, could have had no knowledge, each of what the others were doing. This preliminary remark may be needful, because a reader of the letters would suppose that the Uva and Colombo correspondents had sat down to dispose of some of the very sweeping statements of "An Experienced One." This gentleman's "experience" has, we believe, been confined to districts north of Kandy, where, undoubtedly "green bug" has done all the mischief he specifies; but we do not see sufficient warranty for this very decided pessimist going on to generalize, that, as it has been in Matale, Kelebokka and the Knuckles, so must it be in Bogawantalawa, Agrapatana and the Uva districts. As a matter of fact, we believe, the comparison or generalization has failed already. We think that the period which was sufficient for green bug to practically kill out what coffee, leaf-disease had left in the Northern districts, has already been exceeded in reference to the other districts with green bug from time to time, visible, and yet no such "killing-out," so far as our information goes, has been experienced in any of the divisions we have specified? We are by no means preaching the permanency of "coffee," nor have we based a single argument for railway extension or any other work on such an idea. We have said and repeated it again and again, that, for every acre of coffee that may disappear in Uva for instance, the full equivalent—and more than the equivalent—will come into cultivation of other products suitable to the climate, soil and other conditions. Whatever value may be attached to our Northern correspondent's views regarding coffee, there is absolutely no justification for his closing paragraph, seeing that the success of tea in the great and fertile districts of Uva is now an assured success, and that to make it fully and financially successful, the Uva planters just want the railway facilities which the cisalpine districts enjoy. The one great railway blunder of the Ceylon Government was the making of the Matale line *before* the extension to Haputale. The latter would have paid handsomely all through the bad years and would now be affording an increasingly handsome income, rising year by year, as all the Uva traffic was gradually absorbed by it, and as the hidden valleys and resources of this most fertile province became more fully developed,—whereas the poor results of the Matale branch and of the abortive Nanuoya section have done much to damage the credit of the colony. We are free of responsibility for this result, for we preached in and out of season, to show where the really profitable traffic lay. But this is all by the way. It is a fine commentary on the pessimist letter before us that the writer should stand in the way of Uva having a railway after seeing his own district served, and at a time when Railway progress in the rule in nearly every British Dependency—in Dependencies even from whence old Ceylon planters are returning, for the reason that there is more life and activity here—more prospect of prosperous times than in the very countries where railways are going ahead at a rate which covers with shame the Downing Street autocrats who have stopped the completion of our main line all these years.

To return to green bug and coffee, it is absurd to tell planters with fine fields of the staple product which is becoming so increasingly valuable—and in a year when good crops are the rule,—that if green bug is seen on their bushes, they are do nothing, save to grin and look on until their coffee is swept out of existence, meantime putting in the fitting substitute. "One Experienced" laughs at the idea of "lime" being of use, or indeed anything else. Now we stated the other day, on the authority of a proprietor (name given)—a gentleman who is not in the habits of making rash statements, —that on his estate caustic lime had been proved to be very effectual in checking and driving away green bug. This was in Uva. Is our correspondent prepared to say that what did not do with him north of Kandy, is to prove equally useless in a different climate with soil and coffee trees it may be very superior to the best even under his observation? As regards Uva generally, we believe green bug was noticed on several estates both in Haputale and Badulla more than a year ago. Has it then killed out coffee there? Was it not rather seen on some estates which last season gave one of the heaviest crops they ever bore? If so, there is this characteristic about green bug in Uva which, we believe, was not observable in the old Northern districts, namely that the attack comes and goes—it does not, in Uva, as in the North when once it has appeared, march steadily on, killing out all before it. There is therefore not only room, but much reason for en-

couragement, to experiment, to cultivate, to fight the enemy wherever it shews itself with all available forces. A reprieve of even a few years would suffice, where there is any sign of the enemy finally conquering, to bring the substitute into full flush. But meantime we need scarcely say that with Ceylon coffee nearly touching the 100s per cwt., there is no Uva, Udapusellawa, Bogawantalawa or Agrapatena planter who will not make sure of doing justice to all the coffee that remains to him, before he decides to plant up his whole property with tea or some other substitute.

PLANTING LETTERS FROM JAMAICA—NO. XVII.

WEATHER AND CROPS—LEAF-DISEASE—LABOUR.

Blue Mountain District, 25th March 1887.

DEAR SIR,—The crops in the lower elevations are now well over, that in the Top Mountain District is just commencing. All low-lying coffee, as I have mentioned in a previous letter has done well this 1886-87 season, as it escaped the worst of the awful storms of June and August; prices also have been very good, so the settlers must have made money. Planters were willing to buy the cherry at a fair price, but "Quashie" to a great extent thought it better to pulp and cure it himself in his own rough way, fancying he could realize more money for it in Kingston. I have been told that the dealers in Kingston who have got orders from America, and a limit as to price, do not look so much to the quality, as long as they get the quantity. This accounts for the settlers getting a good price for their coffee though it must be far worse cured than the coffee prepared on the estates, with all the necessary and proper appliances. Crop of the real Blue Mountain berry will be very short this year, so prices should range higher than last year; in fact coffee prospects for planters seem to be brightening up, for if it be true that some disease has shown itself in Brazil in the Brazilian coffee fields which must prevent the increase of yield in that immense country, (added to yearly increasing difficulties as to labour,) and keep the production within certain bounds, and cause consumption to overtake production: then may we West Indian and Central American coffee planters be thankful that "it is an ill wind that blows no one any good." I am glad to see that improved prices have stimulated the efforts of the Ceylon planters to keep up in a high state of cultivation, the coffee still left in several of the high districts estates, and that many of them were rejoicing they had not entirely sacrificed their coffee-fields to tea. The Rev. Mr. Abbay's words have come wonderfully true, though I could hardly believe at the time leaf-disease would become so destructive and cause the commercial ruin of so many old and tried Ceylon men, for I hoped and believed it would pass away after a time as did black bug, and other enemies of the coffee tree. Mr. Abbay said, the oldest, poorest, and low-lying estates would first succumb, but that in the higher and younger districts with good soil, on the western, and specially the eastern side of the island as Haputale, Udapussellawa and Uva generally would fight the battle longest, and so it has turned out, but his prophetic idea that coffee would ere this have been selling for 200s per cwt., has not as yet come to pass; he supposed the disease would soon get to Brazil, for a letter, a man's clothes, a parcel, or botanical specimen, a book-packet would be sufficent to spread the spores all over the country. God grant that this may be averted, for so far the West Indies and the Brazils have not been visited by the *Hemelia Vastatrix*, so every care should be taken by the Governments of the various countries on this side of the globe to keep it out. Of late the weather has been cool and pleasant, indeed too much so for coffee fields over 4,000 feet above the level of the sea. The "Northers" we experienced in January and February have a very baneful effect upon the coffee bushes especially young plants, they become dried up, withered and look as if they had been blasted by fire instead of cold. As my experience accumulates, I find it takes longer to raise and bring coffee into bearing in Jamaica than it did in Ceylon, for the winters are much more marked, and vegetation high up on the hills seems checked for quite three or four months. It is evident to me that Jamaica being as far north of the Equator as 17 degrees, the utmost limit for the planting of coffee should be 4,000 feet above sea-level; 3,000 to 3,500 being the best and safest elevation to select. As to labour, it may become more scarce, especially in the low-lands if it be true that labourers are, being offered a Columbian Dollar say 2s 6d a day and their food to work on the Costa Rica Railway the starting-point on the Atlantic being "Port Limon," which moreover is fast becoming a very influential port for the shipment of bananas, and so threatens to damage our Jamaica market in the United States, unless we ourselves extend our railway lines into the fruit-growing districts, and connect them with the chief shipping ports because the Port Limon fruit being carried by rail, is put on board fresh and in good condition, whereas the Jamaica fruit has to be carried in drays and on people's heads, and may have several moves before it finds its way on boardship. It is also said that labourers on the Costa Rica Railway can arrange to have a portion of their wages remitted to their families, this and the food to be provided by the Company, and the better climate will, in my humble opinion, draw many men away from the Panama Canal, which is getting a worse name than ever, as the agents for procuring labour, according to letters in the newspapers state, deceive the people by assurances of immediate employment, and free return passages, whereas it seems only the strong and hardy get employment from the contractors.

W. S.

COFFEE REDIVIVUS!—In our Overland Summary we allude to the special care, nay coddling now observed of every coffee tree with any life left in it, upcountry. A special case is brought to our notice referring to a proprietor in a district not a hundred miles from Adam's Peak who has been trying for two or three years to kill out his coffee generally to make room for the tea, and who nearly accomplished his end last year, but who has of late been anxiously inspecting the stumps with a view to revival! "Can these dry bones live" is the question asked. Apparently they can, for a single sucker is already appearing and with every attention paid to it and the parent stem, we daresay, a good few bushels at R15 per bushel! may yet be gathered even though it may be to the detriment of the tea simultaneously being plucked alongside. The moral is evidently "Never say die" even to a dried up Coffee stick; 'but oh!'—thinks this planter and many other men,—'if I had only not been in such a hurry to supersede the old berry, I might have got a big haul this season!'

CACAO IN BRAZIL.—A correspondent of the *Journal* at Ceará states that the cultivation of cacao is attracting considerable attention in that province, particularly in the Baturité district.—*Rio News.*

TEA PLUCKING EXTRAORDINARY.—From a medium elevation a planter reports that two of his coolies brought in 150 lb. of green leaf plucked between 6-30 a.m. and 3 p.m. The flush was an eight-day one on Jatinga-Manipura, indigenous tea, about three years old. Has this been beaten?

MORTGAGE SECURITIES.—*Public Opinion* has published the first of a series of monthly tables, showing the capital employed in landed securities in Trinidad, as also the fluctuations of the rate of interest as determined by a monthly average. The transactions in February, 1887, fairly indicate the ruling rates in the open market, as distinct from the Bank rate of 6 per cent. In the column of 5 per cent, the figures represent one single transaction between a cocoa firm there and suppliers in England; while in the column of 7 per cent, two large loans of $20,000 and $12,000 respectively make up the figure $32,000. Eliminating these exceptions, the ruling rates in the open market are 8 and 10 per cent., interest at 10 per cent. being readily paid on sums not exceeding 500*l.*, and at 8 per cent. on loans in excess of that amount.

THE VALUE OF SUGAR ESTATES IN BARBADOS.—Here is a chance for English investors. Amongst recent appraisements in Barbados has been the Redland estate, containing 204 acres of land well situated in the valley of St George, which has been valued at 10,958*l.*, and a correspondent of the local *Globe* suggests that it would afford a good opportunity for the organisation of a company to purchase the property and erect a factory thereon, as there is a surounding acreage which would yield about 1,000 tons of sugar, the canes being sent to Redland to be manufactured. Another authority thinks the experiment would be on too small a scale to pay the expense of erecting the necessary machinery; unless, of course, there was a prospect of other landowners being induced to send their canes to the factory to be made into sugar. The proposal, which is said to come from a practical planter, is, however, another indication that the idea is gaining ground amongst the planting body that improved systems of manufacture are indispensable if the Colony is to hold her own in the present struggle with competition.—*Colonies & India.*

DECLINE OF FARMING PROFITS IN BRITAIN.—Mr. Goschen in his Budget speech stated:—

The assessment of lands under Schedule A was £69,000,000 in 1877 and £63,000,000 in 1886. That was on lands alone. The assessment under Schedule B which relates to farming profits, was per penny £74,000 in 1876, £51,000 in 1886, and only £47,000 in 1887, being a fall of 36 per cent in ten years. This is a notable circumstance, and one which should be taken into the consideration of the Committee. (Hear, hear.) It is perhaps what I may call the distributing classes whose incomes are below £1,000 who have suffered least from the general depression. The commercial depression has struck at the top; it has struck the great manufacturers; it has also affected the wage-earning classes to a certain extent though they have been largely indemnified by the fall of prices; it has struck at the agricultural classes and the farmers; but the middleman has not suffered to the same extent. (Hear, hear.)

TEA: INDIAN AND CEYLON.—There was good competition for the small quantity of Indian tea brought forward on Thursday, and slightly advanced rates were in most instances paid. As the available stocks of the past season's crop, held by importers, are now becoming comparatively small, the market for the next few months will probably be more moderately supplied, as is usually the case at this period; the advance in the value of the better grades from the lowest point, which was touched towards the close of last January, is in some cases considerable, but it seems probable from the gradual contraction of their supply, that these kinds will remain firm, at any rate until the new teas are in the market. The tendency of values of the commoner, sorts is also towards greater firmness, but if the proportion of the supply of these grades continues on the same large scale as hitherto, any actual advance in their value does not appear probable. The future course of values, however, must depend on the demand, and if the consumption continues on the present satisfactory scale, prices are less likely to prove more favourable to buyers.—*Produce Market Review*, April 16th.

THE OBSTACLE TO AGRICULTURE.—It is often said that the real obstacle to agricultural improvement in India is the obstinate conservatism of the agriculturists. The *Hindu Patriot* in an article upon the last Report of the Agricultural Department of these Provinces laudably endeavours to strengthen this feeling. It says:—"We have over and over again shewn in these columns that many of the experiments conducted in the model farm relate to matters which can have no real bearing, direct or indirect, on agricultural improvements, and can certainly convey no lesson to the agricultural community. It cannot be too carefully borne in mind that the ordinary ryot cannot be expected to practise the transcendental agriculture of our model farms. We used to hear much of the famous plough invented by the North-West Department in the time of Mr. Buck; but we are now told that 'the initial obstacle to improved ploughs in many places is that the starveling bullocks are unequal to the slightly increased draught.' Did not Mr. Buck assure us that the improved plough patronised by him was admirably suited to the weak cattle of the country? From what we have said above it is clear that although the North-West Agricultural Department costs R70,000 a year, it has nothing to shew in return for this expenditure."—*Pioneer*, May 5th.

"THE TEA-PLANTER'S MANUAL."—By T. C. Owen. (Colombo: A. M. & J. Ferguson.)—Tea-planting is yet in its infancy in Ceylon, and this little book is probably the first treatise that has been written on the subject with special reference to that colony. Mr. Owen, although a practical planter himself, does not profess to speak only from his own experience—and, indeed, it may almost be said that there is as yet no man in Ceylon whose personal experience of tea-planting there would invest a work on the subject with any very commanding authority. But the author expressly premises in his preface that his manual is rather a compilation of the opinions of others, and the results they have arrived at. It is this which gives the book its special value as a practical treatise for practical men in Ceylon, and even perhaps in the older tea districts of India, for, indeed, it is a valuable contribution to the library of tea. Mr. Owen has made his selections from the recorded experiences and deductions of others with great judgment, and addressing as he does, practical planters, who will not be likely to quarrel with a degree of detail, perhaps not always necessary, he has preferred rather to risk erring on the side of prolixity than to sacrifice any of the original authority of the opinions he quotes by condensation. He supplements these opinions, however, by valuable comments derived from his own experience and that of other Ceylon planters. The book also contains plans and specifications of buildings required on a tea garden, which will, no doubt, have their value to the practical planter; although the erection of such buildings is far too important a matter to be materially influenced by hard and fast generalities. To the general reader, however, by far the most interesting portion of the book will undoubtedly be the "Introduction," which is devoted mainly to a narrative of the growth of the industry in Ceylon, and a wonderful story it is. Ceylon therefore, promises to become a serious competitor with India and China; but there is room for all, and cheap tea undoubtedly means increased consumption. There are better days in store, then, for a colony which has suffered so much through the decay of coffee planting. —*Glasgow Herald*, April 11th.

Correspondence.

To the Editor of the "Ceylon Observer."

CINCHONA "THATCHED" AND "UNTHATCHED—AS TO QUANTITY?

Badulla, 2nd April 1887.

DEAR SIR,—A late correspondent, in asking Mr. Esdaile for explanations regarding thatched and unthatched trees, omitted one question, perhaps the most important, viz.: Did the *unthatched* trees produce as much bark as the *thatched*? If Mr. Esdaile can save us the expense of thatching, I am sure we shall all be very much obliged to him. Hoping you can find space for this enquiry.—I remain, &c., A PLANTER.

CACTUS AS A FORAGE PLANT FOR THE NORTH-EAST OF THE ISLAND.

Mullaitivu Agri:-School, 5th May 1887.

DEAR SIR,—In the March number of the *Tropical Agriculturist* (page 586,) I came across an extract about a thornless species of cactus introduced as a forage plant into the eastern districts of the Cape by Mr. J. B. Hellier. I doubt not that, as you remark, the plant will be found useful in the north and east of Ceylon. It will especially be a source of great relief here at Mullaitivu where most of the cattle actually starve during the greater part of the dry season. Anyone, therefore, who will take the trouble to introduce the plant here will deserve our best thanks. One great drawback in cattle rearing here is bad feeding. Country cattle, I need hardly say, would be in a much better condition were they well fed; and any superior new breed introduced here would soon degenerate so long as the present bad feed continues.—Yours respectfully,
E. T. HOOLE.

SERICULTURE.

Colombo, 7th May.

SIR,—Sometime ago I had a few hundred eggs of silkworm sent me by an up-country gentleman. I had according to his directions kept them in a tray, and gave their young, tender leaves of the mulberry tree at first, and larger leaves as they grew older. I had also to take care that no mice, birds or insects got at them and to feed them as regularly as possible three times a day, or four times in hot weather. The result was that after the lapse of about a month, I had cocoons from which I gathered a small quantity of floss silk say about one or one-half lb. But as I did not know how to comb it and put it to some use, nor get further information on the matter, I left off making further experiments. Also, I have not been able to preserve the eggs yet the butter-flies laid. I could not make provision for a further supply of these worms. There is, however one thought that struck me forcibly and that was that if proper and systematic efforts were made in the rearing of silkworms in Ceylon, silk could be easily manufactured here as well as is done in other parts of the world. The following passage which I lately read in a book confirms me on this opinion:—"The countries most noted for their silk manufactures are China, Japan, Italy, France and England. The rearing of silk worms enables many persons to earn a livelihood. Old people and children unfit for hard-labour can tend silkworms."

I have seen a large number of mulberry trees growing freely in and around Colombo, and with their leaves, these worms could easily be fed, and, if needed, more trees might be grown for this particular purpose. As the silkworms or eggs are not procurable here, I think it would be well if Government would order out a supply for gratuitous distribution among the people, and they will, no doubt, give an impetus to a new industry in Ceylon. And if eventually the rearing of the silkworms succeeds, a person could be ordered out in order to teach the further process of combing &c. to the people.—Yours faithfully, A WELL-WISHER.

[We fear suitable labour is too expensive in Ceylon, and the Sinhalese too apathetic, apart from questions of climate. The most promising experiment we ever saw in the colony was at Kowdapallella, somewhat over two years ago, with eggs brought by Mr. Robt. Fraser from Japan. It threatened to break down and probably did so (?) from the difficulty of supplying the voracious worms with a sufficient quantity of mulberry leaves.—ED.]

PECULIAR TEA LEAVES.

Kalutara, 8th May 1887.

DEAR SIR,—I enclose some tea leaves with a peculiar rib running on each side of the mid-rib. This peculiarity is common over hundreds of acres in the district. Can you explain the cause of the appearance? No evil effect whatsoever appears to accompany it, but it would be interesting to know the cause.—Yours faithfully, R. MORISON.

[We referred the leaves to Dr. Trimen, who has been good enough to give the following interesting explanation:—

"The markings on the leaf are not ribs or veins, but linear scars or bruises. The cause of their formation would, in all probability, be found by examining them when in the bud, before expansion. Normally the young tea-leaves in that stage are rolled in from both sides on the upper surface, a condition technically known as 'involute;' but it would appear that in those before us there has been a *folding* inwards instead of or besides the rolling, (accompanied with some pressure) along the lines so clearly marked. These lines thus produced, though not normal in the leaves of tea are always found in those of *Erythroxylon coca* and give them a very characteristic appearance."

COFFEE AND GREEN BUG:—No. I.

9th May, 1887.

SIR,—*Re* the green bug question, people are too apt to catch at straws of hope, instead of utilizing the short time left them to rapidly replace coffee by substitutes, and we are often airily told, in planting notes, that "bug has been about, but has gone again." *Has it*?

It is perfectly characteristic of it to depart for a short season, but the instances when it has not returned again and again while a coffee tree was left, are so very rare, that they are not worth counting. Another straw is, that any coffee which has been actually killed, was it not, perhaps, due more to exhaustion than to bug? And a correspondent wants to know whether any large acreage being killed by it is upon record?

THOUSANDS OF ACRES have been killed in one and two seasons by bug, and bug alone, and as cleanly as if they never existed; while, in many instances, the best coffee (such as one sees round cooly lines) made the poorest fight, caving in in one season only. The great and only hope for such districts now experiencing the bug for the first time, is that some climatic influence, such as higher elevation affords, may obviate much destruction by the pest; but, if the climate fails then the fact is no secret, which every one with experience will maintain, that before two years have elapsed, there will be

but a few desultory fragments of coffee left to Ceylon.

There are no known remedies, and those who are squandering money upon experiments, may just as reasonably drop their coin into the depths of the Indian Ocean. As for *lime*, it is exactly the luxury this bug most dearly loves. To the "nauseous gases" theory and digging round the roots to enable their escape, I say "rubbish and fiddlesticks."

Coffee does not produce 6 to 8 cwt. per acre with nauseous gases at its roots, but fields with fine healthy crops upon them have been, nevertheless, attacked and killed in one season by bug.

The immediate starting of substitutes for coffee is the remedy, solely, for properties where coffee is attacked, but where it is still "The King" fragile monarch tho' he be.

And *until* such remedy be *largely* applied and with every prospect of success proved, were a Governor of Ceylon to give even a passing thought as to Railway Extension beyond Nanuoya, be the gauge broad or narrow, it should entitle him to consignment to some such establishment as Bedlam.

ONE EXPERIENCED.

GREEN BUG IN UVA:—No. II.

DEAR SIR,—Yes, we have green bug here and have had it for some time, longer than we ourselves know, for it is so like the old black bug which never did us any harm to speak of and never spread over an entire estate as it did in wet districts. Green bug, so far as I have been able to judge, is very similar in its action, that is to say, whilst it has diffused itself rapidly over a large extent of country in a short time, nowhere that I know of in Uva has it affected more than a few isolated patches on estates and in no case that I know of has it killed the coffee. Weak, sickly coffee or sickly plants of any kind are always more liable to disease and more severely affected than healthy plants. It would be folly altogether to ignore and shut one's eyes to the fact that green bug is on our coffee, but I would ask the Uva planter to look back on the past and "seeing take heart again." Green bug, serious as the evil may prove, will no more kill our coffee than has leaf-disease or black bug. Let Mr. Deaker continue to cultivate well, keep his trees well open to sun and light, prune judiciously when his "powder will be dry" and he may "trust in Providence" and a good soil.

OLD UVA PLANTER*.

COFFEE AND GREEN BUG:—No. III.

DEAR SIR,—Having been challenged as it were to say something about green bug and having been accorded the privilege of being allowed to stand-by—and watch a considerable part of Mr. Green's operations in working out the life-history of the insect, I venture on making a few observations. The discussion which has arisen about the *Lecanium viride* may be considered by many to be rather late in the day—when about two-thirds of the acreage of coffee in the island has been destroyed by it. However, "better late than never" may I think be exemplified here, as I hope to be able to show that there are several reasons why attempts to destroy the pest in certain situations are more likely to be successful now than they have been in the past. The principal reason which gives planters hopes of eventually overcoming the enemy is the very characteristic which first drew my attention to the fact of its being a new species of coccus—even before I had seen it,—the fact that it flourished most and was more destructive on dry low-lying estates than on high, wet and exposed fields. The year 1860 was a very dry one in the Central Province until crop time, and then it commenced to rain, and continued doing so more or less for about two-and-a-half years on end. In Rambodde—and similarly situated districts—black bug literally smothered certain fields and estates and did immense damage. On Weddamulle estate where I was then stationed, there was a young field at an elevation of about 4,300 feet, bearing a fine crop when the bug got a grip on it, and the green berries—rolled off—might have been swept off the ground literally by the bushel. I don't suppose a tenth part of the crop ever came to maturity, and that small portion was wretched, small, deformed stuff. The bug in some stage was always present for years after, though the black fungus was not always prominent. The young bushes were growing fast, and a day or two's sunshine was sufficient to enable the leaf to throw off the covering of black, but as soon as the wet set in again, a black wave swept over the surface in a very few days, and the result was very disheartening. The new bug on the other hand seemed at one time likely to absolutely annihilate the trees on the hotter and drier fields and only to partially affect those at higher elevations. The new bug was at one time said to absolutely destroy the vitality of the trees, but I am told that many fields, given up as totally gone, have come round again. The old bug, however much it damaged the crop, and the foliage never got so far as to destroy the life of the tree, nor did I ever see in the case of black bug, what I have seen in green bug, and that is the ground below and around the trees covered with the black fungus which accompanies the attacks of both varieties. When the green bug had advanced to where I was residing it was evident that in long spells of wet weather, a very large proportion of them turned mouldy and died, and I learn that the cold this last dry season has caused an immense destruction amongst them especially where there has been a touch of frost on the trees. This is the point where Dimbula and Dickoya planters, and the men of upper parts of Uva may hope to make a successful stand. As far as I can learn, the bug has not spread evenly and badly over large areas, but has appeared in patches larger or smaller as circumstances have been favourable, and these patches are at a comparatively high elevation. The enemy is neither so numerous nor so vigorous as it was when the good folks of Matale and Elkaduwa and neighbouring districts, had to retire from the contest baffled and disheartened. The climate of the higher districts is in their favour, and they have gained the experience which was wanting in the early days of the contest. If our old friend Holloway could do so much in the way of a remedy at Wattagama, the men who enjoy the advantage of higher elevation and more favourable climate as well as being subject to less vigorous attacks of the pest may well hope that their labour may not be in vain. In regard to treatment, Mr. Holloway only repeats what is well-known to all agriculturists when he points out that rendering the trees as healthy and vigorous as possible, enables them the better to withstand the attacks of insects, fungus and all the other ills of vegetable life, such as too much drought, too much rain; and, on the other hand, everyone who has lived on an estate cannot but see that weakly tress first fall victims to such attacks, sooner or later, according to their condition. This, however, is no argument against the late Mr. Nietner's theory. He used to argue—and at the time being merely

*Not a proprietor we may add.—ED.

a listener without experience I saw no reason to disagree with him—that the effect of manuring a tree was practically produced by supplying it with certain matter which was taken up by the roots and absorbed into the sap of the tree. Taking this as the basis of the argument—why should it be impossible—to salivate—so to say—a tree by manuring it with some substance which, when absorbed into the sap, should be inimical to the disease which it is intended to combat, or the insect feeding on that sap. This is a matter which must be decided by scientific botanists. I cannot pretend to say more than that I have always favoured the idea, and in spite of Mr. Holloway's dogmatical assertion to the contrary still imagine it to be quite feasible. I have used Little's Liquid Phenyle to a considerable extent both as a disinfectant and an insecticide, and the successful experiments with it on leaf-disease were made on properties then mine. When properly used, Phenyle is a most valuable adjunct to nurseries for such small light seeds as cinchona and seed-beds carefully prepared can be kept free of insects in a marvellous way. I imagine Phenyle would be very deadly to green bug—even if it were only from the scent so freely evolved from its use—and within the last few days I have learnt that Mr. Green's experimental tree, still remains free of bug when the surrounding bushes are affected in the usual way. As Phenyle can be obtained tolerably cheap if taken in large quantities, I should say that experiments on a larger scale are well worth trying. In fact, I happen to know that they are being tried at the present moment. Perhaps Mr. Holloway may explain why he asserts so positively that green bug was not brought over on the Liberian plants in wardian cases; this is the very point I want to see elucidated, as my idea is that it did come over in that way. EDMUND WOODHOUSE.

TEAS FROM UDUGAMA DISTRICT, GALLE.

Daphne estate, Udugama, 10th May 1887.

DEAR SIR,—Having seen one or two notices lately in the *Observer* anent Udugama, I take the liberty of forwarding for your inspection and taste three small samples of tea from Riseland estate.

You will doubtless not fail to note the absence of strength and presence of flavour as compared to the average of low-country teas. The sample sent has been handrolled and chulafired—and represents tea made from a *first year's plucking*. If this does not speak well of Udugama, I am sorry I troubled you with these remarks. PLANTER.

On the samples, Messrs. Somerville have been good enough to report as follows:—

Samples No	Description	London Value	Colombo Equivalent at Exch.	Remarks
1	Broken Pekoe	1/4, 5 for leaf	86 cts.	Blackish well made semi Bro. Pekoe leaf with tips, strong dark liquor, *burnt*.
2	Pekoe	1/1 for leaf	65 cts.	Blackish fairly made Pekoe leaf with tips, strong pungent liquor. *burnt*.
3	Souchong	9d	41 cts.	Blackish irregular bold Souch. leaf plain burnt liquor.

p. p. SOMERVILLE & Co.
A. H. THOMPSON.

N.B.—These teas would be worth nearly 2d a pound more money if they had not *been burnt* in the manufacture. They possess very fair strength.

CINCHONA HARVESTING: RESULTS FROM UNCOVERED TREES.

Verellapatna, Lunugalla, 10th May 1887.

DEAR MR. EDITOR,—For the information of enquiring correspondents, let me reiterate in part: "The bark was taken from off trees growing together *in lines*, shaved at the same time," these lines were not six feet apart, and were of a field of 50 acres in extent and of same age, say rising seven years, consequently pretty well sheltered. I perceived no difference in appearance of trees after shaving. As to quantity, I operated on 40 trees of each *i.e.*, 40 thatched and 40 unthatched, and on weighing found the difference so infinitesimal that I took no entry of it. I think from 1 oz. to over 1½ oz. in favour of the thatched. So on the whole my endeavours point in favour of: do not thatch—which would be a grand thing for all concerned in "cinchona;" but my advice is, do not act on results as I have shown them or rather let "E. F. T." and "A Planter" and others experiment a little for themselves, and in comparison, we might arrive at some definite and reliable facts which would save thousands in the way of thatching.—Yours faithfully,

CHANNING ESDAILE.

P.S.—I may mention that I only got 10 lb. renewed bark from off the 40 trees. *N.B.*—And further, I may mention that the "Cannaverella" bark which fetched such a handsome figure the other day was from trees that had not been thatched.—C. E.

UDAGAMA TEAS:—BURNT!

15th May 1887.

SIR,—Almost enough to make one feel sort of planted "at stake." My good friend, down at Daphne, I may say, though no sanction needed, acted without my inspiration in sending you on those tea samples for public disrobing. However ruthless a little personal firing, I have no bones to pick, as the report you have kindly published, and by Somerville & Co. furnished, will suffice to help your readers to form their judgment as to the possibilities of the district in regard to the eventual standard of the teas from hence, and which may fairly be put down as information likely to be wished for, and wanted generally of any locality where a special cultivation is still young.

As for the overfiring to the teas, I may not as an excuse, but in apology as still in petticoats in the mysteries of tea-making, say my instructions were to "fire high"—as that is what is liked in the *Lane*! To find oneself at 2 a.m. pacing upt and down a shut up tea-house with the thermometer at 90°, imaginatively watching half-a-dozen perspiring niggers—Indo-Aryan, or Dravidian—squdging green leaf, demands a high figure *sans* any additional roasting.

Apropos of "yield," my last flush here from old bushes pruned down this season for the first time was, at an average of 3 flushes a month, and 10 months to the year, at the rate of 1,260 lb. of made tea per acre annually. To which you may be disposed to add "it might be better and might be worse!" Worse or better, tea is going to pay here." SUPERINTENDENT, RISELAND.

THE COFFEE PLANTERS of Mysore, Coorg and Southern India generally are rejoicing in the prospect of high prices for their staple and they have generally good crops coming in.

"WHITE" COCONUT OIL is being prepared and shipped from Ceylon; but it is not colour alone that renders the Cochin oil superior. There is a difference in the substance of the Cochin coast Oil as compared with the Ceylon—something which mere manufacture cannot get over.—*Com.*

GRUB *v.* GREEN BUG.—The question is started as to whether green bug has not got the merit or demerit of killing out coffee, when probably grub was the chief offender? The two are not uncommonly found together.

CAUSTIC LIME is said to have cleared out green bug wherever it has been applied on certain coffee Uva estates.

A PLANTER informs us that the condition of the coffee in the Coonoor Ravine is simply splendid. The trees appear to be in good heart, and a fine blossom has set. With coffee at 95, this means something. If it isn't the great bumper, it is very near it. The same favourable prospects attend the tea, which has thrown out a fine flush.—*Nilgiri Express*, 7th May.

COFFEE IN SOUTHERN INDIA.—The weather at Seegoor and Mussanagudi is said to be simply intolerable. The recent showers have brought out a fine coffee blossom and the intense heat is burning off at least 20 per cent. Many of the estates in this locality possess facilities for irrigation. One property brings its water by a channel which cost R15,000, from the Pykara river but does not regret the outlay, as since the channel was made irrigation has rendered the crops more certain. If irrigation could be more generally adopted on the Nilgiris, the doubts and fears of planters considerably relieved.—*Nilgiri Express*. [We should doubt the success of coffee where it has to be irrigated.—ED.]

TEA: Mr. WHITTALL, representative of Messrs. Matheson & Co., London, left today by the B. I. S. S. "Chyebassa" for Madras *en route* to visit Coorg and the adjacent planting districts. Mr. Whittall who had long experience of tea in China, and who some years ago did not, we believe, regard the Ceylon tea enterprise very favourably, is now inclined, we learn, to anticipate an export within a few years far in excess of any figurewe have yet ventured to put forward. Seventy to eighty millions lb. of Ceylon tea exported in a year, say about 1891-2, would certainly bring this colony into prominent notice, and, if Uva is to have her due share in making up this quantity, how in the world is she to manage for transport is a question which may well be asked on her behalf and dinned again and again into Downing Street ears. A gentleman of much experience in India, in tea and other products, tells us that he has never seen tea anywhere, for growth at its age, to equal that which he saw in Udapussellawa, and that he recognised at once beyond Nuwara Eliya, the climate and fine soil peculiar to the very best Indian planting districts. Of course, it remains to be seen who are to consume the 80,000,000 lb. Ceylon tea, and whether they will pay for it at a remunerative rate. Much depends on new fields being opened, and it is satisfactory to learn that steady progress is making in America, Italy and France in the sale of good teas.

TEA.—Mr. Joshua Whitworth writing on the subject of tea, says:—"Why should the great socialising beverage be made the target for catch-price adventurers? Tea is now being distributed and advertised in countless mediums and forms. There is the would-be benefactor or compound dealer in tea and dispenser of presents? in the shape of toys, china, metal, earthenware, and other devices. The system (I will not say principle) to my mind is utterly un-English and un-businesslike. I cannot conceive any wife or housekeeper, with ordinary intelligence, purchasing tea with the primary object of obtaining a bonus in the form of a present. She need only ask herself who pays for such gifts. As a matter of course she herself does in the inferior value of the tea she buys. If I go to my tailor and purchase a suit, I neither receive nor expect to be presented with a hat, or even a pair of gloves. The two cases are parallel. Tea is no longer considered a luxury, but a necessary of life, as the increased rate of consumption abundantly testifies. The figures stand thus—the home consumption for 1882 was 164,958,000lb for 1886, 178,891,000lb,—and I am of opinion that if better grades of tea had been sold by the retailers, the increase in consumption would have been still greate

Tea is variously and industriously advertised—notably by London dealers or retailers who offer to deliver a given quantity free of carriage by parcel post. Now, I contend the provincial grocer or tea dealer can do better than this. He gets his tea direct in bulk from the London Bonded Tea Warehouses at about one farthing per pound carriage, while the cost by parcel post will add pence per pound. The natural inference is obvious. To ensure good and nourishing tea, my advice to all consumers is do not pay less than 2s 6d to 3s per pound, and this rule will be found wise and economical. Statistics show that the working classes are the largest *pro rata* consumers; then how desirable it is that the sons of toil should have as a sequel to the day's work an enjoyable cup of tea—tea that must soothe, sustain, and cheer. In this question there is a large field for the exercise of women's right; they should one and all denounce the questionable decoction, and in asserting their rights demand pure tea. In conclusion, there is another aspect to this contention—viz., if people would buy better-class teas, I am morally certain that it would prove a further auxiliary in the spread of temperance principles, irrespective of its health-giving qualities."—*H. & C. Mail.*

TOBACCO AND COFFEE: THE DIFFERENCE OF POLICY.—The following extract from Mr. Goschen's speech shows that although the British Government still apparently refuse to prohibit the adulteration of coffee with chicory and worse, they mean to prohibit the adulteration of tobacco with water:—

There is one error which all parties admit to have been made in the fiscal legislation of late years—viz., the rising of the tobacco duties by 4d. The tobacco duties were raised from 3s 2d to 3s 6d in 1878, and the fiscal result of that has been most unsatisfactory. The first year under the higher duty was expected to yield an increased revenue of £750,000, but it only yielded £500,000 additional, and in consequent years the result has been still more unfavourable. The increase in the consumption of tobacco, which was 11 per cent during the five years between 1872 and 1876, fell to 5 per cent in the period between 1877 and 1881. We checked the consumption of tobacco; and what was the effect upon the quality of the tobacco and upon the smokers? It will be seen that the consumption has not increased in the ratio of the population. The increase in the consumption of tobacco before the duty was raised was twice as fast as the increase of population, but since that time the consumption has not increased as fast as the population. The consumption per head is now less than it was. But there is this most curious fact. It is not quite so certain that people have smoked less pipes or fewer cigars than before. The same thing has occurred with tobacco as with beer. There has been an admixture of water to increase the weight. The workman pays 3d per ounce for his tobacco. When the duty was increased it was supposed that he would pay 3¼d and that in that way the dealers and manufactures would be able to recoup themselves. But that is not what has happened. He does not pay more than 3d per ounce; therefore, tobacco had to be produced at 3d. How is this done? It is done by increasing the amount of water. The purchaser buys a nominal ounce as before, but he really buys less tobacco and more water, and in that way the revenue loses and the smoker loses, because he does not get the amount of tobacco to which he is entitled. The price of 3d is too small to enable the manufacturer to produce the tobacco at a duty of 3s 6d, and I propose to reduce the duty from 3s 6d to 3s 2d. (Hear hear.) That I trust will be a considerable boon to the working classes, and although it will not affect their pockets they will get a better article. For we propose to prohibit by law the watering process by which at present the dealer recoups himself for the extra duty. The natural moisture of tobacco is 15 to 17 per cent, and it is increased to 30 per cent in the process of manufacture. I was not aware that 30 per cent of water was necessary for that process. (A laugh.) But now tobacco is often sold containing 40 or 45 per cent of water. In future we intend to make it illegal to sell tobacco containing more than 35 per cent of water.

A REMEDY FOR BORERS.

TO THE EDITOR OF THE "AUSTRALASIAN."

Sir,—*Apropos* of your remarks in *The Australasian* of last week's concerning the boring grub, permit me to say I have found the following remedy for its attacks upon fruit trees as successful as it is simple.

Take a piece of soap somewhat rounded by use, and force as much of it into the hole made by the grub as you can by pressing the soap on or by rubbing it backwards and forwards over the aperture several times.

Since I tried the above plan about six years ago I have not lost a branch through decay caused by the efforts of the grub in question. I have had occasion to apply the remedy to many limbs on all the kinds of fruit trees in my garden—apples and pears as well as stone fruits, &c. I used the soap with the idea of suffocating the grub by hermetically sealing it up—Yours, &c., J. S. P.

FORESTRY IN THE STRAITS SETTLEMENTS.

It may not be known to many of the ladies and gentlemen who lend life and animation to our Gardens in the cool of the evening, that the pleasure grounds in question form but a small part of a very important system of arboriculture, agriculture, and horticulture, extending over all three of our settlements. The Forest Department has demarcated wide stretching areas, opened up many miles of boundary paths, and planted thousands of valuable trees in waste lands. Excellent work has been done in the new reserves at Bukit Timah Jurong, and Bukit Mandai, where mahogany, teak, and other costly timbers may be seen springing up with every promise of developing into tall and stately trees. We think however that a good policy has been adopted in planting a very large number of native trees of rapid growth, such as serayah, casuarina, bintangor, &c.; these will "form the forest floor," and after they have been cut down and converted into money, they will leave the land in a much better condition than it is at present, to be re-stocked with the more valuable varieties. The young plants appear to be quite able to bid defiance to the *lalang*;* their stems soon overtop this troublesome grass and overshadow it with their leaves; indeed it is rather curious to note that some plants which have been grown on a patch cleared as an experiment in the Bukit Timah reserve, do not look so well as the others which have been left to take their chance among the *lalang*. No manures are used, and as the trees are flourishing it would appear that the soil of Singapore is not quite so poor as is usually supposed, but of course much depends upon the situations in which the different varieties are grown. Thus teak and rubber trees, of which a large number may be seen in the reserve near Cluny road, love low lying and moist lands, while serayah, meranti, kelat, etc., prefer the hill tops and slopes. Some kinds will not grow on laterite, in fact a systematic chain of experiments, (during the course of which the influence of different elevations should be especially studied) must be carried out throughout the Settlements before we can form any real idea of the agricultural possibilities of the Colony.

In the meantime it is gratifying to find such notable progress being made with the afforestation of waste lands. During the year 1885 over one hundred thousand trees were planted in Singapore alone. It is not too much to hope, therefore, that if this good work is carried on with sufficient energy, that we may live to see unproductive and hideous wastes of *lalang* replaced by beautiful and valuable forests.

The different reserves have been demarcated chiefly by means of boundary paths eight feet in width, bordered for the most part by young fast growing trees, amongst which a great number of casuarinas may be noticed. These paths, which in Singapore are about thirteen miles in extent, are much used by the natives as roads, and must be of very great use to them. One of these boundary paths was the means of stopping the further progress of a jungle fire which raged for a distance of two miles along the eight foot way without being able to cross it. The importance of having such "fire-breaks" in a jungle or forest country is very great.

The annual expenditure of the Forest Department amounts to about $20,000 per annum which does not appear to be a large sum when the work done in the three Settlements during the years 1884 and 1885 is considered. During this time about 22,000 acres have been demarcated, 109 acres planted, and 107 miles of the eight foot boundary lines opened; thus it will be seen that although the department is quite in its infancy, it has already accomplished a formidable task, and has so far achieved all the success which can be reasonably expected of it. The enterprise is one that the Government alone is in a position to attempt, and as the Forest Department has really been created by H. E. Sir Frederick Weld, it should meet with adequate support and encouragement. Within a few years these modest nursling forests will be considered as being amongst the most valued of the Colony's possessions, and will be a noble and lasting memorial of Sir Frederick Weld's enlightened administration.—*Straits Times.*

* Our *Illuppi*.—ED.

THE VEGETABLE PRODUCTS OF THE STRAITS SETTLEMENTS.

Besides the many native trees which afford excellent timber, there are other trees and plants cultivated by the Superintendent of the Forest Department which possess an especial interest, these are the varieties which swell our export returns by providing us with rubbers, gums, oils, spices, and other descriptions of produce.

Rubbers are probably attracting a good deal of attention just now in certain quarters; the prospectus is out of a company which intend to spend half a million sterling on a submarine telegraph cable, and if the capital is subscribed it is probable enough that the malodorous and dreadfully adulterated article known as "gutta" may give rise to a certain amount of speculation.

The Department makes a very good show of Rubbers; Panama, Ceara, Madagascar and African kinds are all represented, the native guttas however are growing so well, that the exotics do not after all possess a very absorbing interest.

But another imported plant the Australian Wattle, looks as if it would grow very well in this climate, the bark of the tree is getting into favour with English tanners, and fast coming to the front as an Australian export.

The specimens in the Experimental Garden are of a most varied description; nutmegs, cardamoms, vanilla, cocoa, sugar, tea and coffee are all to be seen growing within a small radius. At one moment the visitor may examine the famous coca leaf *(Erythroxylon Coca)* and at the next, rejoice his eyes with the sight of some tiny English strawberries, peeping in all their scarlet glory from beneath their protecting leaves. And there is a splendid logwood hedge with small delicate leaves which remind the exile of hawthorn sprays and distant landscapes; the many shades of green which it possesses contrasted in the happiest manner possible with a delicate light brown tinge make its colouring as beautiful as its foliage; as this is a rapidly growing plant it might easily be used to replace coarse bamboo hedges in grounds where much attention is paid to effect.

The Superintendent has been working up yet another question, of great interest to ladies who are gifted with a domestic turn of mind, and that is our supply of vegetables of which there are about eighty different kids more or less known in our bazaars. This appears to be a very fair assortment, but unfortunately many of them are scarce, others again are not very attractive to European palates, and nearly all are badly grown because our Chinese market gardeners believing that it pays them best to produce the greatest possible quantity, leave their crops in the ground until the beans, lettuces, cucumbers or whatever they

may be, degenerate into aged, coarse and melancholy caricatures of the young and delicate vegetables which would appear on our tables, but for this deplorable system or sacrificing quality to weight. We hope that the attention which is being drawn to the unsatisfactory nature of this pleasant and wholesome article of food, so necessary in a climate like ours, will lead to good results, although it will need some little energy and skill to overcome the obstacles which lie on the way of a practical solution of the difficulty.

Considerable success has rewarded the trials which were made both in Penang and Singapore of European fruits and vegetables; asparagus, green peas, lettuces, tomatoes, turnips, carrots, leeks, pot-herbs, &c., have turned out well, the superior elevation attainable in Penang of course giving our sister settlement a great advantage in these experiments. The peaches, apples, and vegetables exhibited at the recent flower show, were very pleasant to look upon, and it is somewhat surprising that such a fine display did not attract more general attention, especially as the excellent condition in which these delicacies were shown go far to prove that Singapore tables might be easily supplied from Penang Hill.

The Botanic and Experimental Gardens will be incomplete until they possess a small but well arranged Economic Museum specially designed for the produce of this colony, and the plan adopted by many other colonial gardens, might well be imitated here. Nothing could be more convenient than to have the museum in the gardens so that the plant and its manufactured product might be compared on the spot. Thus the gambier plant having been examined, a few minutes' walk should bring the person interested to the museum, where he might be left to inspect the different kinds of bale and cube gambier at his leisure. In such a building the visitor, after having admired the full, well grown, clustering berries of the pepper vine in the open air, would see a specimen of Singapore "sun-dried," the ideal pepper, than which nothing can be finer, being far superior to anything that comes from Cochin China, Siam, or the West Coast; this being a most desirable commodity, in the nature of things here below, non-existent in our market; then besides the usual "smoked" sorts, there should be good large sample of the stewed, smoked, fermented, uripe pepper, which loses in weight to the extent of 15 per cent by steamer shipment to London. This particular kind is becoming too well known in our market and is much appreciated by the Chinese sellers thereof, but with the European buyers transactions in such a quality are apt to end like the marriage service, that is to say, in "amazement."

In such a way an Economic Museum could be made to fulfil its real functions, and the establishment could not be in better hands than those of the Superintendent of the Forest Department, who, besides having considerable knowledge of the subjects to be dealt with, seems to possess the very useful qualification of producing excellent results with the means at his disposal.—*Straits Times.*

ESTATE COMPANIES FOR CEYLON.

There are few residents in Ceylon who have not at some period found it a difficult matter to invest small sums of money. The purchase of estates, or even of a share in an estate, requires a very considerable amount of capital. There are in Ceylon, and most tropical countries dependent upon agricultural or planting industries, few or no opportunities for small investments. This is a more serious matter for the poorer members of the community than appears at first sight, as it is opposed to those habits of thrift and frugality which go far to enrich any country.

If we look back for some ten or fifteen years to those days when salaries were high, and remember how few estate superintendents, dependent upon their own exertions, really saved money, how many there were who lived up to the last rupee of thir income, it may occur to us to consider why this was the case, why there was such general extravagence, not confined to planters only, but to all other classes of the community. There is but one reason to give—the difficulty of investing savings. In those piping days of prosperity, when A, who had no capital, saw his neighbour B. who had two or three thousand pounds, buy a block of land in one of the new districts and double his capital year after year, poor A. felt himself unable to participate in the good things going. He grew despondent at first, then reckless, and probably ended by having a burst of extravagance, scattering his savings with the prodigality of an Australian digger. When there is no other outlet for small capitalists than the deposit receipt accounts in a Bank, is it to be wondered that few are content with this one form of investment and have the patience to wait till old age to save sufficient to keep them from want? Just consider how much greater interest A would have in his work could he from time to time invest his hundred rupees in business he understood; how he would strain himself to increase his funds and look out for fresh opportunities for investment!

One has not to look far for a remedy for the existing state of matters. There is an excellent old saying "Union is strength," and, were the capitalists of Ceylon, both small and great, to bear this in mind, the prosperity of the colony might be raised to a pitch such as it has never yet attained.

Tropical agriculture, as we all have too good cause to know, is subject to great vicissitudes; so is mining. When a mine is opened in one of the Australasian colonies it is seldom worked at the undivided risk of one individual. When the scheme is matured it becomes a company. The chances of a large fortune may be less for the original proprietor, but the chances of great loss or ruin are proportionately diminished. The prosperity of our Australasian Colonies is greatly owing to the facilities for investment afforded by companies, the original capital of which is subscribed for in shares of from £1 to £10 each. This gives the small capitalist a chance, and minimizes the risk of the richer investor. These companies are not formed for mining investments only: banks, saw mills, manufactories, shops, &c., are among the number.

I cannot help thinking that were more estates turned into companies in Ceylon it would have a great influence in re-establishing the prosperity of the colony. Large companies are not required; small companies, with capitals of from £5,000 to £20,000, are. At first these would have to be commenced in Ceylon itself, but they would soon attract capital from England. At the present time, were any good tea estates to be offered as limited liability companies, I believe London capital would not be wanting. But the greatest benefit such companies might confer upon Ceylon would probably arise from the opportunity it would give to small investors; they would utilize what is now the idle capital of the island, the savings of members of the Civil Service, mercantile and planting communities, &c. But the advantage of forming estates into companies would not be confined to the utilization of capital only, an equally strong argument in favor of such a system of working would be in the diminution of risk. It is well known how variable the returns are from adjacent estates. On estate would pay handsomely while the next estate would seldom give a crop; this I have noticed in different cultivations in widely separated countries. Were estates cultivated by a co-operative system the loss of the bad estate would not fall alone on some unlucky investors, but would be borne by others as well, and the consequences lessened. By not putting all the "eggs" in "one basket" planting would become a much safer investment. Instead of each individual who wished to cultivate cacao, cinchona, tea, spices or coconuts having to open up clearings for the same, in different parts of the country, would it not be more to his advantage to be able to buy shares in estates cultivating the product he fancied? The special cultivation would be on a larger scale and most likely under better management than the single investor, on a small scale, could afford.

Times, I believe, are hard in Colombo, and estate stock-broking might in time become a persuit of considerable advantage to members of the mercantile world in Ceylon.

To recapitulate: I again say "Union is strength," divide the risk, instead of being dependent upon one crop in one district let the planter consider whether his capital would not be better laid out in various crops in different parts of the country. The cost of management may be slightly increased, but the results will be safer and planting investments less speculative. H.

London, April 10th, 1887.—Local "Times."

SILK IN INDIA.

The Indian silk industry is the subject of more attention now than it has been since the days of its greatest importance. Sericulture received a great impulse from the European early settlers, who built factories for the production of the raw material. These factories were large massive buildings erected in wide enclosures and protected by high walls. The residence and factory buildings were generally laid out in such a manner that the whole enclosure could be turned into a fortress if necessary. As the country became more settled, European capitalists stepped in, and travellers passing through the silk districts at the present time will observe standing monuments of the period of keen competition. It appears to have been the custom in those days to erect princely mansions with imposing gateways to prove to the rearers of the worms and to the country in general the wealth and greatness of the owners. But there was a business idea underlying this display of ostentation in the jungle. The substantial show was meant to attract the rearers of cocoons on the look out for good prices. If one of these mansions secured the title of "Burra Koti," the monopoly was secured to the fortunate owner, and other competitors had to retire from the scene, leaving piles of masonry as monuments of the fruitless contest. This process practically left the monopoly of the silk industry in Bengal in the hands of a small group of capitalists, carrying on operations in widely separated districts. As the industry prospered, operations were extended, out-factories were built, and the old contest was renewed. At the time of this revival Cora silk was greatly in demand for export, thus causing a local demand for raw material for the native looms, and the inferior native reeled silk commanded almost as good prices as the finer quality reeled by European filatures. The native was thus able to raise his prices for cocoons, and the market was immediately affected.

The European owners of filatures agreed not to outbid each other, but to purchase cocoons at market rates. This, however, led to no improvement, and the manufacture of fine raw silk for export rapidly changed from an important industry into a mere commercial speculation, such as it is to a large extent at the present day. Rightly or wrongly, Bengal silk has always had a bad name, but it would appear from the prices now ruling that it is in every way as good as Italian, if not superior. All that can be urged against Bengal silk is that, owing to a certain want of firmness in the cocoon, the result of reeling is not all that might, perhaps, be desired. The producer of the Indian cocoon is in some important respects like his brother, the cultivator of the soil. You may point out to the latter how he may grow the best wheat in the world, but unless you can prove to him that the result will place more rupees to his credit, your teaching will be utterly disregarded. But the moment you show him that it is to his personal profit to use improved seed or better methods, the cultivator is surprisingly ready to take advantage of any counsel. In the same way the rearer of cocoons has found from practical experience the quantity of mulberry leaf it pays him best to allow his worms to consume in order to give him a certain gain, and to this present day it has been found impossible to convince him that it would pay to rear cocoons of the Italian quality. When he once sees this he will change his traditional tactics, but not till then. At present, the rearer finds it pays him best to half starve his worms; his father did so before him, and he will continue to do so as long as it pays. He is quite content with the result, and it is not yet ascertained by his teacher that the delicacy of Bengal silk may not after all be due to the process of feeding and forcing in vogue. As a matter of fact the various worms to be seen in Bengal are of a very mongrel description. Some rearers attempt to classify and keep the breeds separate, and succeed partially in doing so, but the difficulties in the way are enormous. In this matter the native would appreciate help and advice from Europeans, but unfortunately the Europeans most capable of aiding him have no time to devote to the subject, and still less to give to the somewhat delicate task of popular instruction.

During the past few years, however, a very considerable amount of attention has been directed to the study of silk, and it may be hoped that the movement—for it is nothing less—will not be without its effect on the practical working of the industry. In England quite a host of men are interested in the future of Indian silk; Mr. Rondot, on behalf of the French Government, has been making a searching study of Eastern silks and dyes; and not many months ago Mr. Thomas Wardle, of Leek, who visited India in connection with the silk collection for the London Exhibition, gave a new and more serious turn to the industrial phase of the enquiry. The Revenue and Agricultural Department has given some attention to the matter, but it may be worth while to consider whether Government might not with advantage make silk the subject of a special enquiry, and do what it can to turn the present movement to account. The time is distinctly favourable for some such action, and there can be no doubt that for want of a fixed central agency a great deal of valuable information is lost, and the development of the industry is retarded. It would be important if a public Association could be formed for the purpose of fostering the study of the special subject, and in these days the manifold difficulties and discoveries in the silk world are adequate to the sustenance of such an Association, and its necessary pendant, a monthly periodical. We understand that a laboratory for the study of Indian silk producers is to be established at the Imperial Museum Calcutta, and that Mr. Wood Mason, the Superintendent of the institution, is already engaged in the work of studying and classifying the worms, and in making accurate drawings of them in the various stages of their development. He has succeeded in rearing some very shapely cocoons, in spite of many drawbacks, and the further results of the work will be looked forward to with great interest by all who have given any attention to the subject. It is by means of such an enquiry, carried out to its logical sequence, and aided by a strong alliance of fellow-workers, that we may yet hope to see a languishing industry revived, and the Government freed from the reproach of neglecting one of the commercial resources of the country.—*Indian Daily News.*

[What about the promising experiment by Mr. Ross of Kowdapellella with silkworms brought from China or Japan and by Mr. Robert Fraser of Waripolla?—ED.]

COMPOSTS FOR POT PLANTS.

One of the most important matters connected with the cultivation of imported or acclimatised plants,—which have in this country to be cultivated mainly in pots or restricted borders, frequently under glass or carefully shaded houses, and have, as a consequence, to be constantly supplied with water by artificial means—must always be the constituents of the soil in which they are potted or planted. Although certain plants—the Croton for instance—appear to be not over particular as to what description of soil is used as a basis for a compost, yet even such plants attain to different degrees of health and vigour when the soil most suited to their nature preponderates. Good culture in all other respects lessons the evils arising from a misapplication of soils; but when a plant finds its element in this respect, and is otherwise

properly cared for, its character is developed with more freshness and vigour.

We believe it is correct to say that the chief features of the horticulture of the present, as compared with that of the past, is that complicated mixtures of soils and manures are less used and believed in as "the secret" of successful culture, and that the tendency is still in the direction of simplicity in this respect. Mixtures when compounded from fancy, and with little knowledge of the elements of chemistry, may or may not be compounds of evil. After many years of extensive practice we are thoroughly convinced that the mixing of different sorts of soils and manures for potting plants in general is an evil to be avoided, and feel certain that a plant that thrives in loam will thrive better in it ultimately—make a more healthy and robust plant—if there are no animal or organic manures mixed with the turfy loam. We of course mean all organic manures of a rapidly changing character which putrifies, even though in that process the substances formed are highly important to plant life. All such, and humus of every description, are best left out of the soil in which all the slower growing and more hard wooded plants are potted, if they are to be healthy, floriferous and long lived. By so doing the soil runs far less risk of becoming what is well understood by the term soured, and, of course, unhealthy. It may be asked, are the excrements of animals and decaying vegetation not beneficial to such plants? Undoubtedly they are; but not mixed in with the soil in a narrow, deep vessel like a flower-pot. Such highly stimulating, and more or less fermenting, substances are best applied as a top dressing when the plants require it. The turfy loam generally used for potting possesses, at first, much organic matter, of a less rapidly changing (because to some extent differently incorporated with the soil) as well as of a more natural character; and as a rule no other manure need be mixed with the ball of earth in the pots, unless it be of a less rapidly changing character, such as ground bones. Take for instance a Croton and a Dracæna—plants of very diverse characters. They thrive splendidly in light turfy loam, and require nothing else till their pots get pretty well filled with roots. Then a top dressing of rich manure is of immense benefit to them, which if mixed with the soil at the time of potting, is not only unnecessary but positively injurious. The roots which these two plants make in the loam pure and simple, with perhaps the addition of some charcoal and bones, are far more numerous, and of a different character to those produced in soil made rich and soft with rapidly decaying manure, in which the roots are long and less twiggy, escaping more rapidly down among the drainage into simpler and sweeter fare.

As a rule we neglect far too much of nature's rule of potting and nourishing her children. We put manure of a too gross nature *into* the soil; Nature lays it on the surface. We give narrow, deep body of soil, with comparatively little surface exposed to the air, and that little is far too often a mass of gangrene and slime: on the other hand nature, as a rule, gives a shallow body of earth with a great wealth of surface clothed with living verdure of some sort. In all these respects we cannot in small gardens or houses follow the lead of nature in the culture of plants in pots. But the further the departure from her ways, the more likely we are to be in error. We can however top dress more and mix less humus *in* our soils. Who will say that flower-pots would not be better if made a little shallower and a little wider? With regard to the mixing of stones or charcoal, or clean broken potsherd, this can be followed without any offence to the eye, or any extra space. This we have come to regard as a cardinal point in the pot culture of nearly all plants that are not of the grossest and most ephemeral kind. Who that has had much to do with plant growing and potting has not noticed that a plant that has clean crocks, or, best of all, charcoal mixed to a liberal extent, with the soil in which it has been potted, has always been in a more satisfactory condition the next time it required a shift, than when these substances finds no place in the soil? Take any hard-wooded flowering or ornamental foliage plant, and in potting it fill one side of the pot with soil in which charcoal is liberally mixed, and the other with soil devoid of that substance, and in twelve months, when the plant needs another shift, it will be found that there are double the number of rootlets on the side of the charcoal to what there is on the other. Wherever a few pieces of broken pot or charcoal are found in the ball of a plant, there the roots are found to muster in greatest numbers and health.

The mixing of these substances, in imitation of nature's prodigality, is not practised to the hundredth part in plant culture that its good effects demand. Charcoal has a wondrous charm for roots, and is of the very foremost importance in the soil of nearly all pot-grown plants. It has a beneficial mechanical effect; has a sweetening tendency; is highly useful, absorbing ammonia and other plant food from air and water and from all decaying substances in its vicinity; while its own character is most unchangeable. It prevents stagnant water; and being such a store-house, is a safeguard against extreme drought. In the case of nine plants out of every ten, it would be well if charcoal formed a fifth part of the whole compost in which they are potted.—*Indian Gardener.*

BRAZILIAN FLOWERS.—Travellers in Brazil speak of Fuchsias 50 ft. and 60 ft. in height, blooming from top to bottom; of large bushes of Abutilon venosum, bearing a profusion of orange bells streaked with crimson; of huge Daturas, with hundreds of white trumpet-shaped and sweet-scented blossoms, some 16 in. in length; of Orchids and Ferns; huge Arums with shield-like leaves, large enough to cover a man; brilliant red and yellow Bromelias and Tillandsias; epiphytes and parasites of all descriptions; Camelias large enough to climb into to pluck the topmost blossoms.—*Indian Gardener.*

TOBACCO.—In France, in the Pas de Calais, large tobacco crops are reared. All about douai the plants may be seen reaching up to between five and six feet high, and the cultivation, treatment, and manufacture form quite an industry of the place. But the Pas de Calais is appreciably colder than the South or even the Midland parts of England. The snow rests there in winter when our landscape is clear of it. It is true the tobacco grown is but of a coarse kind. Still, its cultivation gives employment and brings in revenue. In Canada the revenue authorities are less strict. Tobacco is viewed in that colony not as a luxury but as a necessity. Every farmer is allowed to plant one-eighth of an acre with the plant, and whatever that plot produces is his own, for his own consumption. Beyond that limit he comes under the rigid laws and prohibitory penalties of the Custom-house, but so far he may go with impunity. The 5th of May, 1886, may be an important date in the future history of English revenue; but, if great results should be attained, they will certainly have sprung from very modest commencements.—*Pall Mall Gazette.*

PLANTS IN LIVING ROOMS—There was once, still is, perhaps, a superstition that plants in rooms are unwholesome. Setting aside special cases it may be said that as a general rule, plants in a living room, if they have any, perceptible effected at all, are benefical rather than otherwise. We are glad to see the Faculty taking this view of the subject. An American physician has, it seems, pointed out that by their powers of transpiring moist vapour plants render great service in rooms warmed by dry air. The value of plants and flowers as *dèlassement* for the weak and weary is acknowledged on all hands. Dr. Anders, according to the *British Medical Journal*, goes further and states that the pursuit of gardening, though naturally it favours rheumatism, appears to arrest consumption in persons of phthisical tendency, while the abandonment of the pursuit in other cases led to the development of the disease. Dr. Anders recomends a room well stocked with plants as a complete and agreeable health-resort free from the inconveniences of travelling and the anxiety of separation from home. We coucur with our contemporary in the opinion that the Doctor has opened up a most interesting subject for investigation.—*Gardeners' Chronicle.*

THE PAPER MAKING INDUSTRY OF INDIA.

India is very backward in the paper-making industry, although it abounds with fibre producing plants of all descriptions; and there are perhaps few countries in the world richer in these than India. Many of these fibrous plants have been experimented upon by competent men and found capable of yielding a very abundant and never failing supply of sufficiently cheap and excellent materials for paper-making of all kinds. The following is a list of some of the most important indigenous plants in India which produce fibres most useful for paper-making :—

Venday or Bhendicai (Abelmoscus esculentus)
Toothee nar (Abutilon indicum)
Kasini or Pulchi nar (Hibiscus cannabinus)
Janapa nar (Crotalaria juncia)
Yercum, Mudar (Calotropis gigantica)
Ganja plant (Cannabis sativa)
Coconut fibre from leaf stalks, (Cocos nucifera)
Palmyra tree fibre from leaf stalks (Borassus flabelliformis)
Country date palm (Phœnix sylvestris)
Betelnut palm, fibre covering the nut (Areca Catechu)
Screw-pine fibrous leaves (Pondanus Odoratissimus)
Pine-apple leaves (ananas) (Bromelia ananas)
Common plantain (Musa paradisiacia)
Marool or bowstring hemp (Sansiveera zeylanica)
American aloe (Agave Americana)
Various kinds of Bamboos,
Rattan canes,
Sugar cane refuse,
Arrowroot, Turmeric and Ginger stalks and leaves, Rice and other straws.
Grasses, various kinds.

There is in different parts of the country an abundant supply of certain products known to be well suited for paper-making purposes, such as sugarcane refuse, the common plantain leaf stalks, stems, &c., all which, owing to the fact of there being no demand for the purchase of such materials are allowed either to rot on the ground, or are burnt as fuel or are simply used as manuring substances for the land. Suitable pulp may be manufactured in this country from these or other materials which are at present almost wasted and rendered useless to the country; and such manufactured pulp may be used in this country for making paper of various kinds required for consumption in the country, and the surplus of pulp may be exported to European markets and sold there for profit.

It should be noted that enormous means by which wealth may be increased and the condition of the cultivators improved is lost, and vast quantities of products are allowed yearly to be wasted and treated as useless and undeveloped substances in this country. For instance, thousands of plantain trees on an average are cut down for the sake of fruit every day throughout the year. Each root-stock throws up from six to eight stems, each of which must be yearly cut down, and will yield from three or four pounds of very good fibre fit for texile fabrics, for rope-making, or for the manufacture of paper. Some very useful and tough kinds of paper have been made in India from the fibres of the plantain and paper of finer quality from the same material in France and in England. We can easily see that an enormous quantity of valuable produce is annually lost in this country through the mere want of knowledge and attention, and requisite facilities to turn it to utility.

There is an abundance of some kinds of grasses which readily grow in different parts of the country which yield materials both cheap and well suited for paper-making purposes in this country. The American aloe can be grown to almost any extent and at very slight expense in this country. It will apparently grow on the roughest and coarsest soil and needs little attention or care after it has once sprung up. We have the bamboo growing in the greatest abundance, which yields material for paper manufacture superior to any other vegetable product which has as yet been discovered. Thus we have the most valuable fibre-yielding plants such as the plantain, aloe, and bamboo in sufficient quantities to produce abundant materials for the pape trade. It is hoped that this subject will soon engage the attention of those interested in such matters, and result in the creation of new industries and the development of a large new trade which will add materially to the wealth and prosperity of the country.

Paper pulp is at present not only used for paper making purposes, but it is put to innumerable other and abundant uses in various arts and manufactures. It is employed in the construction of even such things as railway carriage wheels.

It was therefore justly remarked that the real wealth of this country had yet to be found " in its fibrous plants and many valuable vegetable products, as compared to which in value the grain produce of the country will in time be nothing." India abounds in innumerable kinds of fibres most valuable and best suited for paper-making, and as these fibres are procurable at a comparatively very small cost, there ought to be no reason, physical or economical, why paper should not, with suitable machinery, be made at a much cheaper rate than it can be imported from Europe where the raw materials are daily becoming more and more costly. One Mr. Henley, who was evidently in search for materials for paper manufacture in his country, observed that " the east coast of the Bay of Bengal, as well as Malabar on the West coast of India, are the places where the growth of suitable materials from the warmth and moisture of the climate, is most abundant, and the conveyance by sea is at the same time most easy. It is to India we must look for extensive and cheap supplies, for it is there alone we find the necessary conditions of very low priced and intelligent labour, with an abundance of elementary suitable materials."—*Friendly Visitor.*

VARNISH RESINS.

BY P. LUND SIMMONDS.

The number of substances suitable for coarse varnishes has lately become very numerous in Europe. Common resin is now purified by a patent process consisting of distillation with superheated steam, by which it is obtained nearly transparent and colourless as glass. Resins suited, however, for the preparation of the finer descriptions of varnish are still very limited. All plants produce, indeed, resins in a greater or less degree, but the trees which produce them in sufficient quantities to be of commercial value are to be found principally in South America, India, Africa, and New Zealand. These belong principally to the pine tribe, the *Dipteraceae* (only found in India and the Eastern Archipelago) and the *Leguminosae.*

Of the latter, the *Hymenaea* seem to be the trees from which the resins most nearly akin to the true hard, or fossil copals, are mostly derived. The copal of Africa and the dammar of New Zealand (known in commerce as kowrie gum), are the best known and most esteemed.

The word Varnish covers a very wide field, as the term in its fullest sense, can embrace all the thousand and one preparations compounded for as many different purposes. An essential quality of varnish is that it must harden without losing its transparency, as it must not change the colours it is intended to preserve. It must exclude the action of air, because wood and metals are varnished to protect them from rust and decay. It must also be waterproof, else the effect of the varnish would not be permanent. And a point of primary importance is that it must possess durability. New uses are constantly being found for varnish, by which it embellishes the article to which it is applied, affording satisfaction to the buyer and profit to the manufacturer. A few notes on the chief varnish resins may therefore be acceptable.

East Indian dammar is the name applied by varnish makers to the resin of *Dammara orientalis*, imported chiefly from Singapore, which is strawcoloured, or, like pale amber, very clear or transparent. It is easily and entirely soluble in benzole, ether, or chloroform, less rapidly so in turpentine, forming a clear, nearly colour-

less varnish, which dries rapidly on exposure to the air. Dammar comes principally from the Lampong islands and Sumatra, and the yearly receipts may be given at about 32,000 cwt. This resin is produced by many kinds of trees in the State of Perak. The principal are *Dammar mata kutching D. Meranti D. Lant, D. Degon*, and *Dammar Bulk*. It is the sap which exudes spontaneously, and being exposed to the air, acquires a flinty hardness, from which the epithet batu, or stone, is given, to distinguish it from the softer resins. The dammar is found either in large masses, at the foot of trees which yield it, or floating in rivers, drifted to them by the floods of the rainy season. The natives apply it to most of the uses to which we put tar, pitch, and resin. Most of the family of *Dipterocarpeæ* yield balsamic, resinous juices, those of the genus *Dipterocarpus* the wood oils, and of *Vateria* indurated dammar. The natural order abounds in Sumatra, Java, and Borneo, which are the chief sources of the dammar of commerce. In Borneo, dammar is generally found in the ground below the trees, but may occasionally be seen in huge masses, not unlike icicles, hanging from the sides of the trees. A single piece weighing 6 cwt. has been found on one tree, but necessarily these large masses get broken in collection. The value of the dammar found in the Sandakan district, North Borneo, is rarely over 10s. per cwt. Further to the north much better sorts are found, the dammar mata kutching (or cat's-eye), of Palaman, brings £2 per cwt. Of resins, chiefly dammars, we import 20,000 cwt. from Singapore, and 6,000 cwt. from Java. Two or three species of dammars are met with in British India, but are of no great commercial value. *Canarium strictum* is known in Malabar under the name of the black dammar tree, in contradiction to the *Vateria indica*, known as the white dammar tree.

The Sal tree (*Shorea robusta*) furnishes also a dammar, which dissolves much more freely and speedily in benzole than in spirits of turpentine. The resin is usually of a pale, creamy colour, nearly opaque. *Shorea sericea* yields a kind of dammar which closely resembles the Indian kind.

Hopea odorata, of Burma and Pegu, yields the rock dammar of commerce, a yellow resin which dissolves readily. The trunk of *Hopea Mingarawan* furnishes a white dammar of a superior quality. The resin yielded by *Hopea Micrantha* in Borneo, Sumatara, and Malacca is not so good, but that obtained from Belambang is much sought after for the lustre it gives. This resin is of a yellowish colour, and exudes in large lumps from the trunk and branches. It is soluble in turpentine or benzole, and forms a clear limpid varnish.

The Kauri gum of commerce is the produce of *Dammara Australis*, a coniferous tree, which occurs only in the north island of New Zealand, over a large area of land which has been exhausted by forests in past ages, and is now barren. The turpentine that has exuded from the dead trees is found at a depth of from 2 ft. to 3 ft. The export of this fossil resin has been steadily increasing the last thirty years. In 1855 only 355 tons were shipped, whilst in 1883, 1884, and 1885 the annual shipments were over 6,000 tons, valued at £320,000. We received in 1885, 81,000 cwt., valued at £254,000. This fossil resin is often found in immense masses, larger than those of any other known resin. Fine Blocks were shown in the New Zealand Court at South Kensington last year, as well as large collections of trade samples of the different commercial varieties.

Copal of Zanzibar.—This, sometimes called Indian Animé, has been found to be the produce of *Hymenaea Mosambicensis*, or *Trachylobium mosambicense*. The South American species *Hymenaea courbaril* also yield a good deal of resin. The true, or ripe copal, is the product of vast extinct forests overthrown in former ages. The export from Zanzibar averages about 1,000,000 pounds annually. The raw, or true copal, is called Chackaze, corrupted by the Zanzibar merchant to jackass copal. Copal, it may be remarked, is the Mexican generic name for all resins. Manila copal derive its name from the port from which it is shippe there are two varieties known as hard and soft Manila the hard resembles kowrie in appearance, but is inferior in quality; the soft is a pale yellow kind resembling dammar. From *Hymenæa courbaril*, the soft resin known in commerce as American copal, is obtained. The tree is very extensively diffused over the West Indies, British Guiana, Venezuela, Mexico, and in almost all the provinces of Brazil, though some other species of *Hymenæa* probably furnish the resin. It is found in many localities in a semi-fossil state, and is obtained by digging in the vicinity of the roots of the tree. The masses seem to have the appearance of a stalagmitic formation, arising from exudations from the branches of the tree dropping in the soil below. *Guibourtea copallifera* is the principal, if not the sole, source of the copal resin of Sierra Leone. All the resin exported under the name of West African copal, may be looked upon as a fossil resin, produced in times past by trees which, at present, are extinct, or exist only in a dwarfed posterity. The origin of the kind of copal known as Angola, is at present undetermined. Considerable quantities of copal are washed down during the rainy season from the slopes of the mountains. The natives subject the copal to a rude washing in lixiviated ashes, whereby the outer crust and its impurities are partly removed. It has, on arrival to be further cleansed for the trade with extreme care, and without the use of acids, which are very detrimental to varnishes in causing them to run "pin-holey." The flat Angola copal is sometimes called red animi, as it somewhat resembles it in appearance and quality. It is principally sent from here to Europe and America. The rounded water nodules, known as "pebble copal," assume this form, from the abrasion consequent on their being washed down by the rapid mountain currents, from the beds of which they are obtained.

The animé of commerce is a resin of great value to the varnish maker, but it is now largely replaced by copal. The best is obtained from Zanzibar, and is derived originally from *Trachylobium mosambicense*. The finer qualities come from the northern districts of Wande. The imports are never very large, seldom amounting to 3,000 cwt. Of copal, the imports occasionally reach 20,000 cwt. but the imports from West Africa are only about 7,000 cwt. Of dammar the imports range from 3,000 to 7,000 cwt. and of kowrie gum, 70,000 cwt. to 80,000 cwt. annually.—*Journal of the Society of Arts.*

ON THE USE OF SOOT.

As an April top-dressing for wheat, soot has been applied in certain districts for very many years, with most satisfactory results. Indeed, before the introduction of Peruvian guano and nitrate of soda, it was probably the only spring top-dressing employed; while its use on certain soils was regarded more as a preventive against fungoid and insect attacks than as a source of plant food. Doubtless it is owing to this preventive property that soot has retained its position as a favourite dressing with many practical farmers, so that its cost has rather increased than decreased.

If we compare the relative amount of available nitrogen compounds supplied by soot and by nitrate of soda respectively at the same cost, the economy is certainly largely in favour of the latter; for not only is the nitrate, on account of its richness in nitrogen, much less bulky, and therefore less costly in the matter of carriage and subsequent distribution, but there is the advantage that it can be purchased with a definite guarantee as to its chemical composition; whereas soot is subject to all kinds of adulteration, and its quality, moreover, must necessarily vary with the character of the coal consumed in different localities so that it is quite impossible to get any quantity at a uniform standard of purity. The only ready test of quality is its weight per bushel, for the less the weight the richer in ammonia-salts, and, consequently, the more valuable the soot. As we shall presently see, upon making a careful comparison of the chemical composition of the best qualities of soot with ordinary nitrate of soda, the latter is the more valuable of the two if we consider it simply as a

source of manure; and, further, this opinion has been borne out by actual field experiments. If, therefore, soot is to be preferred in certain localities, it must be on account of properties other than those of a manure pure and simple. From a number of analyses it will be sufficient to select the two following ones as fairly representative of average good commercial soot, which are placed by the side of a very poor sample for better comparison.

	Good soot.		Bad.
	No. 1.	No. 2.	No. 3.
Water	4·90	2·37	2·40
*Carbonaceous matters	33·01	49·01	41·86
Tar and hydrocarbons	27·42	15·83	·30
† Chloride of ammonium	5·69	7·49	trace
† Sulphate of ammonia	4·09	·81	·89
Oxides of iron and alumina	7·48	7·70	14·16
Sulphate of lime	4·49	2·72	5·36
Sulphate of Magnesia	·50	·86	·18
Siliceous matters	12·41	13·21	34·85
	100·00	100·00	100·00
*Containing nitrogen (insoluble form)	1·66	1·24	1·25
Equal to ammonia	2·03	1·50	1·51
†Containing available ammonia	2·85	2·59	·23
Total ammonia	4·88	4·09	1·74
Matters insoluble in water	74·60	82·20	91·75
Matters insoluble in spirit	57·90	73·70	96·90

From the above results it will be seen that good soot should contain at least 4 per cent of ammonia, and not more than 20 to 21 per cent of mineral impurities, such as sand, oxides of iron, and alumina. No. 3 shows us the composition of a very inferior quality, there being nearly half its weight of mineral matters, while the total ammonia is not more than 1·74 per cent. It is important also to notice that of this 1·74 there is only ·23 present in the form of available ammonia, as compared with 2·85 in No. 1, and 2·59 in No. 2, samples. This comparison leads further to the observation that even in No. 1, the best sample, there is only 2·85 of the ammonia present in a form available as plant food, the remainder 2·03 existing in a condition insoluble in water, and probably of very little practical use to the growing crop.

Indeed, a glance at the above analytical results will at once show that, so far as a source of fertilising matter is concerned, it is only the available ammonia that is of any manurial value in the soot. This ammonia is in fact, present in the form of an ammoniacal salt, sometimes in union with chlorine, and sometimes—perhaps more frequently—in combination with sulphuric acid, which latter is produced from the sulphur present in the original coal.

It will be further noticed what a large proportion of the three samples is insoluble in cold water; thus, in No. 3 there is nearly 92 per cent., in No. 2 as much as 82, and in No. 1 there is still 74 out of 100 that is of no use as a soluble manure.

It is therefore worth while, in these days of agricultural depression to ascertain whether it is possible that good soot will be an economical source of soluble nitrogen as compared with nitrate of soda. For this purpose we will assume that commercial soot of good quality, representing the mean analysis of Nos. 1 and 2, can be obtained at 6d. per bushel weighing 28 lb. Also, that good nitrate of soda, testing 95 per cent purity, can be obtained at 12s per cwt.

Nitrate of soda compared with ordinary soot.

	Nitrate of soda.	Soot.
	1½ cwt,	36 bushels,
Quantity of manure per acre	168 lb.	=1008 lb.
Cost of manure	18s.	18s.
Soluble nitrogen	26 2/5 lb.	22 3/5 lb.
Equal to ammonia	32 lb.	27½ lb.

From these figures it will be seen that, with the expenditure of the same money, the nitrate gives nearly 5 lb. more of available ammonia, and that, in order to make the quantities equal, it would be necessary to apply 42 bushels of soot, costing 21s., as against 18s. for the nitrate of soda.

In other words, the latter would appear to be quite 16 per cent cheaper than soot at 6d. per bushel, and that unless the price is 4½d., the farmer had far better use nitrate of soda as a top dressing for his wheat. Moreover, in these calculations only the original cost of the manures has been considered; but if we compared the extra cost for carriage and distribution caused by the increased bulk of the soot, the difference in the expense would be still greater. Thus, 42 bushels of soot at 28 lb. each, would represent 10½ cwt. as against 1½ cwt. nitrate of soda.

Let us next ascertain how far these chemical calculations have been borne out by actual field experiments, and we cannot do better than refer to a most exhaustive paper, "On Experiments with Different Top Dressings upon Wheat," by the late Dr. Voelcker, which was published in the Journal of the Royal Agricultural Society in 1862.

The experiments, which were carried out on the College farm at Cirencester, include a number of different kinds of manure; but for our immediate purpose it will only be necessary to refer to those we are now comparing, namely: a dressing of 1½ cwt. nitrate of soda gave an increase over the unmanured plot of 10¾ bushels of corn and 10½ cwt. of straw, while 32 bushels of soot gave only an increase of 7⅝ bushels of corn and 6¼ cwt. of straw, the nitrate thus giving an increase of nearly 25 per cent more corn and 35 per cent more straw than the soot. Both manures were carefully analysed, and found to be of good quality.

These results, therefore, fully confirm the previous calculations respecting the agricultural value of the two dressings, and it seems therefore desirable, at present market prices, to confine the use of soot to those districts where it can be obtained for about 4½d. per bushel, and also to certain cold damp clays, specially liable to produce mildew, but upon which soot seems to exercise its popular property of averting this disease. Indeed, if we refer to the analysis of No. 1 sample it will be seen what a much larger proportion of tar and hydrocarbons there is, as compared with No. 2 sample, there being 27·42 in one case, and only 15·83 per cent in the other; while in No. 3 there is only a mere trace.

It is therefore important to have as much of these compounds in the soot as possible; and the extent to which a sample is soluble in spirits of wine will be a useful indication of its quality as a preventive of fungoid disease, as well as against the attacks of insects.

In regard to this latter point there can be no doubt that it must be most effective, acting both mechanically and chemically. Further when applied in large quantities, such as forty bushels per acre, soot must supply a warm covering and protection from cold wind to the young plants, and its dark colour favours the increased absorption of the sun's heat rays.

In conclusion, it may be repeated that as a simple manurial top-dressing soot cannot be economically compared with nitrate of soda, except in those districts where it can be purchased at 4½d. per bushel; but as a useful preventive against fungoid and insect attacks it is likely to be still employed with marked advantage, even when the price is as much as 6d. per bushel, provided it is of really good quality.—JOHN HUGHES, F.C.S., Consulting Chemist to the Planters' Association of Ceylon, 79, Mark-lane, E.C.—*Field.*

AGRICULTURE ON THE CONTINENT OF EUROPE.

(Special Letter.)

PARIS, April 16.

An experienced authority asserts that he has increased by five per cent the yield of milk from his cows, and which his neighbours admit, by attending to the following simple rules:—Never worry the cows on their going or returning between the field

and the dairy; milk them at uniform and unchangeable intervals, say five in the morning and six in the evening; let the operation of milking be performed as gently and silently as possible; and to remember that passion and threats will not win the confidence of cows, nor will a blow in their flank be the means for dispelling their fear.

The only grain which succeeds in all soils is oats, due to the great development of its roots and leaves, that is, its organs of development. For spring oats, as well as for barley and maize, the most economic and efficacious sources of azote, phosphoric acid and potash are nitrate of soda, the salts of Strassfurt; and the dephosphoration-clinkers and phosphate of lime nodules reduced to powder. The collective dose to apply depends on the richness of the soil and the wants of the plant to be cultivated; the expenditure should, under the head of fertilizers for top-dressing spring cereals, be about fr. 40 per acre.

For barley, the Chevalier is the pet variety; for oats, the Canadian or the Hallet Tartary. The practice of farmers, residing in different and distant districts, exchanging grains for sowing, cannot be too highly encouraged. The vigour of a plant at its first stages depends uniquely on the reserve of aliment contained in the grain. This magazined food is destined to furnish the plant with all its nutrition, till the moment where the development of its roots and stem permits it to rely on the air and soil. Hence, the importance of seed being dense, plump, flat and heavy, and the utility of sifting out of cereals intended for sowing all seeds either light, small or shrivelled. In the case of oats 75 per cent of the grains germinate, for barley 88, and maize 70. To germinate, oats must swell to the extent of 60 to 70 per cent of their weight of water, and which is absorbed in soils of ordinary humidity in twelve or twenty-four hours. When the soil has a temperature of 65 or 66 degrees, germination will take place in the course of two days, but not till eight days if the temperature be as low as 39 degrees. Above 86 degrees the grain will not germinate at all. On an average the germination is effected within six to seven days.

These conditions are modified by the depth to which the seed is buried; in compact clays one inch of covering will suffice; for soils of average consistency 2½ inches in depth, while in light sandy land a covering of 3 to 3½ inches will be required. The growth of the plant commences by the development of three rootlets; next, by the first leaf. With a soil of 65 degrees temperature, the daily increase of the stem is less than half an inch. Oats require a larger sum of heat to mature than barley, and the average period of maturation may vary from 134 days as in England to 100 round Paris, and only 88 at Kœnigsberg in Prussia. Oats should be sown in 6 inch rows. Barley possesses the faculty to germinate at a soil-temperature of 97 degrees, while oats can only sustain that of 85; this explains why in warm latitudes barley replaces oats in the alimentation of stock. Barley will germinate after absorbing 55 per cent of its weight of water. Around Paris it ripens in 96 days, while in England it takes 127. Maize exacts only 44 to 50 per cent of water to germinate; from its appearance above ground, till coming into flower, 45 to 105 days are required; 15 to 18 more for fecundation, and 40 to 80 days to mature. In France, the total mean time from the sowing of maize to its reaping 104 to 130 days, and even more are necessary.

Since ten years a professional agricultural school has been established at Haroué, in Lorrain, by Monsieur l'abbé Harmand for orphan girls, and which is conducted by the Sisters of Charity. The area of land attached to the institution is 35 acres; it is worked almost exclusively by the pupils and their mistresses. Practical everyday instruction is not only given in household management and the elements of ordinary education, but in kitchen gardening, floriculture, small farming; the culture of fruit trees, vines, hops, tobacco, &c.; dairy management, poultry, and the rearing of cattle. The school is a success, and the girls are eagerly sought as servants and wives. Would it not be time to make farmers' daughters at least as well-informed as their helps?

In Belgium, farmers are compelled by law to keep down weeds on their holdings, so as not to allow propagation by the wind carrying away the seeds. The farmers have petitioned that the State should take the beam out of its own eye, by ordering that all the vacant land it owns be kept clear of weeds, and that the roadsides especially be maintained as a model in the way of freedom from weed propagation.

The truth is now making way that meadow lands require their fertility to be as much studied as tilled soils. Indeed, when the grasses commence to get thin and dwarfish, when irrigation too fails, something is wrong with the soil. It wants potash and nitrogen, or, it may in addition be sour. If the latter, commence by drainage and fresh limings; next apply fertilizers, such as potash or bone dust singly, or in the proportion of two of kanite and one of bone powder. This dosing will not only augment the yield, but the quality of the grass. There was a time when potash alone was relied on as a sufficient top-dressing for pastures; it was concluded, meadows contained a sufficiency of the other elements of plant nutrition. This belief has been of late shaken by the failure of potash to act as a heal-all, because when phosphates are added the efficacy of potash becomes developed, proof that phosphoric acid was wanting, and when co-operating with an alkali, the best action of both stimulants were obtained.

Tobacco culture is making rapid strides. The secret of success perhaps lies in the preparation of good compost or mould-manure to form the nursery beds. The compost should be prepared twelve months in advance, and blood and urine will form excellent ingredients. The site for the beds should be such as to secure sunshine from nine in the morning till four in the afternoon. Many enclose the beds with bricks or boards, so as to keep the farm-yard manure, which ought to be two feet thick, and the compost well together to produce heat—it is in March the seed is sown—for the young sprouting plants against the chance rigors of spring. Over the trampled-down manure the compost should be placed, the first layer three inches, and also trampled, but the next left loose. Mix the seed with ashes and a little of the compost, sow broadcast, rake in, cover with matting, and regulate air and light, till the young plants are able to hold their own. If watering be necessary, leave the water in the pot exposed to the sun a day before being employed.

In planting out, care must be taken to water liberally, so that the rootlets can readily take up sap when dibbled in the field. Water after dibbling. Good black calcareous soil suits tobacco best. And the soil must be kept rich by winter manurings, and not too often stirred, as this might induce excessive porosity, and hence dryness. The soil before planting out cannot be rendered too friable by skim-plough, harrow and roller. In soils not the best for tobacco culture, such should be well dosed with sulphates of potash and lime. Bad land produces a tobacco without much flavour, and which burns badly. Dibble the young plant in firmly 24 by 16 inches in straight lines.

If after some days any of the plants fade replace them. Hoeing, earthing, stripping off the lower leaves, and nipping the top shoot of the plant, so as to leave 8 to 10 leaves, is all that is necessary. The tobacco raised on plains is more aromatic than that grown in a garden, while that produced on some southern slopes is superior to both. Tobacco succeeds all crops in a rotation if the soil be rich. In Alsace it follows best after maize and beet. Both the large and narrow-leaved varieties of tobacco are cultivated. In France the revenue officers insist upon the plants being spaced at fixed distances according to defined regions. In the south 4,000 plants per acre is the government number, while in the north it is 20,000. In Alsace 12,000 plants are limited to an acre.

The harvest generally takes place at the end of August, and the plant is considered ripe, when on cutting the stem a reddish circle appears. After

being cut some leave the plant a few days to fade, others transport it under sheds to dry, and later, roll the leaves in linen cloths or press them between bundles of oaten straw. The object is to obtain a leaf that will be at once aromatic and burn well. From 5 to 15 cwt. is the average yield per acre in southern and northern regions respectively. The question may fairly be raised, is tobacco culture profitable? Many farmers will not hesitate to say directly it is not, but indirectly it is the best preparation for any succeeding crop.

Dr. Hector George, Professor of Hygiène in the Agronomical Institute of this city, draws attention to the sanitary influence of light in favouring the formation of blood globules, and aiding all the functions of life to their fullest extent and intensity. Light revives and stimulates energy in the animal economy, assists to purify air by destroying malaria germs. Light is salutary for the young by aiding growth, and for the aged by filliping sluggish nerve-organs.

It may be useful to dwellers in the bush to known that carpenters frequently cut rafters according to this rule: Multiply the span in feet by 6, and point off one right hand figure, as in decimals. The left-hand figures are feet and the other inches; thus, for a roof of 28ft. span x 6=16·8, or 16ft. 8in. This is not quite one-third pitch, and makes a good roof.—*Queenslander.*

Benjamin Hepburn, of Ballarat, Victoria, makes known in the *Australasian* the following antidote to strychnine:—The remedy is salad oil first, and afterwards castor oil. In three cases of his own stud greyhounds he has proved its efficacy, even although convulsions had already commenced. He gives a small bottleful of salad oil at one dose, and in about an hour's time a large dose of castor oil.—*Queenslander.*

Local Manufacture of Quinine.—A London correspondent interested in Ceylon writes:—"I have been making some experiments upon the extraction of quinine from cinchona bark and shall hope to write you shortly on same. I have extracted the quinine without using *sulphuric* or hydrochloric acid. I am surprized that no Ceylon firm has yet taken up this important matter of local extraction. Sending low quality of bark home cannot possibly pay at present prices."

The following remedy might perhaps be effective in destroying the cabbage caterpillar. It is used for the destruction of the gooseberry and currant caterpillar:—If 5 oz. of alum be dissolved in boiling water, and this mixture afterwards mixed with cold water so as to make about 18 quarts, and the fluid be applied to the bushes when attacked, the caterpillar will entirely disappear. It is a good assistaance also against the attacks of other species of caterpillar, the American blight, and aphides.—*Queenslander.*

The following letter from Baron von Mueller on the transport of cuttings is published in the *Gardeners' Chronicle*:—"To show the facility with which cuttings also of rather hard-wooded plants can be sent to very long distances, I may mention that an experiment lately instituted by me in sending cuttings of Buddleia Madagascariensis and B. globosa simply packed in wax-cloth, by post, all the way to Madras, proved perfectly successful, as stated by Mr. Lawson and Mr. Gamble, while cuttings of the large-flowered Hypericum shrubs of Upper India, and of some other kinds of plants, reached me in return also quite safely by the same simple process. The time required for the sending of these cuttings was four to five weeks."—*Queenslander.*

The diamond drill has led to a valuable discovery in South Australia. Around the township of Hammond hitherto the water found in any wells that have been sunk has invariably been too salt for use, and very frequently the residents were put to great straits when their surface supply was exhausted. The diamond drill has discovered beautiful fresh water at a depth of 230ft., which immediately rose to within 60ft. of the surface. There are many spots in Queensland where salt water only is to be got in the shallow wells already sunk, and we mention this success of the drill to encourage settlers here to bore down below the salt stratum. It is a trouble sinking a well through strata containing salt water, but with any of the water augers or earth borers this trouble is reduced to a minimum, for the salt water can be easily kept back by piping the bore.—*Queenslander.*

Tea Flushing and Sinhalese Pluckers.—While in the higher districts there has actually been a check of flushing from the drought which followed the little monsoon, in the medium districts like Dolosbage there has been steady continuous flushing keeping all hands so fully employed, that extra pay to the amount of 3d per day is being freely earned—a circumstance sure to gratify Ramasami and which will erelong induce a big inflow of coolies to share in the rupee harvest. Meantime many estates are able to get help from Sinhalese, who in some cases are glad to work along with the Tamils on day's pay. Mr. Blackett especially has quite a large force and he finds the Sinhalese boys and lads very useful as pluckers. Some of the 8-year old tea in this district is simply magnificent. Mr. Blackett had the 'flush' on one or two bushes carefully plucked and weighed the other day, resulting in 9 ounces of leaf per tree; equal to about 400 lb. made tea per acre for the one plucking! or at the rate of 4,000 lb per annum!! 'What do these planters do for the country and its people?' is a question sometimes thoughtlessly asked by a young Civilian or other newcomer. Perhaps if they saw Mr. Blackett's force of 1,200 men, women and children (Sinhalese and Tamils) and his monthly indent for 1,000 bushels of rice to feed them, the thoughtless querist might feel he had his answer.

How Moisture in the Soil Behaves.—To many it appears inexplicable how our settlers can cry out for rain within a very few weeks of the time that the fall of perhaps several inches has been recorded. The fact is easily explained when the extreme desiccation of the subsoil and even the rocks is considered. Capillary-attraction is silently but constantly at work distributing to the most attenuated film the water in the ground, so that once a series of years of deficient rainfall has occurred nothing but prolonged rain will saturate the lower ground to the point of yielding moisture to the surface instead of drawing it downwards. When prolonged and heavy rain falls, the water descends by gravity and fills all the larger spaces in the ground, the cracks, and even the rocks; then this same law of capillary attraction comes to work for the benefit of vegetation. Instead of attenuating the only moisture in the soil and retaining it, as is now the case, it causes a constant film upwards to the roots of the plant from the store pools below. It is often a matter of surprise how the roots of a tree will discover a well or a drain many feet away from the parent tree. It seems inexplicable that there should be so much sense in the rootlet, but a little thought about the action of capillary attraction will explain the proceeding. From such a well or drain there is this constant film of water being spread out; no matter, though it is many feet off the root, yet the moist film touches it and the root follows the lead until the fountain's source is reached. Besides, while the lower ground is spreading out the moisture in the way just mentioned, it must be remembered that the young growth of succulent grass which has been started into to life by the rain falling upon the hot surface is a powerful evaporator of moisture; the water absolutely streams through the fresh young leaves into the hot dry air, and in order to keep this up the drain upon the moisture in the surface soil is very great, so that in a short time the supply is inefficient and the grass withers. Thus it is that the newspaper correspondents' reports of the "drought having broken up" is soon followed by the unexpected cry of "drought." Unfortunately nearly the whole of interior Queensland is in this desiccated state, and nothing but prolonged rains can possibly do any real good. Even a flood would not suffice unless it were followed by continuous rains, for flood waters rush away before they have time to penetrate deeply into the earth.—*Queenslander.*

INDIAN TEA COMPANIES.

(From the "*Pioneer's*" *Calcutta Commercial Reporter.*)
CALCUTTA, April-May 1887.

TEA.—The report of the Managing Agents of the Adulpore Terai Tea Company shows that the outturn was 684½ maunds, against an estimate of 700 maunds and an outturn in 1885 of 690 maunds. The price realized was As. 8-1 57 against As. 10-4 last season.

The report of the Managing Agents of the Bengal Tea Company shows that the yield was 3,605 maunds, against an estimate of 3,600 maunds and an outturn in 1885 of 2,795 maunds. The fine tea realized an average of As. 8½ per lb. against As. 10 1-6ths in 1885, and the coarse 5 5-12ths per lb. against As. 6⅝ in 1885. The gross revenue for the year was R1,37,172, and the expenditure R1,17,751, leaving a profit of R19,421, and, adding the balance brought forward from 1885, the amount at credit of Profit and Loss is R34,455. A dividend of 3 per cent will be paid and R6,000 will be carried forward. This is the first dividend for many years. The area of the gardens under plant is 1,292¾ acres. The estimate for 1887 are for a crop of 3,000 maunds fine, and 1,400 maunds coarse, tea at an outlay of R1,42,400. The Manager hopes to plant out 200 acres of flat land by next cold season.

The report of the Directors of the Bishnauth Tea Company discloses an outturn for the past year of 492,315 lb., against an estimate of 492,000 lb. and an outturn of 331,412 lb. last year. The teas have all been shipped, and so far have realized an average of 10d per lb. against 1s 3d per lb. last year. The revenue account shows estimated receipts of R2,82,842 and an expenditure of R2,49,582, leaving an estimated profit of R33,260, and, adding the balance from last year, the amount at Profit and Loss is expected to be R35,707, which would admit of a dividend of 4 per cent. The Directors propose to declare a dividend after realization of the crop. The estimates for the current season are for 7,650 maunds of tea at a cost of 3,05,700. The Calcutta expenditure will be exceptionally heavy as it includes some R45,000, cost of coolies. The area under tea is 1,556 acres. The dividend last year was 4 per cent. The block account stands at R8,47,010.

The report of the Directors of the Central Terai Tea Company shows that the outturn was 1,916 maunds, against an estimate of 1,850 maunds and a crop in 1885 of 1,577 maunds. The average price realized was As. 7-6·64 per lb. As. 9-4 last season.

The report of the Directors of the Cocheela Tea Company discloses an outturn of 93,455 lb., against an estimate of 90,000 lb. and an outturn in 1885 of 85,858 lb. The average price realized was As. 7 against As. 9½ for the previous year.

The report of the Directors of the Dehing Tea Company shows that the outturn was 5,196 maunds, against an estimate of 4,700 maunds, and an outturn in 1885 of 4,348¾ maunds. The average price realized was As. 7-11 against As. 9-5½ in 1885.

The report of the Managing Agents of the Dhunsiri Tea Company shows that the outturn was 1,005 maunds, against an estimate of 1,180 maunds and an outturn of 900 maunds in 1885, the average price realized being As. 9 7·29 net against As. 12½ per lb. last year. The receipts for the year were R52,010 and the expenditure R50,912, leaving a profit of R1,098, and, adding the balance from last season, the amount at credit of Profit and loss is R1,296, which will be placed to credit of new cultivation. The dividend last year was 5 per cent. The area now under plant is estimated at 300 acres, and some 25 acres, are already cleared for planting out. The estimates for 1887 are for a crop of 1,250 maunds of tea at a local cost of As. 5 per lb. The Company have ordered the necessary machinery for a saw mill to turn out 15,000 boxes a year, as a lot of fine timber is available from the clearances, and the Agents estimate a profit annually of at least R3,000 from this source. The block account now stands at R1,56,694.

The report of the Directors of the East India Tea Company shows that the crop was 310,250 lb., against an estimate of 304,000 lb. and an outturn in 1885 of 200,190 lb. The entire crop has been sold at an average of As. 8-0½ per lb. against As. 10-5¾ in 1885. The receipts for the year were R1,53,784 and the expenditure R1,70,482, leaving a loss on the working of R16,698, and the debit balance at Profit and Loss is R16,549. The dividend last year was 3½ per cent. The estimates for 1887 are for a crop of 4,782 maunds, at an outlay of R1,72,000, or 7¼ As. laid down in Calcutta. The area of the gardens under plant is 1,535 acres, and the block account stands in the books at R10,10,660.

The report of the Directors of the Majagram Tea Company shows that the outturn was 76,693 lb. against an estimate of 88,000 lb. and a crop of 84,883 lb. in 1885. Two severe hailstorms account for the deficiency. The bulk of the tea was sold in Calcutta at an average of As. 6-7 per lb. and 13,785 lb. in London at an equivalent of As. 7.

The report of the Directors of the Monacherra Tea Company shows an outturn of 2,039 maunds, against an estimate of 1,925 maunds and a crop in 1885 of 1,869 maunds. The average prices realized were:—

FINE TEA.	1886.	1885.
Monacherra per lb.	As. 8-4	As. 10-5
Julnacherra ,,	,, 7-7	,, 9-10
COARSE TEAS.		
Monacherra ,,	,, 5-8	,, 6-7
Julnacherra ,,	,, 3-10	,, 6-1

The report of the Directors of the Mothola Tea Company shows that the outturn was 1,470 4-5ths maunds, against an estimate of 1,400 maunds and a crop in 1885 of 1,351½ maunds, the average price realized being As. 10-2⅛ per lb. gross against As. 9-10 in 1885.

The report of the managing agents of the Pashok Tea Company shows that the outturn was 1,433 maunds, against an estimate of 1,450 maunds and a crop in 1885 of 1,369 maunds. The teas were nearly all disposed of in London, and the average realized for the whole crop was As. 7-10 net in Calcutta, against As. 10-4 obtained last year.

The report of the Director of the Runglee Rungliot Tea Company shows that the outturn was 1,400 maunds against an estimate of 1,250 maunds and a crop in 1885 of 1,250 maunds. The average price expected to be realized is As. 9-8 against As. 10-10 for the previous season.

The report of the Managing Agents of the Sapakati Tea Company shows that the crop was 107,145 lb. against an estimate of 96,000 lb., and an outturn in 1885 of 95,375 lb. Some 80,415 lb. were disposed of in London at 8¾d per lb., and sales in Calcutta realized As. 8-10 per lb. The average price last year was As. 9-2 per lb.

The report of the Managing Agents of the Shamshernugger Tea Company shows that the yield was 3,745 maunds, against an estimate of 2,800 maunds and an outturn in 1885 of 3,070 maunds, the average price realized being As. 7¾ against As. 10 last year.

TEA.—The report of the Managing Agents of the Bargang Tea Company shows that the outturn was 88,579 lb. against an estimate of 76,000 lb. The teas which were of fair quality were shipped to London and have almost all been disposed of at 1s per lb. which is equal to As. 10½ in Calcutta. The receipts are put down at R58,676 and the expenditure at R39,718, leaving a profit on the season's operations of R18,958, and adding the balance from 1885, the amount at credit of profit and loss is R19,947. A dividend of 10 per cent is recommended, and the transfer of R5,000 to a working capital account, carrying forward R397. The estimates for 1887 are for a crop of 1,100 maunds at an outlay of R13,000. The area of the gardens under plant is 271 acres and the Block Account stands at R1,48,500. The report is satisfactory.

The report of the Managing Agents of the Good Hope Tea Company is in accordance with its name; it discloses an outturn of 2,214 maunds against an estimate of 1,800, a crop in 1885 of 1,616 and in 1884 of 1,301 maunds a record of steady and substantial progress. The average prices realised were As 9⅜ against As 12½ in 1885 and As. 9¾ in 1884. Had prices kept up the results would have been truly magnificent. The revenue for the year was R1,03,986 and the expenditure R75,842

leaving a profit of R28,144, and adding the balance from 1885 the amount at credit of profit and loss is R34,745. Ad interim dividends of 20 per cent, exhausting R20,000 have already been declared, and a final dividend of 8 per cent. has now been paid, a balance of R6,745 being carried forward. The dividend last year was 40 per cent. The estimates for 1887 are for 2,200 maunds at an outlay of R74,456. The area under plant is 440 acres, and the Block Account R96,383.

The report of the Managing Agents of the Mohargong Tea Company shows that the outturn was 1,285 maunds against an estimate of 1,200 maunds and a crop in 1885 of 1,042 maunds. The average price realised was As.7-11 per lb. against As. 10-11 in 1885. The accounts show receipts of R50,995 and expenditure of R47,209, leaving a profit of R3,786 and adding the balance from last year the amount at credit of profit and loss will be R3,885. A dividend of 2 per cent. has been declared and R685 carried forward; the dividend last year was 5 per cent. The estimates for 1887 are for 1,300 maunds at an outlay of R44,652. The area of the Mohurgong garden is 215 acres and the Block Account R1,60,000.

The report of the Managing Agents of the Tezpore and Gogra Tea Company shows that the out-turn was 3,150 maunds against 2,318 in 1885 and 2,744 in 1884. The average price realized from both gardens was As. 7¾ per lb. against As. 10-11 for Tezpore and As. 11¼ for Gogra in 1885. The accounts show receipts of R1,21,764 and expenditure of R1,06,956, leaving a profit of R14,808 and adding the balance from 1885 the amount at credit of profit and loss is R18,272; a dividend of 4 per cent is declared on the A shares carrying forward a balance of R2,313. The estimates for 1887 are for a crop of 2,800 maunds at an outlay of R104,625. The area under plant is 667½ acres and the Block Account stands at R6,05,350. The dividend on the A shares last year was 7 per cent.

The report of the Directors of the Baintbaree Tea Company for the year 1886 shows that the out-turn was 133,653 lb. against an estimate of 128,000 lb. and a crop in 1885 of 124,480 lb. the average prize realized being As. 7½ against As. 9-5 last year. The revenue account shows receipts of R62,580 and expenditure of R57,362, leaving a profit on the season of R5,218, and adding the balance from 1885 the amount at credit of profit and loss is R7,355. The estimates for 1887 are for a crop of 2,000 maunds at local outlay of R45,000 which includes the cost of opening out and planting an additional 50 acres. The area under cultivation is 334 acres and the Block Account stands at R1,74,242. The capital of the Company is R1,60,000 and there is an over draft of R11,723 at the Agra Bank.

The report of the Managing Agents of the Ting Ling Tea Company shows that the out-turn was 862 maunds against an estimate of 900 maunds, and a crop of 794 maunds in 1885, the average price realized As. 10-10-22 against As. 14½ in 1885. The revenue account shows receipts of R51,481 and expenditure of R37,625, leaving a profit of R13,856 and adding the amount at credit of Profit and Loss from 1885, the available balance is R13,929. Dividends aggregating 8 per cent. have been declared, and R1,929 carried to new cultivation account. The dividend last year was 15 per cent. The estimates for 1887 are for a crop of 900 maunds of really fine tea at an expenditure of R40,090.

The report of the Directors of the Leesh River Tea Company shows that the outturn of the Kallagoitee Division was 1,629 maunds against an estimate of 1,500 maunds and a crop in 1885 of 1,412 maunds. The price obtained being As. 9-2 per lb. against 11-1 per lb. in 1885. The estimate for 1887 is for 1,700 maunds. The outturn of the Hope Division was 394 maunds against an estimate of 382 maunds and an outturn in 1885 of 290 maunds; the price realized being As. 7-7 per lb. against As. 9-1 last year. The prices realized are disappointing. The estimate for 1887 is 550 maunds. The accounts show receipts of £5,298 on account of Kallagoitee Division and an expenditure of £3,777, leaving a profit of £1,521 and deducting debenture interest and other charges and adding balance from last year the amount at credit of profit and loss is £955. The Hope Division shows a loss of £1,056 which has been added to Block. A dividend of 4 per cent has been paid, £250 taken to Reserve, which now stands at £1,000 and £105 carried forward.

The report of the Grob Tea Company shows that the outturn was 3,238 maunds against an estimate of 3,050 maunds, and a crop in 1885 of 2,878 maunds. The average price realized was As. 7-8 per lb. against As. 10-8 last year. The receipts for the year were R1,22,641, and the expenditure, including interest, &c. R1,34,487, leaving a loss on the working of R11,846 and the debit balance at profit and loss is swelled to R52,935. The estimates for 1887 are for a crop of 3,392 maunds at a cost of R1,15,867. The area of the gardens under plant is 798 acres and the Block Account stands at R5,59,020.

The report of the Desai and Parbutia Tea Company for the year 1886 shows that the yield of tea has been 136,226 lb. against an estimate of 136,000 lb. and an outturn in 1885 of 125,734 lb. The average prize realized was As. 9-3 16-25ths per lb. against As. 11-329-50ths in 1885. The revenue account shows receipts of R79,982 and an expenditure of R73,700 leaving a profit on the season of R6,282 and after writing off R1,416, for land purchased and adding R258 brought forward from 1885 the amount at credit of profit and loss is R5,124. A dividend of 2½ per cent has been declared and R624 carried forward; the dividend last year was 9 per cent. The estimates for 1887 are for a crop of 152,800 lb. from an area of 493 acres at a local coast of As. 5-10 per lb. which includes the upkeep of the young cultivation. The Block Account stands in the books at R1,50,433.

The report of the Managing Agents of the Phoolbarrie Tea Company shows that the outturn amounted to 239,374 lb. against an estimate of 273,000 lb and an outturn in 1885 of 247,774 lb. the average price obtained being slightly over As. 8¼ per lb. against As. 10⅞ per lb, last year. The Revenue Account shows receipts of R1,27,002 and an expenditure of R1,01,460—which includes interest on debentures, preliminary expenses, and amount written off Block, aggregating R9,393—the nett profit being R25,542, and adding the balance from 1885 the amount at credit of profit and loss is R25,647. A dividend of 5 per cent has been paid and R47 carried forward;—the dividend last year was 9 per cent. The estimates for 1887 are for an outturn of 3,550 maunds at an expenditure of R100,000, or a little under As. 5¾ per lb. The Company has suffered a loss in the death of its garden manager, Mr. C. H. Pillans. The Block Account stands at R5,26,036.

The report of the Managing Agents of the Washabarie Tea Company shows that the outturn was 2,724 maunds against an estimate of 2,200 maunds and a crop in 1885 of 1,686 maunds,—the average price realised being As. 8¼ per lb. against As. 11 1-6ths last year. The Revenue Account shows receipts of R1,10,287 and expenditure of R79,485, leaving a profit of R30,802 and adding the balance from last year, the amount at credit of profit and loss is R32,046. Dividends aggregating 10 per cent have been paid, R8,010 taken to extensions, R4,385 written off machinery and R4,651 carried forward, the estimates for 1887 are for a crop of 3,000 maunds at a total cost of R77,922. Proposals are in circulation to transfer the Company to London and to alter the capital to a sterling one of £25,000. The area under plant is 523 acres and the Block stands at R211,872.

A return of R16 per share has been made to the shareholders in the Gowhatty Tea Company.

TEA.—The first annual report of the Managing Agents of the Chapagurie, Tea Company for the season ended 31st December shows that the area under plant is 305 acres, of which 170 acres were planted in and before 1884, 50 acres in 1885 and 85 acres in 1886. The outturn for the year was 422 maunds, against an estimate of 340 maunds, and the average price realized, As. 6¼ per lb. The receipts were R14,456 and the expenditure R42,441, the balance being transferred to Block Account which stands at R94,686. The estimates for 1887 are

for 850 maunds of tea at a total cost of R58,261, which includes cost of boiler, engine and drying and rolling machines, as well as of putting out 55 acres more tea. There will probably therefore be a deficiency of R24,261 on this season's working, which can be added to Block.

PLANTING IN NETHERLANDS INDIA.

(Translated for the *Straits Times*, May 11th.)

In the province of Pasaruan, the Resident has forbidden the people to take away young bamboo shoots from clumps of that plant. These shoots are largely used by the natives as an article of food, and as such are sold in the markets in hundreds. Among the poorer classes, slices of bamboo shoots are the only relishes to rice. The prohibition has been promulgated to save the bamboos there from total extermination, but will be found hard to enforce.

In the Lampong districts, according to the Batavia *Nieuwsblad*, disease has broken out among the pepper plantations. The Resident of the province has forthwith repaired to the spot to make enquiries. His report on the subject is already in the hands of Government. The spread of the disease will prove detrimental to the wellbeing of the natives in that quarter. Experiments with tobacco growing there, have so far not led to any satisfactory results. Tin has also been sought for in the Lampong districts but hitherto without encouraging results.

CHINA TEAS GOING OUT OF CONSUMPTION.

The London Tea Broking Firm whose China tea circular we quoted lately, have since issued the following:—

DEAR SIRS,—Since we had the pleasure of writing you last week the position has become more acute. It is no use China buyers any longer living in a "Fools's Paradise," the fact staring them in the face is that China tea is going out of consumption with the most alarming rapidity. For example the delivery of congou last month (March) was 8 millions; if we allow 2½ millions for export, it leaves 5½ millions for Home consumption against 7¾ millions of Indian growths, and for the first three months of the year figures stand thus:—Congou deliveries 1885, 33,253,000 lb. 1886, 29,103,000 lb. 1887, 23,500,000 lb. If figures prove anything this should be tolerably convincing.

In former years when prices materially gave way, consumption quickly responded, but not so now. The trade find that they can get such value in Indians at 6d to 7d that common Chinas are dear at less than the cost of production, that is to say we take it that Shuntaams cannot be laid down here at 4½d, nor common whole leaf red at 5d with an export duty of Tls. 2-8 included.

At the opening of your markets it would seem that exchange would be lower than ever before known, freights may be, as well as Marine Insurance. If the differences on all these are to be calculated in the laying down cost and given to the Chinaman "the game is up." For there to be any safety in the trade, you must pay the teaman (and so the grower) a tael price that will not induce him to pluck for quantity.

We quote a few sales made in the auction room this week:—A choice Kintuck said to have cost 1s 8½d at 11d, a few sold on arrival at 1s 5d. Another bought on speculation by a well-known judge of fine tea at Messrs. Thorne's sale in June at 1s 6d resold at 11d, an Oonfaa counterpart sold at 1s 2d, at 9¾d, a choice Ningchow part sold at 1s 5d, at 11d. "Wing Mow" a contract Pekling per mail steamer at 11½d. A choice Paklum part sold last month at 1s 2d to 11¾d.

COCAO PLANTERS are in a fair way to be strongly congratulated in Ceylon: their product is equally with coffee, rapidly approaching the round 100s per cwt. and with the good crop prospects which Matale and Dumbara as well as other districts shew, the Ceylon owners of cacao may well be satisfied.

A TRIP THROUGH THE KELANI VALLEY.

(From a Correspondent.)

I have just returned from a visit to the Kelani Valley, one of the new and flourishing tea districts. The estates are a good deal scattered through this large Valley. Starting from Avisawella Rest-house, I visited some of the estates in the neighbourhood. On Atherfield, a few miles off, I met Mr. Ingles the Manager formerly of Mariawatte; this place was looking well and I was informed that 600 lb. per acre had been taken off this property. More land was being opened and the only complaint had reference to the risk of an insufficiency of labour.

On the properties managed by Mr. Byrde I found other products, such as coconut and cardamoms but the latter, I was informed, was not productive, the elevation being too low for this kind of cultivation. Arecanuts I found were planted everywhere, the profits from this cultivation being estimated at R50 per acre. Elston, a large and fine estate with a manager and assistant, and close by is Farnham, managed by Mr. Willisford; this property looked remarkably well cared for—even the surroundings of the buildings being all so neat and tidy.

On Doranakande I met Mr. Grigson, who was busy plucking, and found it, he said, hard to keep up with the flush as many of his coolies were down with fever. From Avisawella I proceeded to Dihawita; on the way I was ferried across at two places where bridges are being built. At Dihawita Messrs. Glenny, Fielder & Co., have a store and agency under the management of Mr. Ferguson-Jones. A cart road is in course of construction between this place and Veyangoda which is about 15 miles off, passing Springvale, Brazenose and Dewalakande—the latter has a fine large iron store and is a well cultivated property under the management of the popular Secretary of the Kelani Valley Planters' Association, Mr. H. V. Masefield. At Yatiyantotte I noticed a large quantity of machinery lying on the roadside which I was informed was for Polotagama, where a large store had just been completed. I also passed through Parusella and Kelani—all very fine tea estates. I passed through Ivies near the Yatiyantotte Rest-house and on the banks of the Kelani Ganga and went on to Balgownie, near by which is the Morton estate under the management of Mr. Hope who has also the opening of Eila—a new place. On my return I visited Lavant and Ekkioya both places being worked as one property under Mr. Wright: this was as fine a block of 250 acres of tea as you could wish to see. Before leaving this district, I went to Mipitiyakande, and also to the adjoining property (Dunedin) belonging to the Ceylon Tea Plantations Co. Here I spent some hours with the courteous manager, Mr. Turpin, who has just completed a fine store and was busy planting up more land. Opposite this estate and in sight of the Bungalow can be seen the Degalessa estate, a large new clearing of over 200 acres. From Yatiyantotte I proceeded to Ruanwella, the site of a former Military station and on to Veyangoda. I passed through Sunnycroft and some other places; on the last-named place a large force of coolies were busy planting. I also passed through several new places where planting had not commenced as yet, though the land had been cleared. As I passed through the villages, I heard bitter complaints of the ravages of fever and passed a number of huts that had been recently forsaken by the occupants. These huts are built alongside the roads recently opened to the tea estates in this district, and I suppose on the outbreak of fever which has been worse than usual this year, the Sinhalese must have cleared off. On enquiry I was told that at Karrawanella there was a Doctor and Assistant and an Out-door Dispensary. The hospital, I was told, was just being built.

[It is shameful that the Government have not been earlier with their hospital, and that, so far as we can find, no one was sent through the villages in the fever districts at the out-break, to distribute fever powders. —ED.]

DURATION OF AN ASSAM-HYBRID TEA-BUSH UNDER CULTIVATION.

The question raised by Mr. J. L. Anstruther, and to which we only very hurriedly responded in our last issue, is one of great practical importance. The fear evidently entertained is that subject to the heavy and continuous pruning which tea receives at the hands of the planter in Ceylon and India, can it be fairly expected to last beyond a very limited term of years. To any one who has seen a Tea Garden after the knife has been thoroughly applied, the doubt is not an unnatural one. The sight of the bushes cut down until not a single leaf is visible is not a very encouraging one. "Can these dry sticks live?" springs spontaneously to the mouth of the observer. Now we are not going to enter on the vexed question of "pruning," further than to say that a good deal has, no doubt, yet to be learned on the subject in Ceylon, and that it would be well for planters in different districts to initiate experiments on their own account, meantime, studying all the literature on the subject, including the thoughtful paper by Dr. George King of Calcutta on "tea pruning." Already, there is considerable division of opinion in Ceylon, some with experience averring that the "annual" pruning should rather be one of "eighteen months" interval, and that a slight pruning should often be sufficient. This, of course, apart altogether from the important question raised in our letter "From the Hills" on Saturday as to whether our bushes should not be left to grow much longer than is usual before the knife is put in at all. Such is undoubtedly the opinion of a good many of our Indian critics. Some have gone the length of saying that a very few years will show the wrong principle upon which we have been acting, and that our bushes will then need a long rest and do nothing or very little for two or three years. But we do not think such gentlemen make sufficient allowance for the wonderfully recuperative character of the Ceylon climate, especially in our moist region, so far as the tea-bush is concerned, nor for the hardy character of the plant itself as exhibited even in our poorest soils.

Then as regards the life of the bush, in Ceylon even, we have some data to supply for the reassurance of Mr. J. L. Anstruther and his "Job's comforters." The first clearing in Loolcondura—20 acres—was felled by Mr. Taylor we believe at the end of 1867 and has been cropped continuously we suppose, for about 17 years. We feel sure no objection will be offered to an inspection as to its condition today. Then again Mr. C. Shand reminds us that he has tea in Kakwana—on the Barra flat which was always considered as worthless by coffee planters—under regular cultivation and pruning from 19 to 20 years. We cannot go beyond this in Ceylon but the question is well asked whether the case of cinnamon should not afford some comfort to the dubious tea planter. The same cinnamon bushes are flourishing today that have had their main stems hacked and cut away periodically for over a hundred years back and still the process goes on with good results over the same roots and stumps.

But it is from Northern India and Assam mainly, that we must gain the information calculated to relieve the suspicion that the tea-bush under pruning is short-lived. One authority writing on tea either in Assam or China, speaks of 100 years as the life of a tea-bush; but we cannot recall where we read that statement whether in Fortune's or Colquhoun's book? Of more intimate bearing is the fact that the original Assam Company began operations in the "forties", their first shipment of tea being made in 1847. It will be of special interest to learn whether the clearing from which this was gathered is still in operation and if not, what is the age of the oldest garden in regular and full cultivation in Assam? This is a question which we hope to have answered in due course by one or other of the Ceylon men now in Northern India who get the *Overland Observer* or by an Assam planter who will read of this discussion in his *Tropical Agriculturist*.

THE LIFE OF THE ASSAM-HYBRID TEA TREE.

Pundaluoya, May 20th.

DEAR SIR,—Can you or any of your kind correspondents inform me of the "duration of life" in the Assam hybrid tea bush under cultivation and harvesting. I observe that "Fortune" in his book: "Tea countries of China," states "the length of time which a plantation will remain in full bearing depends of course on a variety of circumstances, but with the most careful treatment consistent with profit, the plants will not do much good after they are ten or twelve years old; they are often dug up, and the space replanted before that time." I trust for the sake of our industry, that with us the hybrid plant will live and give profit somewhat longer, although from a sympathetic point of view the poor plant having such a painful existence after we have once begun to operate upon it, it might not be desirable. While on this subject, I do not think that the mysterious mortality amongst apparently healthy bushes all through plantations, at various ages, has ever been satisfactorily explained. Can it be that the bushes lose heart at the terrible future before them, and prefer to succumb rather than brave it, or prefer death to existence under the circumstances.—Yours faithfully,

J. L. ANSTRUTHER.

[The existence of the "Symplocos" tree often accounts for dying out: see Tea Planter's Manual. As to the age of the Assam-Hybrid bush under cultivation, we do not see why it should not flourish and bear profitably for 30 to 40 years and there must be gardens of that age in Assam. We shall endeavour to make sure on this point.—ED.]

COFFEE, CACAO AND TEA PROSPECTS.

Our South-west monsoon, in the opinion of the most competent local authority, Master Attendant Donnan, may be considered to have fully set in at Colombo and the biggest thunderstorms of the season may be regarded, we fancy, as being over. But there will be some more rain yet to come, although April gave us nearly three times its average, and the total for the year is also above the average. Thus the average of 17 years' rainfall at Colombo for the first five months is almost exactly 32 inches, whereas to date (21st May) we have had over 35½ inches, of which no less than 23·80 inches fell in the one month of April. We have therefore no reason whatever to complain of our South-west monsoon allowance at Colombo. But the case is very different upcountry, where "a failure of monsoon" has already been an alarming note sounded from some districts. This cry is, however, premature; there is plenty of time yet for plenty of rain, and even now heavy clouds are moving on from the Indian Ocean across the lowcountry to the hill districts to gladden the hearts of the tea planters and render them as busy as possible

over the flushes. Already in the low and medium districts, planters have been crying out 'hold, enough' to the tea-flushes, which many of them have scarcely been able to overtake with their supply of plucking hands. Labour seems to be the only ticklish question in connection with the future of our great tea industry and even here, light is now breaking in from several sides; for, besides that coolies are reported to be coming in from the Coast far more freely than in previous years, in quite a number of districts, Sinhalese are coming to the rescue and showing themselves very ready to earn the tea-planters' money. Extra pay too in the busy flushing season is sure to be popular and must speedily attract the poor people of Southern India in large numbers. The difficulty of getting Tea machinery supplied and erected in time is said to be bothering the planters this season: every machinist in the island is reported to be as busy as he can be, while agents for home firms have also plenty of orders; and no wonder with the large area of tea coming into bearing erelong throughout the island.

New life has also been put into other staples. The high prices for coffee,—middling plantation Ceylon being reported from London at 100s per cwt.—have cheered planters with our old staple still on their estates, very greatly. This is especially the case in the Bogawantalawa and Agrapatana divisions of Dikoya and Dimbula, in Udapussellawa, and all through Uva. The greatest possible attention will now be paid to good coffee and every effort made to arrest any signs of the new visitant green bug. As for the leaf fungus, it is scarcely, if at all, heard of now-a-days, and even the native coffee along roadsides which for years has done nothing in crops, is this season reported to be improving and shewing berries. Cacao planters are much cheered by the good prices of their product "cocoa," no doubt caused by the anticipated great scarcity of coffee—a circumstance which may well be expected to benefit tea, since if there is no coffee to drink, tea as well as well as cocoa must be taken to as substitutes.

CEYLON UPCOUNTRY PLANTING REPORT.

HOW TO MAKE TEA PAY—TRANSPLANTER—TEA PRUNING FLUSHES GALORE.

23rd May, 1887.

In a late number of the *Indian Planters' Gazette* there is a communicated article on "How to make tea pay." The writer is treating of "plucking," and the following little extract may perhaps in part explain why so many Indian tea gardens lose money for their proprietors:—"A little rum goes a long way: it is well to celebrate the beginning of the season by giving the pluckers the first day a glass of rum each, and say a bottle to the *sirdar*"! We don't all think alike, but it seems to me that the writer of the article has a good deal to learn. I fancy this "rum" dodge of making tea pay, has never occurred to even the most imaginative mind in Ceylon, and I trust it never will.

It is like harking back to something old referring to the transplanter of Mr. Scowen. But it is a tool which only requires to be used, to know its value and it is but lately I have taken to use it. I had it highly recommended to me, and during the rains in April I put out with that tool as a trial about 500 tea plants as supplies a day or two after the dry weather set in, and there was more than a fortnight of it. The plants were left without any shade, and with the exception of two or three, they stood as well as if they had never been taken from the nursery. Those that failed were evidently damaged in some way independent of the transplanting. For Supplying, it evidently means certainty, that anyhow was the character I got of the work by one who used it all last season. The coolies get very expert in handling it, after working with it for a very short time and from 800 to 1,200 plants can be taken out in a day. The carrying out is where the expense is, but if the estate nurseries be at all central, even that does not cost so very much when it is remembered that the work once done, has not to be done again.

About tea pruning there is much to be learned. How often a bush should get the knife, and where, are questions which will be undecided for a long time. It looks like as if a yearly pruning were much too often, when you hear that "Rookwood" has not been pruned for two years, and they are getting over 800 lb. an acre now.

A visitor to the Kelani Valley was telling me of the wonderful character of the tea flushes lately to be seen there, and the more extraordinary ones of which he heard. I don't care to give the average pluckings—figures you gave as extraordinary the other day are nowhere near them—besides it might set every other district "envying and grieving," but they were piled on till at last the visitor was forced to suggest a new system of measuring, which he had often to adopt himself, he said, especially in a rush. He gave the wrinkle to a man who had not been able to get round half his place in a week, and the growth was so rapid that he had always had a difficulty in saying where the former day's work had ended! "Try our plan" said the visitor "give your pluckers grass knives, stack the leaf, and measure and pay for it like firewood"!! The visitor came from one of the old districts, the fame and knowledge of the ways of which had evidently never reached the benighted Valley of Kelani. There should be no flushes lost there in the future, and their Labour Difficulty ought to vanish.

The monsoon rains seem to be fairly in, and Planting will soon be in full swing.

PEPPERCORN.

THE PRICE OF COFFEE.

Nearly a year ago the *American Grocer* gave it as its opinion that Brazil had already reached its maximum of production, a bold prophecy, truly, concerning a country of 3,300,000 square miles, or nearly as large as Europe, having a large proportion of its area still virgin forest, and a population of little more than ten millions, including rather over a million slaves. Still, there are many things which seem to support the idea gathered by the *American Grocer*. Coffee planting in Brazil cannot be considered a success so far as the planters themselves are concerned when in the Provinces of Rio Janeiro, Unias, S. Pauls, and Espirito Santo nearly nineteen-twentieths of the plantations are mortgaged. Nor can low prices be pointed to as the cause of this state of things, most of the mortgages being of over twenty years standing, a magnificent fact when we recollect the price of coffee prior to the last few years of depression. The emancipation of slaves has equally little to do with the planter's embarrassments, as the law of free birth only came into force in 1871, and though it was estimated two years ago that the whole of the slaves in Brazil would be free by 1895, there have been few complaints of the great damages which it was at one time expected would be done to the coffee industry by emancipation. At the same time, if Brazilian planters, from whatever causes, could not keep out of difficulties when they had slave labour, it is unlikely that they will be able to do so without it, so that, on this account alone, it does not seem as if coffee cultivation will be extended, either by the original planters or by fresh settlers. Vast as the forests of Brazil are, they must remain practically untouched

for years to come, until the increase of the world's population provides a class of imported labour for Brazil as good and as cheap as that employed in the East Indies. With this probably somewhat distant period it is unnecessary to deal.

The 1887-88 crop is estimated as a very short one, and consequently, the price of coffee is likely to remain high until some idea, however vague, can be formed of the prospects of the 1888-89 crop. This, with a short yield the season previous, should be large, and, if a bumper one, the last Indian quotation would doubtless come down with a run, probably below 80s a cwt. But to forecast with any chance of success it is necessary to look to the causes of the expected shortfall of the 1887-88 crop. Various reasons are given. "Prolonged droughts, followed by severe frosts" would naturally have a bad effect, but we are also told that, in parts at least, "only the new coffee gives any hope, the old, though very green and fine, has not blossomed." This, taken in connection with the accounts of serious disease, not, apparently akin to our "leaf disease," but attacking the roots of the coffee tree, which shortly afterwards dies, seems to point to exhaustion of the soil, whether from want of cultivation of whatever cause, and if this is the true reason of Brazilian short crops then indeed the *American Grocer* is correct in saying that the maximum production has been reached, and the price of coffee is more likely to be doubled than to drop. In any case, as the time approaches for the 1888-89 blossom the reports of the sanguine ones are sure to cause a fall in the quotations, which will be confirmed in the event of their anticipations turning out correct. If there is another short crop East Indian planters may reasonably conclude that the presen Brazil plantations are past their prime, and that bum per crops from them and correspondingly low prices, are things of the past.—*Madras Mail*, May 16th.

PLANTING AND MINING IN SELANGOR (STRAITS SETTLEMENTS) IN 1886.

COFFEE—GAMBIER—PEPPER—TOBACCO—NATIVE CULTIVATION—MINING—RAILWAY—LABOUR.

It is satisfactory to find that the agricultural resources of the State are being put thoroughly to the test. Coffee-growing presents such a promising outlook that the cultivation of the Liberian variety has been taken in hand successfully by Javanese and Tamils in two districts. At Weld's Hill, fifty-seven acres under Liberian Coffee, yielded seven hundred piculs last year. Gambier and pepper are the articles that have been most productive in agriculture. Considerable areas have been taken up for growing them. At Klang Mr. Stephenson has already brought a considerable extent of land under pepper cultivation, with the result that the vines have come into full bearing. His example has been followed by Messrs. Hill and Rathbone at Weld's Hill; and by Captain Christiansen and Mr. Barugh at Batu Tiga. At Pataling, Mr. Bailey has taken up a wide stretch of land for the same purpose. Syed Zin has set to work growing gambier, and pepper at Klang. Several Chinese from the Straits Settlements, have started pepper and gambier plantations at Sepang in the Ulu Langat district. They have already cleared 2,000 acres and have 200 coolies in their employ. They have altogether secured 5,000 acres of land. Their success so far is said to augur well for the thorough realisation of their aims at no distant date. In these hard times, it is an encouraging sign to find Europeans taking up a line of plantation enterprise, so likely to yield remunerative returns as pepper growing. The field has too long been left to Chinese to profit by the steady and increasing demand for spice in Europe, and America. With European skill and business knowledge scientifically brought to bear upon pepper growing, the pioneer planters in Selangor may count upon a return handsome enough to satisfy reasonable expectations. Tobacco growers in Deli already alarmed and kept on the alert by competition looming in Siak and North Borneo, will have to keep an eye also to Selangor. Competition in their line of business in that quarter, has every prospect of becoming formidable erelong. With seeds from that Netherlands colony, tobacco plantations have been started by Messrs Hill and Rathbone at Batu under the supervision of Mr. Toynbee, a planter from Sumatra. In spite of planting operations having been set agoing late in the year the crop yielded proved highly satisfactory. The quantity and quality so answered expectations, that several European planters have applied for grants of land to be put under tobacco in the Klang district. It all depends upon the result of the first shipment of Selangor tobacco to Europe. Should the outcome prove satisfactory, tobacco cultivation in that Protected State will become an important branch of plantation enterprise.

The public interest has also been seen to by the passing of regulations checking the reckless felling of primeval forest. Measures have also been taken for putting a stop to the destructive native system of shifting the cultivation of hill paddy from place to place, as the soil becomes exhausted. Bringing the soil under cultivation permanently, has on the other hand, met with official encouragement by holding out hopes of Government aid in the opening out of land for growing swamp paddy, coconuts, and productive trees generally. Native cultivators in some cases have not been backward in taking action accordingly. In most of the districts, they have taken pains to improve their land, and to bring an increased acreage under tillage, with the gratifying result that swamp paddy has been more extensively cultivated. As must however be expected from the sparseness of the population, wide stretches of land available for the purpose far inland remain uncultivated. Malay indolence and stubborn attachment to old customs, will bar for a long while yet the march of improvement in the agricultural line. Soil and climate favour laziness among them. Paddy growing for their own immediate needs, just suits them. Plantains and a few other food articles enable them to eke out a subsistence till the following year. This easy-going system however readily it may meet the wants of the moment, runs so counter to the interests of the country, that we are glad to find the Sultan of Selangor setting a good example to his subjects by increasing the acreage he has under coffee and fruit. The path he has so far successfully trodden has been followed by his son, Rajah Kahal, and many other planters. The son of the late Rajah Muda of Selangor bears the palm for intelligently taking planting operations in hand. He has now about one thousand acres under sugar cane, coconuts, areca nuts, swamp paddy, &c. A high meed of praise is certainly due to him for showing his countrymen what businesslike enterprise can do. Another headman, Datu Dugang, has opened out in Klang, a plantation for growing areca nuts and swamp paddy on 600 acres of land, by means of Javanese labour with encouraging results hitherto. The fruit season did not turn out well, but the paddy crop proved satisfactory throughout the State. It was satisfactory doubtless as to yield, The trade returns show heavy importations of rice, the quantity required to meet local consumption aggregating upwards of 186,000 piculs, about two-fifths more than in 1885. The population in the interval barely increased by one-seventh. Evidently there is every ground for encouraging local agricultural enterprise in this direction.

Enterprise in mining affairs has made considerable head-way in 1886, judging from the tin exported totalling 99,073 piculs, an increase of about 16,000 compared with the quantity shipped in 1885. In the Kwala Lumpor district, Chinese management has again scored a success, where European methods broke down in the case of the Sunghy Puteh tin mines. These workings started by the Selangor Tin Mining Company of Shanghai, passed by purchase into the hands of Chinese in 1885. The latter have worked the mines so remuneratively ever since, by setting 1,800 men at work, that 6,120 piculs of tin

were exported therefrom last year. Profitable returns have been secured from deep as well as shallow workings. Three engines bought from the company have sufficed to keep the mines quite dry. Fresh mining land has been opened out near the railway line, and in many other localities. European tin mining enterprise in Selangor has yet a bright future before it. The Rawang mines have been kept thoroughly free of water, by a 42 horse power turbine and are susceptible of large extension. The result of mining operations on Mr. Cameron's concession at Ulu Kerling has not proved equally encouraging, owing to the ground having been only partially tested. Chinese miners have worked successfully on the adjoining land. There is no reason why Europeans, should not do well in the tin mining line provided local circumstances be duly taken into account.

The Selangor railway from Kwala Lumpor to Bukit Kuda has been so fruitful of controversy and difference of opinion, that it is satisfactory to find the Acting Assistant Resident affirming its practical success so far as local circumstances admitted. There is urgent need of extending the line either to Klang itself or to some point opposite. The latter site has the advantage from its admitting of extension to the seaboard. The railway taken altogether cost $721,473, or about $37,000 per mile. Considering the nature of the country traversed and the hindrances in the way of constructing a railway in an undeveloped country like Selangor, the Engineer in charge may be congratulated on having so creditably overcome these difficulties.

Of six weather stations, Ulu Selangor heads the list with a rainfall of nearly 286 inches last year. Kwala Selangor standing at the bottom with 67·41 inches.

The population of the State at the close of the year may be estimated at 60,000. Chinese immigration has helped materially to swell the number of inhabitants. No fewer than 8,000 new arrivals under contract from China entered Selangor in 1886. Chinese immigrants not bound by contract totalled 5,000. The aboriginal Sakei tribes have been brought under control of the district collectors, with such a marked improvement in their condition generally, that they have increased in number, owing, especially, to their immunity from small pox. Not only Chinese coolies, but also Chinese capitalists have set to work developing the mining resources of Selangor. They have so little to complain of there, that the Chinese Commissioners who recently visited the State found their condition satisfactory. With increased shipping facilities, the tide of Tamil immigration continues so to swell that the number of persons of that nationality already reaches one thousand who earn a living as coolies and bullock drivers. Messrs. Sword and Mullinghaus have secured a three years monopoly of the right to export tin ore from Selangor. They have set to work smelting tin with coal instead of charcoal, and anticipate great success from the enterprise on the score of saving of expense.—*Straits Times*, May 4th.

PLANTING INDUSTRY IN THE CAROLINES.

(Translated for the *Straits Times*, May 11th.)

The *Comercio* in giving particulars of the hoisting of the Spanish flag in the Eastern Carolins islands, so recently a cause of trouble with Germany, states that the Commander of the man-of-war, charged with this duty, has forwarded to the Minister for the Navy at Madrid, a despatch furnishing interesting details of the voyage. The first island group touched at was that of Raur composed of 17 or 18 coral islets with 600 inhabitants, the handsomest throughout the whole of the Carolines, living on breadfruits, coconuts, and fish. The only trade they carry on is in copra, in barter for tools, tobacco, and cloth. The king of the group readily submitted to Spanish rule.

The vessel then proceeded to Ifalik, a group of islets without any anchorage or inhabitants. Coconuts abound on them. After calling at other small islands, she anchored off the Hogoliu group made up of eight large islands and about two dozen smaller ones, the former mountainous and fertile, and abounding with water and fruit trees. The inhabitants, about 12,000 in number, are accounted downright savages, ugly and uncleanly. They go about dressed in skins, only those of high rank showing off in cloth. Their practice of smearing themselves with fishoil renders them disagreeable at close quarters. Being both warlike and cannibalistic, they are continually at strife with the neighbouring islanders. In the island of Mohen, a Methodist missionary named Logan is stationed. Native teachers under his supervision are labouring in the adjoining islands. The mission has been at work for three years with appreciable results. With the aid of Mr. Logan, no less than 16 chiefs were assembled together. They all signed a treaty accepting Spanish sovereignty. The man-of-war then proceeded to Jamestown on Ascension or Ponape island. It is the largest of the Carolines, and the most important from a commercial standpoint. Ascension is mountainous, abundantly watered, most fertile, and picturesque. Breadfruit abounds, and is the staple food of the inhabitants. The pine-apples grown there proved to be of highly superior quality. Of poultry and hogs, there is no lack. With hardly any tillage worth the name, the inhabitants grow sweet potatoes, sugar cane, and coffee. They are mild and gentle in disposition. The people wear European dress with neatness and elegance. The population muster from 4 to 5,000, mostly Methodists, residing chiefly on the coast. They go about in the neighbouring waters in neatly constructed canoes. The exports are copra, and vegetable marble. Their civilisation is due to the efforts of the American mission which has been established among them for more than 30 years, under the management of Mr. Dean. The weekday and Sunday schools are numerously attended. The missionaries weild great influence over the natives, who are too few in number to take full advantage of the fertility of the soil. About half-a-dozen European firms do the trading. Some two dozen Europeans, chiefly deserters or refugees, dwell on the island. The Spanish flag after being hoisted, was left in charge of a petty chief. On the island of Tomen, some ruins are met with. They consist of double walled square enclosures built up of basaltic stones. The outer wall is 8 feet high by 16 inches thick. It is as strong and as solid as ever, and can easily be turned into a fort. On leaving Ascension, the Spanish mission proceeded to the Pinguelap group, where the German flag had been formerly hoisted. Four closely adjoining islands form the group. About fifty inhabitants dwelt there. The sandy soil supported abundance of coconut trees. On the hoisting of the Spanish flag, the islanders tendered their submission. The natives are industrious after a fashion, by making hats and other articles of pandanus leaves. Their civilisation has reached the same height as on Ascension. The chief of Lela, the easternmost of the Caroline islands, signed a treaty, and agreed to hoist the Spanish flag. An American widow resides in Lela, where she carries on trade. She is the only foreigner settled there. The islanders are civilised, owing to missionary effort. The island is fertile and beautiful. The schools there supply masters for those in the Gilbert and Marshall Groups. The man-of-war after visiting also the Uluti Group, returned to her starting point.

TEA ROLLING.—We hear very good accounts of Messrs. Richardson & Kinmond's roller: the large quantity rolled with a moderate power to drive, seems to be the great recommendation.

NETHERLANDS INDIAN HORTICULTURAL SOCIETY.—The "Ind.-Mercuur" hears that preparations are being made to create under the superintendence of Mr. E. J. Voute of Zeist an establishment to foster agricultural interests in India and in Holland by way of mutual interchange of plants, &c. Accordingly a proof station (probably in the district of Mistengorg) will be founded in connection with the existing establishment of Mr. Voute at Zeist (Holland). The first effort to establish a horticultural garden in India deserves general encouragement and support. The Indian Establishment has in view to experiment with artificial manure, and the results of the same will be published.

PURIFICATION OF DRINKING WATER.

EDWIN J. HOWE, M. D.

The average healthy adult man takes into his system four and a half pounds of water daily, and with it too often a dangerous quantity of foreign matter and disease-producing germs. In very many homes during the summer months, water that otherwise would nauseate the drinker, is made cold by ice, and then is hastily swallowed, the coldness masking its offensiveness. Unfortunately for the health of the consumer, the addition of ice does not render the impurities in water innocuous, but often adds to it its own contribution of disease-germs. Those who have studied the subject are aware that impure drinking water is the cause of many of the most common diseases. No subject then is of greater importance to the public than how to purify our drinking water. Water, if drawn through lead and tin pipes, often becomes, contaminated with these metals to a dangerous extent. Where water remains in a lead pipe for twenty-four hours, and is then drawn off and drank, there is always danger of lead poisoning. It is always safer to let the water run for several minutes before using any for drinking purposes. Boiling the water destroys some germs, but does not remove impurities in solution. Analyses of water from city wells have frequently shown it to be so impure as to be utterly unfit for drinking purposes, and dangerous to health. The use of rain water caught in cisterns, with suitable precautions, will obviate most dangers from the present supplies of many cities, but unfortunately, few persons can take these "suitable precautions." A clean roof to collect the rain, clean pipe to transport, and a clean, well ventilated cistern to receive it, are essential. Water stored in a close cistern soon becomes unfit for use. Many waters that appear clear are full of impurities, and dangerous to health. Dr. Ezra Hunt says: There are many waters used for drinking, which, if kept a few days in a long glass tube, half full and corked, will, on opening, emit much odour from the change in the suspended or dissolved ingredients they contain." The large majority of people in cities must depend for water on the public supply, hence it is of the utmost importance to the public health that the purest water attainable be secured; this, unfortunately, is often very impure. The only safe-guard to the consumer is in giving his personal attention to the filtration of the water used in his household. Water slowly percolated through crushed vegetable charcoal will escape from it not only cleansed of particles held in suspension, but also of organic and other matter. The cheepness of charcoal is such that is obtainable by all classes, and when soiled, a fresh quantity can be substituted at trifling cost. The most effective filtration is obtained by placing crushed charcoal in an earthen vessel, so arranged as to compel the slow passage of the water through it, as all efforts at rapid filtration have proved inefficient. Only wooden spigots should be used in drawing of the water. A reservoir for the filtered water with a separate ice chamber, will permit the water to be sufficiently chilled and keep all ice impurities out. Such a contrivance requires but very little room, is easily cleaned, the coal renewed, and is efficient in freeing water from impurities.—*Indian Gardener.*

AMOUNT OF FAT IN FISH GUANO.

BY JOHN HUGHES, F. C. S., F. I. C.

Of late years finely ground dried fish, commonly known under the name of fish guano, has been extensively used as a separate manure, with very satisfactory results. On naturally poor sandy soils, as well as on the light chalk soils of Kent and Sussex, it makes a capital manure for potatoes, especially when used in conjunction with superphosphate and kainit salts. That fish should form a valuable fertiliser is not at all singular; indeed, its agricultural value has long been recognised by the farmers of the sea coast in all countries, but the peculiarly offensive character of decomposing fish has hitherto prevented its extensive use, and it is only of recent years, since attention has been directed to the removal of the greater portion of the natural moisture and the subsequent grinding into a fine powder that the article has become of commercial value.

The name of fish guano seems appropriate, inasmuch as there can be little doubt that fish was the original source of Peruvian guano, the latter consisting in fact of the dung of sea-fowl, whose only food was fish. In the one case we have the natural dried fish, and in the other we have the same material which, under a process of slow decomposition in vast heaps under the influence of a hot rainless climate, has been converted into the strong-smelling ammoniacal guano of Peru and Chili now, alas! becoming only too scarce.

It is well, however, to bear in mind that there are differences in the agricultural value of the new guano as there was and still exists in the cargoes of the old, and that not only do the proportions of phosphates and ammonia vary considerably in quantity, but that the rapidity with which these constituents can be rendered available as plant food is also likely to vary according to the special character of the prepared fish, and more particularly in relation to its freedom from fatty or oily matter. Fat, as we all know, is a great preservative o animal and vegetable substanc s, and therefore any large quantity of fat or oil is prejudicial to the natural decomposition of fish manure when applied to the soil, and it will be desirable to encourage the manufacturer to press out or extract by chemical means as much oil as possible.

It must be remembered that fat has no agricultural value in a manurial sense, and that its presence in close association with an organic material rich in nitrogen and phosphates tends very materially to retard the natural process of conversion of these ingredients into plant food.

With a view of showing clearly to what extent the proportion of oil varies in different samples of fish guano, some dozen specimens representing the average qualities prepared by different firms were carefully tested for the amount of oil or fat contained, and the results, with the relative amounts of nitrogen and phosphate of lime present in each, are set forth in the following table:—

Sample.	Oil.	Nitrogen	Equal to Ammonia.	Phosphate of Lime.
1	5·80	7·26	8·81	15·98
2	6·93	7·68	9·82	19·54
3	6·96	8·90	10·80	16·94
4	7·30	6·94	8·43	16·46
5	8·33	8·71	10·57	19·54
6	8·90	8·54	10·37	18·88
7	8·36	8·68	10·54	15·94
8	7·96	8·71	10·57	20·63
9	8·93	8·69	10·55	18·99
10	10·10	8·66	10·51	17·79
11	12·56	8·48	10·30	15·06
12	17·06	9·45	11·47	9·14

It will be seen that the oil varies from 5·80 in one sample to 17·06 in another, and that the specimens which show from 6 to 9 per cent, of oil are those which are the richest in nitrogen and phosphates combined.

In order, therefore, to keep down the proportion of oil in commercial samples, it is suggested that the amount of this constituent should be stated in the analysis in addition to the other items, and if this be asked for by buyers, the manufacturer will, no doubt, soon find means to reduce the fat in the best make of fish guano.—Analytical Laboratory, 79, Mark Lane, E.C. —*Agricultural Gazette.*

CULTIVATION OF CAOUTCHOUC-YIELDING PLANTS.

BY THOMAS T. F. BRUCE WARREN.

Looking at the increasing commercial importance of india-rubber, and the few fresh sources of supply which have been added to augment our stock of this substance, we are forced to admit that the activity of our experts have not been marked with that success which a manufacturer can wish for.

Caoutchouc is much more widely diffused in the vegetable kingdom than many are aware of. An idea exists that any plant which yields a lactescent juice contains caoutchouc. There is an error in such a proposition being too generally accepted, because of the disappointment which follows an unfavourable report; still, it would be very unwise to assume that any plant yielding a lactescent juice is unworthy of a careful examination for caoutchouc. There seems to me a great want of a reliable method for examining the juices of plants for caoutchouc. It cannot be too forcibly impressed upon those who are interested in this matter, that the recently-drawn sap of a plant should be examined, if possible; even experienced people consider that caoutchouc is too permanent in its character to alter. When caoutchouc is isolated from resins, oils, and similar principles, it may be kept for a long time, but it would be quite another matter if these were left together for some time. The elaboration of certain principles, or secretions, by *living* plants, points conclusively to an idiosyncrasy in plant life which we ought not to ignore. We know that vitality interferes with chemical affinity, by preventing changes due to mere chemical action.

A few years ago my attention was directed to the curious changes which took place in the medicinal activity of certain plants under cultivation, as compared with the same plant growing as it were on its own natural soil. Chemical analysis of the soil and plant revealed the fact that nitrogenous matter was wanting. The mineral ash of a plant gives a fair idea of what is required in the soil so as to be favourable for its growth, but we must look to the sap of the living plant to know how far climate and other meteorological surroundings are suitable for a healthy and vigorous growth. An abnormal development of any part of a plant must be avoided if we wish to maintain its original integrity.

Warm climates are more favourable to the production of milky juices than cold climates. From this we may conclude that, in order to arrest rapid evaporation from the plant, which would of course involve exhaustion, certain principles are developed whose function is by its emulsive action to retain the water, or to impede its evaporation, we must not overlook the fact that excessive evaporation, *per se*, is injurious to a plant, but the cooling action due to rapid evaporation, has the same influence as transferring a plant to a cooler region.

In such cases, currents of dry air are productive of much mischief; moist air has little or no effect on evaporation. When the cultivation of india-rubber plants was first mooted, the idea was to work on the plant yielding Para-rubber, and considering the state of our knowledge at that time, the error of judgment was pardonable, still it is by no means improbable that the effort to raise the Para-rubber yielding plant may be again attempted.

I have often been struck with Faraday's analysis of India-rubber juice, which was, I believe of Indian origin. The omission of ammonia, if present, could not have been passed over by such a careful observer. More recently, in examining india-rubber juices, I find that ammonia is by no means a constant ingredient in these juices. When a juice has been coagulated, the caoutchouc which separates out cannot be redissolved, but if ammonia be added previously, the caoutchouc remains blended in an emulsive form. If the juices become acid in anyway, the cautchouc separates out. The only juice I have examined which contains a large quantity of free ammonia is that obtained from the *Syphonia clastica*, grown in Para, and it would be extremely interesting to know whether, when the plant is raised elsewhere, this ammonia is present. The juice of the Masaranduba (Cow-tree), although as rich in caoutchouc as the *Syphonia elastica*, and quite as good as regards quality, is not only free from ammonia, but remained for some months quite fluid. This juice was also gathered at Para. A point of singular importance connected with the cultivation of the *Syphonia clastica*, is the fact of its juice being so rich in a nitrogen compound, when we know that the soil itself is neither manured nor supplied with nitrogen in any form, so far as we can tell. We are driven to the conclusion that the atmosphere contributes nitrogen to the plant.

This brings us to the consideration of the meteorological conditions under which the Para india-rubber plant grows, and will help us to explain why it is that this plant will not grow productive of caoutchouc, even when transplanted to the same parallel of latitude. During the evening, and greater part of the night, it is curious to note the vivid lightning which plays almost incessantly among the trees along the Para river; there is a decided absence of that violence which characterises a thunderstorm; in fact if rain sets in, it is almost invisible. Do these silent elective discharges in warm, damp air, assist in generating ammonia? If it is impossible to transplant the *Syphonia clastica* to a suitable climate, with the meteorological accompaniment as found at Para, we are certainly justified in trying an experiment by supplying it with ammonia in some form, so that under the influence of vegetation, it may approach the assimilative action of what nature supplies to the Para plant. I am comvinced that in some parts of our colonies, we may reasonably expect that rubber cultivation can be successfully carried out.

The Mangabeira (Mango-tree) and Masaranduba (Cow-tree), are worth experimenting on, as their cultivation do not require anything particularly special but what an ordinary grower can supply, of course a suitable climate being granted.

Analyses and general descriptions of the soils on which caoutchouc producing plants are grown, are indispensable, as from them any soil to which a plant may be transferred for cultivation, can be selected or made up so as to represent the natural soil on which it previously grew. This assistance would help to relieve an intending cultivator from the onus of delay in fruitless experimental trials and expense.

This would be a very simple matter, as our foreign Consuls would have no difficulty in procuring authentic samples of the soil and of the wood of the rubber plant raised on it.—*Journal of the Society of Arts.*

MOTHER-OF-PEARL FISHERIES IN THE RED SEA.

Consul Jago, of Jeddah, says that the mother-of-pearl fisheries extend the whole length of the Red Sea, from El Wedj on the North, to Aden on the South. The principal grounds are in the neighbourhood of Suakim, Massowah, and the Farsan Islands. About 300 boats are employed, the majority belonging to the Zobeid Bedouins, a tribe of Arabs inhabiting the coast line between Jeddah and Yambo. About fifty boats belong to Jeddah, and two or three to Confida, Cameran, and Loheiha. They are open, undecked boats of between eight and twenty tons burden, carrying a large lateen sail, manned by crews varying between five and twelve men, and each provided with a number of small canoes, which are imported specially from the coast of Malabar. There are two fishing seasons during the year, one of four months and one of eight months, during nearly the whole of which the boats keep the sea, the crews living on board, returning to their homes for short periods of two to four weeks. The crews, composed principally of black slaves, are paid by share of the produce of their fishing, the owner of the boat taking one-third, the remaining two-thirds being divided among the former, after deducting the cost of food consumed by them during the voyage, and which consists of dhourra, rice, and fish, with sometimes a little ghee and dates as a luxury. Fatal accidents are said to be unknown, and the men are remarkable for their strength and good health. They dive between the ages of ten and forty, and the practice is said to have no ill effects. The fishing takes place in the neighbourhood of reefs, the boat anchoring at a certain spot, whence the crew proceed

to fish in their canoes, in the vicinity. Operations are conducted only in calm weather, when the shell can be discovered by the eye at a depth varying between seven and fifteen fathoms. Of late years, to assist the eye, empty petroleum tins, with the ends knocked out, and a sheet of glass inserted in one end, have been used. The tin, with the glass end below, is submerged a little in the sea, and the discovery of the shell thereby facilitated. During the last ten years the find is said to have diminished ten to twenty per cent in quantity, owing to dearth of shells. The value of the total harvest is estimated at 120,000 to 170,000 dollars annually, the dollar varying in value between 3s. and 3s. 6d. The short season of four months, which used to average between 40,000 and 50,000 dollars, only realised in 1886, 25,000 dollars. Formerly, all the produce of the Red Sea was brought to Jeddah for sale and export, but recently, owing to fiscal and custom-house restrictions, only about one-fourth now goes there, the remainder going to Suakim and Massowah. Shells imported at Jeddah for sale are disposed of by public auction in heaps of about half a hundredweight each. As preliminary inspection is not allowed, the bidding is purely speculative, and bidders have to take account of dirt, corals excrescences, and inferior shells. Prior to exportation the shells are sometimes cleaned to remove the coral and dirt, and are then packed in barrels. Up to ten years ago all shells brought to Jeddah for sale were shipped by natives to Cairo to be sold there. Now, however, the bulk goes to Trieste, a small quantity to London, and a little to Havre; and a few of the finest and largest shells are purchased for exportation to Bethlehem, where they are engraved and sold to pilgrims. The Jeddah shell is considered in Europe inferior to that exported from Suakim and Massowah, owing, it is said in many instances, to the yellowish tint of the former, and the fact that many of the shells have a greenish tint round the edges. Some ascribe this to the excessive dampness of the climate of Jeddah. With regard to the origin of the shells, the following distinctions are made:—*Dah al ak-i* shells, found on the group of islands of this name, situated along she African side of the Red Sea; *Barr-adjem-i* shells, found along the same coast, north of the Khôr or inlet of Suakim; *Farsan* or *Yeman-i* shells, brought from the Farsan group of islands, on the Arabian side of the Red Sea; *Shebak-i* shells, from the banks between Confidah and Leet; *Sham-i* shells, from El Wedj down to Hassance Island on the Arabian side, and found in the neighbourhood of Kossaïr on the African side. Consul Jago says, in conclusion, that the *Sham-i* is the best, and the *Yeman-i* the most inferior quality.—*Journal of the Society of Arts.*

BRITISH NORTH BORNEO.

PROVINCE DENT, BUNDU.—Situated about 26 miles from the British Island of Labuan, the flourishing district of Bundu in Province Dent invites attention from its many peculiar and interesting characteristics. In no other part of British North Borneo have we met a community of descendents of Chinese, who whilst still wearing positive pig-tails have gradually abandoned the ancient teachings of Confucius and who now declare themselves to belong to native tribes. In some of their houses are still to be found altars, idols and pitcures of the Good and Evil Spirits which are peculiar to China. Most of them have discarded their Chinese names, and rejoice in Malay titles and names conferred on them and on former generations by the Sultan and chiefs of Brunei, and very few of them can speak any Chinese dialect. The chiefs were usually ennobled by the Sultan because they were the most wealthy and powerful cattle-thieves during this and the last centuries. In Great Britain the present bearers of titles in some of our highest aristocratic families are the descendents of the most notorious cattle-lifters on the Scotch Borders, and so history repeats itself in different countries. Whilst these descendents of a Chinese race were carrying on marauding pursuits, they were conscious that they had settled upon a fertile tract of country, and whilst they received empty titles of honor they had to pay heavy and irregular exactions to the Sultan of Brunei and to his chiefs, but still they held on with Chinese tenacity to their adopted country of Bundu. Besides, they were intermarried with Besayah, Dusun and Brunei tribes and their crops yielded remunerative returns. On the cession of Province Dent by the Sultan of Brunei to British North Borneo about eighteen months ago, the Bundu people, tried of the oppressions of Brunei rule, gladly welcomed the advent of the white man's administration and are new amongst the most royal of the population in the Province.—*British North Borneo Herald.*

KUS KUS TATTIES are made from a grass (*Andropogon maricatus*) which grows in abundance on sandy banks in Bengal, Upper India, the Coromandel Coast and Mysore, where it is commonly planted to divide fields. The roots when distilled with water yield a fragrant oil, which is used as a perfume. An infusion of the roots is also given as a febrifuge, and a powder in billious complaints. It is regarded as stimulant, diaphoretic, stomachic and refrigerant. The essence (or otto) is used as a tonic, and, finally, the grass itself when young affords good fodder.—*Madras Mail.*

SOLVENT POWERS OF EUCALYPTUS OIL.—The solvent power of eubalyptus oil on resins, etc., have been given in the following order:—Mastic, sandarac, elemi, xantorrhea, resin, benzoin, copal, amber, anime, shellac. cautchouc, and gutta-percha. The oil added to methylated spirit, in the propotion 10 ounces of the former to 1 gallon of the latter, is used to dissolve kauri resin, which will dissolve in this mixture without the aid of heat to the extent of 2 lb. out of every 2½ lb. used; the addition of a little colophony or Venice turpentine rendering the kauri resin completely soluble. It is also used to dissolve asphaltum for photograph varnish. In veterinary practice it is used in Australia as an embrocation for swellings, bruises, or stiff joints. In domestic practice it is employed for rehumatism. etc.—*Indiarubber and Guttapercha Journal.*

THE ORANGE OR CITRUS tribe of trees are somewhat delicate trees to transplant during the dry winter season peculiar to this colony. When once planted on well-drained porous soil they stand hardship in the way of neglect as well as, if not better than, any other tree, but care should be taken when transplanting. If a drying westerly wind is blowing defer planting out, and keep the trees well protected from it in some shed, but keep the roots moist. The best plan is to puddle them and then throw a big over them. If the young tree has only to be lifted from your own nursery bed to your own orchard, still this precaution of never allowing the just exhumed roots to be acted on by the wind or sun holds good, for nothing is more detrimental, and many trees and garden plants fail to grow simply owing to the omission of this precaution. All holes for the trees should be dug previously, or by a man in advance of the planter. Puddling is done by immersing the roots in a tub of liquid sludge of mud and water, so that every root gets a coating. This is a good plan to adopt with any trees, shrubs, or plants that have naked roots when taken up. The watercan should follow the planter immediately, indeed there should be several bucketfuls poured into the hole before putting in the tree and allowed to penetrate the soil; then when the tree is planted and the fine soil carefully pressed against the roots (not carelessly trodden so as to break off half of the small rootlets) one good watering should be given; afterwards rake back the dry soil on the top of the moist centre, drive three stakes in a triangular fashion round the tree, outside of the circle of roots, and from these stakes the strings to the stem of the tree not forgetting to put a piece of soft material to hinder friction of the bark by the strings. In a week's time remove the soil from round the stem so as to form a basin a few inches deep, pour in several buckets of water, and when this has disappeared rake back the soil again, or cover with a good mulch of dry grass or litter, but not of manure. Apply *no* manure at the time of transplanting any of the orange tribe, or most assuredly they will be killed.—*Queenslander.*

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's London Price Current, April 28th, 1887.)

FROM MALABAR COAST, COCHIN, CEYLON, MADRAS, &c.	QUALITY.	QUOTATIONS
BEES' WAX, White ...	Slightly softish to good hard bright ...	£6 a £7 5s
Yellow ...	Do. drossy & dark ditto...	£4 10s a £6
CINCHONA BARK—Crown	Renewed	1s a 2s 6d
	Medium to fine Quill ...	1s 4d a 2s
	Spoke shavings	6d a 1s 2d
	Branch	2d a 6d
,, Red	Renewed	8d a 2s
	Medium to good Quill ...	6d a 2s
	Spoke shavings	3d a 7d
	Branch	2d a 4d
	Twig	1d
CARDAMOMS Malabar	Clipped, bold, bright, fine	2s a 3s
and Ceylon	Middling, stalky & lean	8d a 1s 11d
Aleppee	Fair to fine plump clipped	1s 3d a 2s 3d
Tellicherry	Good to fine ...	1s 6d a 2s 2d
	Brownish ...	6d a 1s 3d
Mangalore	Good & fine, washed, bgt.	1s 4d a 3s 6d
Long Ceylon	Middling to good... ...	8d a 1s 4d
CINNAMON 1sts	Ord. to fine pale quill ...	7½d a 1s 5d
2nds	,, ,, ,, ,, ...	7d a 1s 2d
3rds	,, ,, ,, ,, ...	6½d a 11d
4ths	Woody and hard	6d a 9½d
Chips ...	Fair to fine plant... ...	2½d a 7d
COCOA, Ceylon	Bold to good bold ...	80s a 83s
...	Medium	72s a 74s
	Triage to ordinary ...	60s a 70s
COFFEE Ceylon Plantation	Bold to fine bold colory...	101s a 107s
	Middling to fine mid. ...	95s a 100s
	Low mid. and Low grown	90s a 93s
	Smalls	87s a 92s
Native	Good ordinary	84s a 87s
Liberian ...	Small to bold	65s a 80s
East Indian ...	Bold to fine bold... ...	101s a 112s
	Medium to fine	95s a 100s
	Small	85s a 91s
Native	Good to fine ordinary ...	84s a 87s
COIRROPE, Ceylon & Cochin	Mid. coarse to fine straight	£5 a £15
FIBRE, Brush ...	Ord. to fine long straight	£10 a £35
Stuffing ...	Coarse to fine	£8 a £17
COIR YARN, Ceylon ...	Ordinary to superior ...	£12 a £30
Cochin ...	Ordinary to fine	£11 a £32
Do	Roping fair to good ...	£10 a £13
COLOMBO ROOT, sifted ...	Middling wormy to fine...	10s a 28s
CROTON SEEDS, sifted ...	Fair to fine fresh... ...	10s a 20s
GINGER, Cochin, Cut	Good to fine bold... ...	80s a 5£ 10s
,,	Small and medium ...	47s a 56s 6d
Rough	Fair to fine bold	32s a 58s
...	Small	20s a 28s
GUM ARABIC, Madras ...	Dark to fine pale ...	25s a 110s
NUX VOMICA ...	Fair to fine bold fresh ...	7s a 11s
	Small ordinary and fair...	3s a 6s
MYRABOLANES Pale ...	Good to fine picked ...	6s a 8s 6d
	Common to middling ...	5s a 6s 3d
	Fair Coast...	5s 6d a 5s 9d
Pickings	Burnt and defective ...	3s 3d a 4s 6d
OIL, CINNAMON ...	Good to fine heavy ...	1s a 3s
CITRONELLE ...	Bright & good flavour ...	¾d a 1d
LEMON GRASS ...	,, ,, ,, ,, ...	1¾d a 2d
ORCHELLA WEED ...	Mid. to fine, not woody...	40s a 50s
PEPPER, Malabar blk. sifted	Fair to bold heavy	7⅜d a 7½d
Alleppee & Cochin ,,	,, good ,,	
Tellicherry, White ...	,, ,, ,, ...	10d a 2s 6d
PLUMBAGO Lump ...	Fair to fine bright bold...	9s a 14s 6d
	Middling to good small...	7s a 10s
Chips ...	Slight foul to fine bright	3s 9d a 10s
dust ...	Ordinary to fine bright ...	3s a 9s
RED WOOD	Fair and fine bold ...	£4 10s a £4 15s
SAPAN WOOD ...	Middling coated to good	£6 a £7
SANDAL WOOD, logs ...	Fair to good flavor ...	£20 a £41
Do. chips ...	Inferior to fine	£5 10s a £22
SENNA, Tinnevelli ...	Good to fine bold green...	8d a 1s
	Fair middling medium...	5d a 7d
	Common dark and small	2½d a 4½d
TURMERIC, Madras ...	Finger fair to fine bold	9s 6d a 10s
Do. ...	Mixed middling [bright	8s 6d a 9s
Do. ...	Bulbs whole	7s 6d a 8s 6d
Cochin ...	Do split	6s 3d a 7s
VANILLOES, Mauritius & Bourbon, 1sts	Fine crystalised 6 a 9inch	17s a 29s
2nds	Foxy & reddish 5 a 8 ,,	16s a 23s
3rds	Lean & dry to middling under 6 inches ...	10s a 16s
4th	Low, foxy, inferior and [pickings	4s a 8s

FROM BOMBAY AND ZANZIBAR.		
ALOES, Soccotrine and Hepatic...	Good and fine dry ...	£6 10s a £8 10s
	Common and good ...	75s a £7 10s
CHILLIES, Zanzibar ...	Good to fine bright ...	32s a 33s
	Ordinary and middling...	25s a 31s

FROM BOMBAY AND ZANZIBAR.	QUALITY	QUOTAITONS.
CLOVES, Zanzibar and Pemba, per lb.	Good and fine bright ...	11½d a 12d
	Common dull to fair ...	9½d a 11d
,, Stems...	,, fresh ...	2½d a 2½d
COCULUS INDICUS ...	Fair ...	9s
GALLS, Bussorah blue & Turkey ₱ cwt.	Fair to fine dark blue ...	57s a 62s
[cwt.	Good white and green...	45s a 53s
GUM AMMONIACUM per	Blocky to fine clean ...	15s a 34s
ANIMI, washed, ₱ cwt.	Picked fine pale in sorts,	£13 10/ a £14 10/
	part yellow and mixed	£10 a £12 10s
	Bean & Pea size ditto ...	£4 10s a £7
	amber and dark bold ...	£7 10s
scraped...	Medium & bold sorts ...	£5 a £8
ARABIC, E.I. & Aden ..	Sorts	90s a 115s
per cwt. Ghatti ...	Fair to fine pale ...	38s a 80s
Amrad cha	Good and fine pale ...	90s a £6 10s
	Reddish clean ...	34s a 68s
ASSAFŒTIDA, per cwt.	Clean fair to fine ...	35s a 40s
	Slightly stony and foul ...	25s a 30s
KINO, per cwt.	Fair to fine bright ...	40s a 44s
MYRRH, picked ,,	Fair to fine pale ...	£6 a £7 10s
Aden sorts	Middling to good ...	70s a 100s
OLIBANUM, drop per cwt. ,,	Fair to fine white ...	45s a 55s
	Reddish to middling ...	32s a 44s
pickings...	Middling to good pale ...	13s a 18s
siftings ...	Slightly foul to fine ...	11s a 13s 6d
INDIARUBBER Mozambique, red hard		2s 5d a 2s 6½d
per lb. Ball & sausage white softish		2s a 2s 3d
unripe root		10d a 1s 2½d
liver		1s 8d a 2s

FROM CALCUTTA AND CAPE OF GOOD HOPE.		
CASTOR OIL, 1sts per oz	Nearly water white ...	3½d a 4½d
2nds ,, ...	Fair and good pale ...	2½d a 3d
3rds ,, ...	Brown and brownish ...	2½d a 2½d
INDIARUBBER Assam, per lb.	Good to fine ...	2s a 2s 7d
	Common foul and mixed	8d a 1s 10d
Rangoon ...	Fair to good clean ...	1s 6d a 2s 6d
Madagascar	Good to fine pinky & white	2s 4d a 2s 6d
	Fair to good black ...	1s 11d a 2s 2d
SAFFLOWER ...	Good to fine pinky ...	£4 10s a £5 10s
	Middling to fair ...	£3 5s a £4 2s 6d
	Inferior and pickings ...	£1 a £1 10s
TAMARINDS ...	Mid. to fine *black* not stony	10s a 14s
	Stony and inferior ...	3s a 6s

FROM CAPE OF GOOD HOPE.		
ALOES, Cape, per cwt: ...	Fair dry to fine bright ...	24s a 29s
,, ...	Common & middling soft	8s a 22s
Natal ...	Fair to fine ...	25s a 30s
ARROWROOT Natal per lb.	Middling to fine ...	3½d a 3¾d

FROM CHINA, JAPAN & THE EASTERN ISLANDS.		
CAMPHOR, China, ₱ cwt.	Good, pure, & dry white	62s a 65s
Japan ...	,, pink	
GAMBIER, Cubes, cwt. ...	Ordinary to fine free ...	32s 6d a 33s
	Pressed ...	29s a 30s
Block [per lb.	Good ...	22s a 22 6d
GUTTA PERCHA, genuine	Fine clean Banj & Macas-	2s 4d a 3s 3d
Sumatra...	Barky to fair [sar	6d a 2s 3d
Reboiled...	Common to fine clean ...	1d a 1s 4d
White Borneo ...	Good to fine clean ...	11d a 1s 3d
	Inferior and barky ...	1d a 8d
NUTMEGS, large, per lb...	61's a 80's, garbled ...	2s 7d a 3s 9d
Medium ...	83's a 95's ...	2s 5d a 2s 7d
Small ...	100's a 160's ...	1s 5d a 2s 5d
MACE, per lb. ...	Pale reddish to pale ...	2s 2d a 3s
	Ordinary to red ...	1s 10d a 2s 1d
	Chips ...	1s 5d a 1s 6d
RHUBARB, Sun dried, per lb.	Good to fine sound ...	1s 6d a 3s
	Dark ordinary & middling	8d a 1s 4d
High dried ...	Good to fine	1s a 1s 3d
	Dark, rough & middling	3d a 9d
SAGO, Pearl, large, ₱ cwt.	Fair to fine ...	11s a 14s 6d
medium ...	,, ,, ,, ...	11s a 13s
small ...	,, ,, ,, ...	9s 6d a 11s
Flour [per lb.	Good pinky to white ...	8s a 9s 6d
TAPIOCA, Penang Flake	Fair to fine ...	2½d a 2¾d
Singapore ...	,, ,, ...	2½d a 2¾d
Flour ...	,, ,, ...	15s a 18s 6d
Pearl ...	Bullets, per cwt. ...	26s a 30s
	Medium ,, ...	21s a 22s
	Seed ,, ...	20s 6d a 22s